

T. C.
İSTANBUL ÜNİVERSİTESİ
SOSYAL BİLİMLER ENSTİTÜSÜ
İKTİSAT ANABİLİM DALI

DOKTORA TEZİ

**ARAB UPRISINGS: DEVELOPMENT PROSPECTS IN THE MENA
REGION:**

**VULNERABILITY TO POVERTY, POVERTY TRANSITION, ORDINAL
INEQUALITY OF INCOME DISTRIBUTION, AND INEQUALITY OF
OPPORTUNITY.**

SHLAIR ABDULKHALEQ ALZANGANEE

2520160022

TEZ DANIŞMANI
PROF. DR. HASAN VERGİL

İSTANBUL, 2022

ÖZ

ARAP AYAKLANMALARI MENA BÖLGESİNDE KALKINMA BEKLENTİLERİ: YOKSULLUK, YOKSULLUK GEÇİŞİ, GELİR DAĞILIMINDA OLASI EŞİTSİZLİK VE FIRSAT EŞİTSİZLİĞİ.

SHLAIR ABDULKHALEQ ALZANGANEE

Arap Ayaklanmaları, Orta Doğu ve Kuzey Afrika (MENA) ülkelerinin kaderlerinde dönüm noktası olarak dikkat çekmektedir. Öngörülemeyen Arap Ayaklanmaları protestolarının zinciri, Arap devletlerinin hükümetlerini ve uluslararası toplumu hazırlıksız yakaladı. Bölgedeki birkaç ülkenin tanık olduğu büyük ayaklanmalar, bazılarında siyasi geçişlere, bazılarında ise korkunç sosyopolitik yansımalara yol açtı. Bu demokrasi yanlısı halk hareketliliği, Orta Doğu ve Kuzey Afrika'daki (MENA) tarihin seyrini değiştiren bir dizi olayın habercisi olmuştur. Ayrıca bölgede uzun süreli bir sivil anlaşmazlık ve siyasi istikrarsızlık dönemini de hızlandırdı. Arap ayaklanmalarının patlak vermesinden hemen önce, bölgede uzun süredir devam eden otokratik hükümet modelleri nispeten istikrarlıydı. MENA bölgesinde toplumsal huzursuzluk patlak verdiğinde, bölge Arap Ayaklanmalarından önceki on yıl boyunca yüksek seviyelerde sosyal ve ekonomik kalkınmayı sürdürüyordu. Ancak Arap halklarının yaşam standartlarından memnuniyetsizliği artmaktaydı. Ekonomik kalkınmanın toplu göstergeleri, ekonomik bozulma, yaşam standartları ve sosyal ve ekonomik adalet ile halkın hoşnutsuzluğunu yakalayamadığı için kamu öfkesinin başlangıcı öngörülemezdi. Ayaklanmaların patlaması, MENA bölgesindeki halk protestolarının arkasındaki ana tetikleyiciler olarak gösterilen kapsayıcılık, gelir eşitsizliği, yoksulluğa karşı savunmasızlık ve yoksunluk gibi sosyal konulara dikkat çekti.

Ekonomik, politik ve kurumsal faktörlerin etkileşimi, Arap Dünyası'ndaki geçiş koşullarını ve buna bağlı olarak ortaya çıkan sosyo-ekonomik durumu şekillendirmiştir. Bu çalışma, Arap ayaklanmalarının ardından Arap bölgesinde yoksulluğa karşı savunmasızlık, gelir dağılımı eşitsizliği ve fırsat eşitsizliği gibi konuların gelişme yönlerine odaklanmaktadır. Arap ayaklanmalarının geçiş bağlamına uyan dinamik refah analizleri sağlamayı amaçlamaktadır. Ayrıca, geçiş analizleri yapmak için gerekli tablo verilerinin eksikliği ile başa çıkmak için uygun ve yenilikçi ampirik yaklaşımları dahil etmeyi amaçlamaktadır.

Arap ayaklanmalarının ardından gelişme beklentilerinin değerlendirilmesi, refahın ana göstergelerindeki değişim dinamiklerini gözlemlemeyi zorunlu kılmaktadır. Bu çalışmada kullanılan kesitsel veriler, bir grup Arap ülkesinde yürütülen hane halkı düzeyinde anket bilgileri tedarik eden Ekonomik Araştırma Formu mikro veri portalından türetilmiştir. Bu çalışmada kullanılan sıralı veriler World Value Survey veri portalından elde edilmiştir. Bu çalışmanın zaman dilimi, Arap ayaklanmalarının yoksulluğa karşı savunmasızlık oranları üzerindeki etkisini temsil etmek için seçilmiştir. Anket dönem yılları, her ülke için Arap ayaklanmasından önce ve sonra olarak seçilmiştir.

Arap bölgesine getirilen değişimin geçiş bağlamında, yoksulluk oranlarındaki değişiklikleri tek başına gözlemlemek yerine yoksulluğa karşı kırılganlık eğilimlerini gözlemlemek daha uygundur. Arap ülkeleri örneğinde kesitsel hane halkı düzeyinde veriler kullanılarak yoksulluğa karşı kırılganlık ölçümü sağlanmıştır. Çalışma, Arap ülkelerindeki nesnel büyüme kümelerine dayanan yanıltıcı ekonomik büyüme eğilimlerinin, insanların yaşam standartlarından memnuniyetsizlik seviyelerini tahmin etmede nasıl başarısız olduğunu gösterdi. Arap ayaklanmalarının Arap ayaklanmalarından önce ve sonra hane halkının refah seviyelerindeki etkiler, yoksulluğa karşı savunmasızlık oranlarındaki değişikliklerden ve

yoksulluğa giriş ve çıkış hareketlerini gösteren yoksulluk geçiş haritalarından çıkarılmıştır. Arap ayaklanmalarının ardından, yoksulluğa karşı kırılganlık ve yoksulluğa geçiş ile ilgili tahmini ölçümler, Arap nüfusunun kötüleşen refah seviyelerini yansıtıyordu. Arap nüfusunun büyük bir kısmı yoksulluğa karşı savunmasız olarak tanımlandı.

Sıralı veriler kullanılarak gelir eşitsizliğinin öznel ölçümleri sağlanmıştır. Olağan gelir eşitsizliği endeksi, Arap ayaklanmasından önce ve sonra Arap ülkeleri örneği bazında tahmin edilmiştir. Hem devrim öncesi hem de devrim sonrası dönemlerde, olağan eşitsizlik endeksi, Arap ülkelerinde geleneksel nesnel ölçümlerle bildirilen orta ila düşük seviyelere kıyasla daha yüksek gelir eşitsizliği seviyeleri bildirmiştir. Kendi finansal refahı ile ilgili kendi kendine bildirilen memnuniyet seviyelerine ilişkin görüş anketlerinin olağan verileri kullanıldığında, öznel gelir eşitsizliği ölçümleri, Arap ayaklanmalarından önceki yıllarda yüksek eşitsizlik seviyeleri bildirmiştir. Devrim sonrası dönemde olağan eşitsizlik endeksleri iyileştirilmemiştir.

Sosyal adalet, Arap ayaklanmasından önceki on yıl boyunca Arap ülkelerinde bildirilen orta ila düşük eşitsizlik oranlarına rağmen Arap dünyasının yaşadığı ayaklanmanın arkasındaki odak noktasıydı. MENA bölgesindeki fırsat eşitsizliğinin parametrik bir tahmini ortaya konulmuştur. Fırsat eşitsizliğinin parametrik endeksini tahmin etmek için kullanılan yaklaşım, fırsatları eşitlemek amacıyla Arap ayaklanmalarından sonra yürütülen politika reformlarının yansımalarını değerlendirmeye izin vermiştir. Sonuçlar, Arap ülkeleri örneklemimizdeki mevcut gelir dağılımının, ortalama gelir dağılımına kıyasla adil gelir dağılımından uzak olduğunu göstermektedir. Politika reformları, haksız fırsat eşitsizliğini azaltmada etkisiz kalmıştır. Eğitim için artan kamu harcamaları politikaları, Arap nüfusu vatandaşlarının bireysel çaba düzeylerini teşvik etmekte de başarısız olmuştur.

Anahtar Kelimeler: Yoksulluğa Karşı Kırılabilirlik, Yoksulluğa Geçiş, Sentetik Tablo Verileri, Sıradan Gelir Eşitsizliği, Öznel Refah Ölçütleri, Haksız Fırsat Eşitsizliği, Adil Olmayan Gini İndeksi, Fırsat Eşitliği Politikası.



ABSTRACT

ARAB UPRISINGS: DEVELOPMENT PROSPECTS IN THE MENA REGION: VULNERABILITY TO POVERTY, POVERTY TRANSITION, ORDINAL INEQUALITY OF INCOME DISTRIBUTION, AND INEQUALITY OF OPPORTUNITY.

SHLAIR ABDULKHALEQ ALZANGANEE

Arab Uprisings are remarked as the turning point in the destiny of the Middle East and North African (MENA) countries. The unpredictable chain of Arab Uprisings protests has caught governments of Arab states and the international community by surprise. The massive uprisings that a few countries in the region had witnessed led to political transitions in some, and dire sociopolitical repercussions in others. This pro-democracy popular mobility has ushered a series of events that turned the course of history in the Middle East and North Africa (MENA). It also precipitated a prolonged era of civil conflicts and political instability in the region. Right before the eruption of Arab uprisings, the long-standing autocratic models of governments in the region were relatively stable. When social unrest erupted in the MENA region, the region was sustaining high levels of social and economic development during the decade preceding the Arab uprisings. However, the Arab population's dissatisfaction with their standards of living was escalating. The onset of public anger was unpredictable as the aggregate indicators of economic development failed to capture the public discontent with economic deterioration, standards of living, and social and economic justice. The burst of uprisings raised attention to social issues like inclusion, income inequality, vulnerability to poverty, and

deprivation which were all cited as the main triggers behind the public protests in the MENA region.

The interaction of economic, political, and institutional factors has shaped the terms of transitions and the consequent socio-economic situation in the Arab World. The study focuses on development aspects like vulnerability to poverty, inequality of income distribution, and inequality of opportunity across the Arab region in the aftermath of Arab uprisings. It aims to provide dynamic measures of well-being that fits in with the transitional context of Arab uprisings. It is also intended to incorporate innovative empirical approaches that are accommodated to deal with the lack of panel data required for making transitional analyses.

Evaluating development prospects in the aftermath of Arab uprisings mandates observing the dynamics of changes in the main indicators of well-being. The cross-sectional data used in this study are derived from the Economic Research Form microdata portal that provides household-level surveys conducted in a bundle of Arab countries. The ordinal data used in this study are derived from the World Value Survey data portal. The timeframe of the study is selected to represent the effect of Arab uprisings on rates of vulnerability to poverty. The years of survey rounds are selected for each country before and after the Arab uprising.

Within the transitional context of the change brought to the Arab region, it is more convenient to observe trends of vulnerability to poverty rather than to observe the changes in poverty rates per se. A measure of vulnerability to poverty using cross-sectional household-level data in a sample of Arab countries was provided. The study demonstrated how misleading trends of economic growth built upon objective aggregates of growth in Arab countries failed to predict people's levels of dissatisfaction with their standards of living. Repercussions of Arab uprisings on levels of household welfare before and after Arab uprisings were inferred by changes in rates of vulnerability to poverty and by poverty transition maps that demonstrate

movement into and out of poverty. In the aftermath of the Arab uprisings, the estimated measures of vulnerability to poverty and poverty transitional estimates reflected deteriorating levels of well-being of the Arab population. Larger proportions of the Arab population were identified as vulnerable to poverty.

Subjective measures of income inequality using ordinal data were provided. The ordinal income inequality index was estimated for a sample of Arab countries before and after the Arab uprising. In both pre-revolution and post-revolution periods, the ordinal inequality index reported higher levels of income inequality in the Arab countries than the moderate to low levels reported by conventional objective measures. When ordinal data of the opinion surveys on self-reported levels of satisfaction with own financial well-being were used, subjective measures of income inequality reported high levels of inequality during the years before the Arab uprisings. Ordinal indices of inequality were not improved in the post-revolution period.

Social justice was a focal point behind the upheaval inflicted on the Arab world notwithstanding the moderate to low rates of inequality reported in the Arab countries during the decade before the Arab uprising. A parametric estimate of inequality of opportunity in the MENA region was provided. The approach employed to estimate the parametric index of inequality of opportunity allowed for evaluating repercussions of policy reforms conducted after Arab uprisings on the purpose of equalizing opportunities. The results indicate that the actual income distribution in our sample of Arab countries is far from fair income distribution compared to the distribution of the average income. The policy reforms were ineffective in reducing unfair inequality of opportunity. Policies of increased public spending on education also failed to promote the levels of individual effort exerted by the citizens of the Arab population.

Keywords: Vulnerability to Poverty, Poverty Transition, Synthetic Panel Data, Ordinal Income Inequality, Subjective Measures of Well-being, Unfair Inequality of Opportunity, Unfair Gini Index, Opportunity-equalizing Policy.



ÖNSÖZ

Doktora programındaki uzun yolculuğum boyunca bana destek olan herkese derin şükranlarımı sunuyorum.

Öncelikle programım boyunca sürekli destek ve hoşgörü gösteren gözetmenim Prof. Dr. Hasan Vergil'e tüm kalbimle teşekkür ediyorum. Bu başarının büyük bir parçası olduğu için ona teşekkür ediyorum. Programımda ilk günden beri sınırsız sabırlı ve destekleyici olduğu için ona derin bir şükran borçluyum. Onun akademik desteği ve değerli bilgi akışı olmasaydı devam etme ısrarına sahip olamazdım. Tezin uzun sürecinin zor zamanlarında yanımda olduğu için ona ne kadar teşekkür etsem azdır.

Ayrıca bizi çok uzun süre ayrı tutan uzak coğrafi mesafeye rağmen sabırlı ve destekleyici oldukları için ailemin üyelerine de teşekkür ediyorum. Yaşadığı zor zamanlara rağmen her zaman yanımda olan babam, yaşadığım zor zamanlarda her zaman yanımda olan annem. Bu başarının büyük bir kısmını onlara borçluyum. Onların desteği olmadan devam edemezdim.

Başarımın bir parçası olduğu için İstanbul şehrinin cazibesine, nefes kesen güzel manzaralarına, Boğaza, Marmara denizine, müzelere, İstanbul camilerinin mistik ruhuna, İstanbul Üniversitesi'nin kadim binalarının büyüleyici ruhuna, Sahaflar çarşısına, sahildeki martılara, İstanbul'un başıboş kedi ve köpeklerine, tarihin güzellikleriyle çevrili olarak çalıştığım her halka açık kadim kütüphaneye ve tezime hazırlanmak için dizüstü bilgisayarında saatlerimi harcadığım her kahvehaneye teşekkür ederim.

Komite üyelerine de hoşgörüleri ve değerli yorumları için teşekkür ediyorum. Bu süreçte ne zaman duracak olsam, ne kadar uzak olsa dahi bunun her zaman bir başlangıç olacağına beni inandırdıkları için onlara teşekkür ediyorum.

Shlair Abdulkhaleq Alzanganee

İstanbul, 2022

ACKNOWLEDGMENT

I would like to express my deep gratitude to all who supported me during my long journey in the PhD program.

First, I would like to thank from all my heart my supervisor, Prof. Dr. Hasan Vergil, for his constant support and tolerance during my program. I do thank him for being a major part of this success. I owe him a deep gratitude for being unlimitedly patient and supportive since day one in my program. I would not have had the persistence to continue without his academic support and valuable feedback. I cannot thank him enough for being there for me during the hard times of the long process of the dissertation.

I also thank my family members for being patient and supportive despite the far geographical distance that kept us apart for too long. My father, who was always there to support me despite the hard time that he was going through. My mother, who was always there for me in the hard times that I have been through. I owe them a major part of this success. I would not have been able to go on without their support.

I thank the charm of Istanbul city for being part of my success, the breathtaking beautiful sights, the Bosphorus strait, the Marmara sea, the museums, the mystic spirit of Istanbul mosques, the mesmerizing spirit of the ancient buildings of Istanbul University, the Sahaflar çarşısı, the seagulls at the seashore, Istanbul's stray cats and dogs, every public ancient library in which I studied surrounded with the beauty of history, and every coffeeshop in which I spent hours on my laptop preparing for my dissertation.

I also thank the committee members for their tolerance and valuable comments. I thank them for making me believe that whenever I would stop during this process, even if it was so far, that it will always be the beginning.

Shlair Abdulkhaleq Alzanganee

Istanbul, 2022

TABLE OF CONTENTS

ÖZ	ii
ABSTRACT	vi
ÖNSÖZ	x
ACKNOWLEDGMENT	xi
LIST OF FIGURES	xv
LIST OF TABLES	ii
LIST OF ABBREVIATIONS	iii
INTRODUCTION	1
CHAPTER ONE	
MEASURING VULNERABILITY TO POVERTY AND POVERTY TRANSITION, USING CROSS-SECTIONAL WELFARE SURVEY	
1.1 Introduction	8
1.2 Literature Review	13
1.2.1 The Concept of Vulnerability to Poverty	14
1.2.2 Measuring Vulnerability to Poverty	17
1.2.3 Poverty Transition Analysis	24
1.2.3.1. Poverty Transition Analysis Using Synthetic Panel Data	26
1.3 Data and Methodology	30
1.3.1 Data.....	30
1.3.2 Methodology.....	35
1.3.2.1 Vulnerability to Poverty - Theoretical Framework.....	35
1.3.2.2 Vulnerability to Poverty - Empirical Model	40
1.3.3 Poverty Transition Analysis Using Synthetic Panel Data	46
1.3.3.1 Poverty Transition Analysis - Theoretical Framework.....	46
1.3.3.2 Constructing Synthetic Panel Data - Empirical Approach	49
1.4 Discussion and Findings	58
1.4.1 Post-Arab Uprisings Poverty Profile in MENA.....	58
1.4.2 Interpreting and Using Vulnerability Estimates	69
1.4.3 Egypt.....	71
1.4.3.1 Post-Revolution Profile of Vulnerability to Poverty in Egypt.....	79
1.4.3.2 Poverty Transition Matrices in Egypt 2008, 2012, 2015	82
1.4.4 Tunisia	86

1.4.4.1 Post-Revolution Profile of Vulnerability to Poverty in Tunisia	91
1.4.4.2 Poverty Transition Matrix in Tunisia 2008, 2012	93
1.4.5 Iraq	96
1.4.5.1 Post-Revolution Profile of Vulnerability to Poverty in Iraq	100
1.4.5.2 Poverty Transition Matrix in Iraq 2008, 2012	102
1.4.6 Jordan	104
1.4.6.1 Post-Revolution Profile of Vulnerability to Poverty in Jordan	110
1.4.6.2 Poverty Transition Matrices in Jordan 2008, 2012, 2015	113
1.5 Results	117

CHAPTER 2

INEQUALITY OF INCOME DISTRIBUTION IN MENA: MEASURES OF SUBJECTIVE WELL-BEING USING ORDINAL DATA

2.1 Introduction	122
2.2 Literature Review	127
2.3 Data and Methodology	134
2.3.1 Data	134
2.3.2 Methodology	135
2.3.2.1 Measuring Ordinal Inequality of Income Distribution – Theoretical Framework	135
2.4 Discussion and Findings	144
2.4.1 Ordinal Income Inequality Index	144
2.4.1.1 Egypt	146
2.4.1.2 Iraq	149
2.4.1.3 Jordan	152
2.4.1.4 Algeria	154
2.4.1.5 Tunisia	156
2.4.1.6 Lebanon	158
2.4.2 Link Between Subjective and Aggregate Measures of Inequality	160
2.4.2.1 Subjective Measures of Economic Inequality Relative to Gini Index	165
2.5 Results	168

CHAPTER 3

AN EX-POST MEASURES OF INEQUALITY OF OPPORTUNITY – EVALUATING REFORMS IN PUBLIC EXPENDITURE POLICY AFTER ARAB UPRISINGS

3.1 Introduction	172
3.2 Literature Review	176
3.3 Data and Methodology	182
3.3.1 Data	182
3.3.2 Methodology	185
3.3.2.1 Theoretical Framework	185
3.4 Discussion and Findings	193
3.4.1 Egypt	193
3.4.1.1 National Level Analysis	195

3.4.1.2	The Unfair Gini Index Versus the Standard Gini Index	198
3.4.1.3	Regional Level Analysis and Oaxaca Decomposition	199
3.4.2	Tunisia.....	203
3.4.2.1	National Level Analysis.....	205
3.4.2.2	The Unfair Gini Index Versus the Standard Gini Index	207
3.4.2.3	Regional Level Analysis and Oaxaca Decomposition	208
3.4.3	Jordan	212
3.4.3.1	National Level Analysis.....	213
3.4.3.2	The Unfair Gini Index Versus the Standard Gini Index	215
3.4.3.3	Regional Level Analysis and Oaxaca Decomposition.....	216
3.4.4	Palestine	219
3.4.4.1	National Level Analysis.....	220
3.4.4.2	The Unfair Gini Index Versus the Standard Gini Index	221
3.4.4.3	Regional Level Analysis and Oaxaca Decomposition.....	222
3.5	Results	225
CONCLUSION		229
REFERENCES.....		236

LIST OF FIGURES

Figure 1-Headcount Poverty Ratio – Arab Countries – Poverty Line (2011, PPP).....	58
Figure 2-Rise in Egypt’s Poor Population (2000-2018)	64
Figure 3-Poverty in Egypt - % Under US \$5.50 Per Day	66
Figure 4 - Tunisia 2010 Poverty and Extreme Poverty Rates by Region	67
Figure 5-Aggregate Poverty and Vulnerability Profiles – Egypt 2008, 2012, 2015	80
Figure 6 - Distributions Graphs for the Residuals: Egypt 2008, 2012, 2015	83
Figure 7 - Aggregate Poverty and Vulnerability Profiles, - Tunisia 2008, 2012	92
Figure 8 - Distributions Graphs for the Residuals: Tunisia 2008 and 2012	94
Figure 9 - Aggregate Poverty and Vulnerability Profiles, - Iraq 2008, 2012.....	101
Figure 10 - Distributions Graphs for the Residuals: Iraq 2008 and 2012	103
Figure 11 - Aggregate Poverty and Vulnerability Profiles, - Jordan 2008, 2012, 2015.....	111
Figure 12 - Distributions Graphs for the Residuals: Jordan 2008, 2012 and 2015.....	114
Figure 13 - WVS – Response Distribution – Egypt.....	148
Figure 14 – WVS – Response Distribution – Iraq.....	150
Figure 15 – WVS – Response Distribution – Jordan.....	153
Figure 16 – WVS – Response Distribution – Algeria.....	155
Figure 17 – WVS – Response Distribution – Tunisia	157
Figure 18– WVS – Response Distribution – Lebanon	159

LIST OF TABLES

Table 1 - Aggregate Poverty and Vulnerability Profiles, - Egypt 2008, 2012, 2015.....	72
Table 2 - Poverty and Vulnerability within Different Segments: by Geographical Location - Egypt 2008, 2012, 2015	77
Table 3 - Poverty Transition Matrix from Synthetic Panel Data - Egypt 2008, 2012	84
Table 4 - Poverty Transition Matrix from Synthetic Panel Data - Egypt 2012, 2015	85
Table 5 - Aggregate Poverty and Vulnerability Profiles, - Tunisia 2008, 2012.....	87
Table 6 - Poverty and Vulnerability within Different Segments: by Geographical Location - Tunisia 2008, 2012	89
Table 7 - Poverty Transition Matrix from Synthetic Panel Data - Tunisia 2008, 2012...	95
Table 8 - Aggregate Poverty and Vulnerability Profiles, - Iraq 2008, 2012	96
Table 9 - Poverty and Vulnerability within Different Segments: by Geographical Location - Iraq 2008, 2012.....	99
Table 10 - Poverty Transition Matrix from Synthetic Panel Data - Iraq 2008, 2012	104
Table 11 - Aggregate Poverty and Vulnerability Profiles, - Jordan 2008, 2012, 2015...	105
Table 12- Poverty and Vulnerability within Different Segments: by Geographical Location - Jordan 2008, 2012, 2015	110
Table 13 - Poverty Transition Matrix from Synthetic Panel Data - Jordan 2008, 2012	115
Table 14 - Poverty Transition Matrix from Synthetic Panel Data - Jordan 2012, 2015	116
Table 15 - Inequality Index with Upward-looking and Downward-looking Status – 2009, 2014, 2017.....	145
Table 16 - Ordinal Measures of Inequality Versus Calculated Gini Index	167
Table 17 - Net Effort Equation - National Level – Egypt 2009, 2012, 2015.....	196
Table 18 - The Unfair Gini Index – Egypt 2009, 2012, and 2015	199
Table 19 - Oaxaca Decomposition for Income Differences into Effort and Circumstances Factors – Egypt 2015	201
Table 20 - Net Effort Equation - National Level – Tunisia 2009, 2012	205
Table 21 - The unfair Gini Index – Tunisia 2009 and 2012	208
Table 22 - Oaxaca Decomposition for Income Differences into Effort and Circumstances Factors – Tunisia 2012.....	210
Table 23 - Net Effort Equation - National Level – Jordan 2009, 2012.....	213
Table 24 - The unfair Gini Index – Jordan 2009 and 2012	215
Table 25 - Oaxaca Decomposition for Income Differences into Effort and Circumstances Factors – Jordan 2012	217
Table 26 - Net Effort Equation - National Level – Palestine 2009, 2012.....	220
Table 27 - The unfair Gini Index – Palestine 2009 and 2012.....	222
Table 28 - Oaxaca Decomposition for Income Differences into Effort and Circumstances Factors – Palestine 2012	223

LIST OF ABBREVIATIONS

GDP	Gross Domestic Product
MENA	Middle East and North Africa
WVS	World Value Survey
LASSO	Least Absolute Shrinkage and Selection Operator
PMM	Predictive Mean Matching
CRRA	Constant Relative Risk Aversion
HIECS	Household Income, Expenditure, and Consumption Survey
IHSES	Iraq Household Socio-Economic Survey
HEIS	Household Expenditure and Income Survey
EBCNV	National survey on the household budget, consumption, and standards of living
OLS	Ordinary Least Squares
FGLS	Feasible Generalized Least Squares
MPI	Multidimensional Poverty Index
IMF	International Monetary Fund

INTRODUCTION

The unpredictable chain of Arab Uprisings protests denoted as Arab Spring in the Media, has caught governments of Arab states and the international community by surprise. This pro-democracy popular mobility has ushered a series of events that turned the course of history in the Middle East and North Africa (MENA). It also precipitated a prolonged era of civil conflicts and political instability in the region. Right before the eruption of Arab uprisings, the long-standing autocratic models of governments in the region were relatively stable. Except for Yemen and Iraq, Arab states scored relatively high ratings of political stability (Ianchovichina, 2018). During the decade that preceded Arab uprisings, the favorable rates of development indicators that prevailed in the other Arab countries of MENA reflected a satisfying performance of the autocratic governments in delivering economic growth, prosperity, and human development to the Arab population.

Rates of economic growth of MENA countries as a whole have outperformed those of Central Asia, the Caribbean, Latin America, and Eastern Europe as a whole in the five years before the Arab uprisings (Ianchovichina, 2018). Average growth rates of annual gross domestic product (GDP) were around 6% in all of Egypt, Syria, and Jordan, around 5% in Morocco, and 4.5% in Tunisia. The growth rate of annual per capita GDP in MENA countries as a whole was around 3%. Except for Yemen, the incidence of absolute poverty was very low and rates of poverty were declining in all of the other Arab states. Some MENA countries have achieved progress in fulfilling development projects relevant to the World Bank's Millennium Development Goals, and some have achieved these goals in terms of poverty eradication and access to infrastructure projects and necessities like health care, education, water supply and sanitation (Iqbal and Kiendrebeogo 2016). The Gini coefficient index shows a constant rate of inequality of expenditure in most MENA countries and declining rates in some. In Egypt and

some other countries, inequality of opportunities was moderate according to international standards and was declining in some countries (Hassine, 2012) and (Assaad et al., 2016).

Conventional measures of well-being and development aggregates reflected a good image of the situation in the MENA region before the Arab uprisings. It looked like the entire population was equally reaping the fruits of the achieved economic development. But if it was the case, why had Arab uprisings happened particularly at that time when things appeared cool and sound? Yet if things were that cool, why would millions of Arab populations take the streets in the hugest protests in Arab history by late 2010 raising their voice for their dissatisfaction with the deteriorating standards of living and indecent quality of public services, and demanding improved economic conditions, social justice, economic justice, and equality of opportunity.

The Arab uprising launched a period of a series of violent incidence and political instability that prolonged to a decade later. In all of Tunisia, Egypt, Libya, and Yemen the uprisings led to the overthrow of autocracies that ruled for decades. In Syria, the regime survived, but the uprisings triggered a prolonged period of armed insurgencies, civil conflicts, and the formation of the Islamic State of Iraq and Syria.

The onset of public anger was unpredictable as the aggregate indicators of economic development failed to capture the public discontent with economic deterioration, standards of living, and social and economic justice. The burst of uprisings raised attention to social issues like inclusion, income inequality, vulnerability to poverty, and deprivation which were all cited as the main triggers behind the public protests in the MENA region (Hlasny and Verme 2016; Nimeh 2012; Ncube and Anyanwu 2012; Osborn, 2011). The interaction of economic, political, and institutional factors has shaped the terms of transitions and the consequent socio-economic situation in the Arab World. The study focuses on development aspects like vulnerability to

poverty, inequality of income distribution, and inequality of opportunity across the Arab region in the aftermath of Arab uprisings.

This study is intended to trace development prospects in the Arab world in the aftermath of the Arab uprising. It aims to provide dynamic measures of well-being that fits in with the transitional context of Arab uprisings. It is also intended to incorporate innovative empirical approaches that are accommodated to deal with the lack of panel data required for making transitional analyses.

Evaluating development prospects in the aftermath of Arab uprisings mandates observing the dynamics of changes in the main indicators of well-being. Studies on the repercussions of the Arab uprising included a wide range of studies on poverty levels. Yet, the phenomenon of vulnerability to poverty has never been analyzed in the literature on the prospects of development in the MENA region. Chapter 1 attempts to introduce the concept of vulnerability to poverty to the literature on economic development after the Arab uprising.

Within the transitional context of the change brought to the Arab region, it is more convenient to observe trends of vulnerability to poverty rather than to observe the changes in poverty rates per se. The dynamic nature of vulnerability to poverty as a phenomenon fits in within the transitional context of the analysis required to monitor development prospects after Arab uprisings. When depending only on per capita consumption in measuring the poverty line, measures of poverty do not capture the proportion of the middle-income population that would become below the poverty line in the future. Measures of vulnerability to poverty capture the risk of falling into poverty in the future, thus they are more of a dynamic nature than measures of poverty. To accommodate for the lack of panel data, the chapter attempts to apply an unconventional approach that allows for using cross-sectional data to measure levels of vulnerability. In the absence of panel data required for intra-generation poverty transition

analysis in Arab countries, the chapter also aims to generate a synthetic panel data set that could be used to monitor poverty transition using cross-sectional level survey data.

In the aftermath of the Arab uprisings, the estimated measures of vulnerability to poverty and poverty transitional estimates reflected deteriorating levels of well-being of the Arab population. Larger proportions of the Arab population were identified as vulnerable to poverty. Particularly in both Egypt and Tunisia, the two countries that first witnessed Arab uprisings protests then subsequent political transitions. Other Arab countries were also affected by the changes brought to the Arab region after the Arab uprisings. In some countries like Iraq and Jordan, levels of vulnerability to poverty were slightly reduced after the Arab uprisings, but a large proportion of vulnerable households became highly vulnerable to poverty with a higher likelihood of falling into poverty in the future.

Income inequality is identified as a fundamental reason for social and political unrest. Political instability by turn has negative repercussions on rates of investment and economic growth (Behzadan et al. 2017) (Ostry, Berg, and Tsangarides 2014; Burger, Ianchovichina, and Rijkers 2016). Popular anger against economic inequality has erupted in the Arab world despite the allegedly recorded increasing rates of economic growth and declining rates of income inequality. The puzzle is represented by the tolerance to inequality by the Arab population from a popular subjective view.

Inequality of income distribution and deprivation of basic facilities are cited among the fundamental causes of upheavals and deterioration of economic growth and human development. With the absence of empirical evidence of rising economic inequality in the economic literature, Chapter 2 uses new techniques for measuring economic inequality from a subjective perspective. It also shows the decline in subjective well-being when attempting to use ordinal data for measuring income inequality from a subjective perspective.

People's subjective perception of well-being is the main reason for frustration with life conditions. A subjective perspective of well-being may not be adequately captured by objective aggregate indicators used to gauge levels of inequality in the MENA region. Levels of income inequality in the Arab region could be higher than what is reported by objective indicators. The monetary quantification of changes in cardinal variables could be adequately reflected in objective indicators. However, such indicators do not reflect fundamental factors of subjective well-being like people's perception of their quality of life and people's aspiration for their future (Ianchovichina et al., 2015). Objective measures of inequality failed to capture the realities beyond people's dissatisfaction rates before the Arab uprisings, not alone levels of income inequality in the aftermath of the Arab uprising. As conventional tools for measuring income inequality reflected misleading trends, Chapter 2 follows unconventional methods for measuring income inequality in the Arab region depending on household-level ordinal data on people's perception of their well-being status. The chapter provides a set of income inequality indices upon evaluating individual status according to the individual position in data distribution.

In both pre-revolution and post-revolution periods, the ordinal inequality index reported higher levels of income inequality in the Arab countries than the moderate to low levels reported by conventional objective measures. When ordinal data of the opinion surveys on self-reported levels of satisfaction with own financial well-being were used, subjective measures of income inequality reported high levels of inequality during the years before the Arab uprisings. Ordinal indices of inequality were not improved in the post-revolution period.

Equality of opportunity has been a prominent demand of the protestors in the Arab world. Though it is cited among the fundamental socio-economic reasons behind Arab uprisings, the literature on the inequality of opportunity before and after the Arab uprising is

limited to qualitative descriptive analysis studies (Ansani and Danielle, 2012; Arampatzi et al., 2015; Ghanem, 2016). However, empirical analysis on the extent of inequality of opportunities in MENA countries does not exist in the literature on Arab uprisings, nor any policy evaluation for equalizing reforms undertaken after Arab uprisings. Notwithstanding that the standard Gini index did not score high in countries of the MENA region for the last decade, inequality of opportunity was still a fundamental demand of people during protests of the Arab Spring. This contradiction is attributed to the fact that conventional measures of inequality did not capture all aspects that indicators of unfair inequality consider. Chapter 3 provides a parametric estimate of inequality of opportunity in a sample of Arab countries before and after Arab uprisings. The approach employed to observe levels of inequality of opportunity allows for evaluating repercussions of policy reforms intended to equalize opportunities after Arab uprisings. Particularly educational policy reforms and increasing public spending on education that are intended to equalize opportunities in the educational sector. The chapter evaluates the indirect effect of policy reforms on wage-earning capacity through its direct impact on levels of individual effort. It gauges the extent by which the intended impact is achieved and whether policy reforms were equalizing and how they are supposed to be redesigned in case they were not equalizing. The analysis is conducted at two levels for each country. Alongside the national level that allows for making cross-country comparative analysis, regional level analysis allows for distinguishing the effect of the regional circumstances on the inequality of opportunity.

As an alternative to the standard Gini index of inequality, the unfair Gini index developed in this chapter to gauge the levels of inequality of opportunity in the Arab countries revealed high levels of inequality of opportunity. In the sample of Arab countries used in the chapter, the distribution of actual levels of income is far from fair income distribution. In both pre-revolution and post-revolution periods, redistribution of resources using equalizing policies was needed to achieve levels of fair income. Policy reforms of public spending on

education conducted in many Arab countries after the Arab uprisings demonstrated heterogeneity in the effect of educational policy reforms on levels of effort exerted by the citizens. Merely increasing public spending on education did not contribute to reducing wage differentials entailed by circumstances variables. These policy reforms were ineffective in reducing unfair inequality of opportunity. Policies of increased public spending on education also failed to promote the levels of individual effort exerted by the citizens of the Arab population.



CHAPTER ONE

MEASURING VULNERABILITY TO POVERTY AND POVERTY TRANSITION, USING CROSS-SECTIONAL WELFARE SURVEY

1.1 Introduction

Arab Uprisings are remarked as the turning point in the destiny of the Middle East and North African (MENA) countries. The massive uprisings that a few countries in the region had witnessed led to political transitions in some, and dire sociopolitical repercussions in others. Albeit the abundant agriculture, mineral, and energy resources that countries of the MENA region possess, the associated low rates of industry and development projects worsened the living conditions and exposed the population of many countries to poverty and food security crises. In 2007, the increasing prices and the shortages of food items were the reason for some riots in Yemen, Egypt, Syria, Lebanon, Jordan, and Morocco (Gelvin, 2013). Though many other factors were identified as causes of social unrest, scarcity and increasing prices of food items after the 2008 global financial crisis made a major contribution to the escalation of social rage (Ansani and Danielle, 2012). MENA countries depend highly on imports of food products. Inflation in the energy market and markets of staple food has eroded real wages and decreased the purchasing power for basic needs. The Gallup World Poll show increased dissatisfaction with the eroded levels of public services like infrastructure projects, housing, education, and health care service. The standards of living were not only worsened for the poor population, but also for the middle-class population by the end of the 2000s (Lagi et al., 2011).

Nowadays, more than ten years after the Arab uprisings, during which no significant progress has been achieved in the living conditions, vulnerability to poverty is becoming a fundamental structural threat to the Arab region (Khoury, 2019) (Abu-Ismail, 2020). Given the

current situation in the Arab region, these persisting conditions are putting more households in danger of falling into poverty for years to come. The reasons for the increased rates of poverty and vulnerability to poverty in the Arab region are aggravating since the Arab uprisings. High rates of population growth that exceed rates of economic growth raise the vulnerability of middle-income households (Abu-Ismaïl, 2020). Large-scale labor-absorbing projects are beyond the capacity of many Arab states' governments. They also outstrip the financial capabilities of the private sector. With the lack of job opportunities and large-scale projects in industrial, agricultural, and infrastructure sectors, vulnerable households become subject to chronic poverty. Once households fall into poverty, they may have to suffer and remain poor for generations to come (Khouri, 2019).

Poverty in the Arab states is attributed to the post-Arab uprisings' economic and political conditions that caused a decline in economic growth rates. Declining growth rates and the associated insufficient strategic planning of public policies caused differential in standards of living and individual levels of welfare. The consequent rising poverty rates caused dire social repercussions and increased rates of vulnerability to poverty.

Evaluating development prospects in the aftermath of Arab uprisings mandates observing the dynamics of changes in the main indicators of well-being. Within the transitional context of the change brought to the Arab region because of Arab uprisings, it is more convenient to observe trends of vulnerability to poverty rather than to observe the changes in poverty rates per se.

Studies of transitions mandate dynamic analysis that contradicts the static nature of poverty measures used in the literature. On an individual level, poverty cycles propagate further cycles of poverty in the future. Individuals who are identified as poor at a specific point in time are vulnerable to falling into chronic poverty. On the other hand, poor households could exit

poverty at some point in the future. Or else, households who are identified as non-poor at some specific point in time could enter poverty at a later point in time. The dynamic nature of vulnerability to poverty as a phenomenon fits in within the transitional context of the analysis required to monitor development prospects after Arab uprisings. Measures of vulnerability to poverty capture the risk of falling into poverty at some point in the future, thus they are more of a dynamic nature than measures of poverty. Meanwhile poverty is an ex-post, backward-looking indicator of well-being, vulnerability to poverty is an ex-ante, forward-looking measure of individual well-being. Therefore, the supremacy of vulnerability measures over poverty indicators lies in that they are more functional for designing anti-poverty policy interventions addressed for poverty prevention rather than poverty eradication (Chaudhuri, Jalan, and Suryahadi, 2002). When depending only on per capita consumption in measuring the poverty line, measures of poverty do not capture the proportion of the middle-income population that would become below the poverty line in the future.

Measures of poverty describe the status quo of the poor population now. However, between today and tomorrow, when a particular event takes place, households may enter into poverty. With the later quick pace of turmoil in the Arab region, what matter is vulnerability measures rather than poverty measures. Vulnerability measures identify individuals with the probability of entering into poverty in the next period. Using estimates of expected expenditure rather than estimates of income, vulnerability measures capture intertemporal changes in levels of households' well-being.

Among the main purposes of conducting vulnerability analyses, are the provision of policy recommendations for combating chronic poverty and poverty prevention. Poverty transition studies provide the basis for policies that are aimed at targeting households that are vulnerable to chronic poverty. Chronic poverty combating and poverty prevention policies

require the availability of panel data welfare surveys that are significantly rare in developing countries. The absence of panel data welfare surveys in developing countries necessitates the need for finding alternative sources of data depending on cross-sectional-level welfare surveys. Poverty transition analyses depending on multiple rounds of cross-sectional welfare surveys have been introduced to the literature on the poverty movement. As a replacement for non-existing panel data surveys, cross-sectional welfare surveys have been used to infer proxy measures of poverty transitions and indicators of chronic poverty (Dang et al., 2014, Cruces et al., 2015, Lucchetti, 2018, Bloch et al., 2021).

This chapter is intended to trace development prospects in the Arab world in the aftermath of the Arab uprisings. It aims to provide a dynamic measure of well-being that fits in with the transitional context of Arab uprisings. It is also intended to incorporate innovative empirical approaches that accommodate the lack of panel data required for making transitional analyses. The chapter makes the following three main contributions to the economic literature on Arab uprisings.

Studies on the repercussions of the Arab uprising included a wide range of studies on poverty levels. Yet, the phenomenon of vulnerability to poverty has never been analyzed in the literature on the prospects of development in the MENA region. The chapter attempts to introduce the concept of vulnerability to poverty to the literature on economic development after Arab uprisings. It employs the dynamic nature of vulnerability measures to evaluate the changes in levels of well-being brought by the Arab uprisings in a sample of Arab countries.

The dynamic nature of vulnerability analysis mandates the existence of panel data that do not exist for Arab countries. The chapter attempts to apply an unconventional approach that allows for using cross-sectional data in order to measure levels of vulnerability. For assessing changes in households' level of well-being before and after Arab uprisings, vulnerability is

measured in terms of the variation in the household's expected expenditure relative to an expenditure threshold measured at the poverty line. The expected expenditure is predicted by the household's characteristics that determine the household's current level of expenditure. The inclusion of the household's disposable income could also capture the effect of covariate shocks represented by the variation in disposable income.

In order to complete the picture, the analysis in the section on vulnerability should be validated by a poverty transition analysis. Upon measuring levels of vulnerability to poverty, the results are to be validated by using a poverty transition matrix. In the absence of panel data required for intra-generation poverty transition analysis in Arab countries, the chapter aims to generate a synthetic panel data set that could be used to monitor poverty transition using cross-sectional level survey data. The synthetic panel data set is predicted by estimating both future levels and past levels of household consumption expenditure. Estimation models are built upon a set of assumptions on the structural error that allows predicting both the lower bound and upper bound for the distribution of poverty transitions. The technique used to generate synthetic panel data in the literature was seen to be remarkably inspiring for the estimation of joint distributions and probabilities of poverty transition in multiple periods of time using cross-sectional data. The span of the synthetic panel can also be extended to other dimensions. It could be employed for welfare measures comparison analyses. It is also functional in the prediction of long-term poverty transition models as it is sufficiently robust to long-term intervals. The application of the suggested approach of using cross-sectional data is adequately functional in the absence of panel data in poverty transition analyses.

The results revealed deteriorating levels of well-being in the aftermath of Arab uprisings. Estimated measures of vulnerability to poverty and poverty transitional estimates reflected higher rates of vulnerability to poverty. In both Egypt and Tunisia, the political

transition brought by the Arab uprisings put larger proportions of poor households at vulnerability risk. Poverty eradication and welfare development policies were not priorities on the governments' policy agenda. Other countries that have never witnessed neither any protests of Arab uprisings nor any subsequent political transition were still inflected with political turmoil. Levels of vulnerability to poverty were not improved, but they were even worsened in the aftermath of Arab uprisings.

The next section summarizes the literature on concepts of vulnerability to poverty, measurements of vulnerability to poverty, and measurements of poverty transition using cross-sectional data. Section 3 describes the data and the methodology used in this chapter. It presents the theoretical frameworks and the empirical approaches used to measure the vulnerability of poverty and to predict synthetic panel data used to develop poverty transitional estimates. Section 4 provides the data analysis and discussion over measures of vulnerability to poverty and poverty transitional estimates in each Arab country included in this chapter. Section 5 summarizes the conclusions of the chapter.

1.2 Literature Review

Due to their dynamic characteristics, the following literature review presents the supremacy of using vulnerability measures for making transitional analyses over other static measures of well-being. The first subsection reviews how the concept of vulnerability to poverty is defined in the literature. It identifies the different perspectives from which the vulnerability phenomenon is perceived in the literature. The second subsection shows how these different perspectives are reflected in different theoretical and empirical frameworks introduced in the literature for studying the same phenomenon. Accordingly, the subsection reviews how each theoretical approach provides a different empirical framework for measuring vulnerability.

In order to complete the picture, the analysis in the section on vulnerability should be validated by a poverty transition analysis. The third subsection reviews the different theoretical and empirical frameworks used in poverty transition analyses that are based on panel data. Due to the lack of panel data necessary for making intra-generational comparisons, a subsection is also dedicated to reviewing the innovative frameworks used to re-engineer poverty transition analyses to adapt for the use of cross-sectional data that exists for Arab countries.

1.2.1 The Concept of Vulnerability to Poverty

The phenomenon of vulnerability could be described as a state of exposure to an adverse shock that endangers the status of an individual, a community, or an entire society. Undesirable shocks could be due to an internal weakness inherent to the individual or the community in question. They could also be due to an external condition that an individual or a community is not capable of dealing with. Within the context of poverty, individuals who are exposed to the risk of falling into poverty are considered vulnerable. Individuals become poor either due to some inherent characteristic that causes a drop in consumption, or due to an external condition that they are incapable of coping with.

There are many definitions for the concept of vulnerability to poverty in the literature. Alwang, Siegel, and Jorgensen (2001) define vulnerability as the propensity to experience a negative welfare shock that takes the household to a lower level of welfare which is below the minimum. Vulnerability is also defined by Glewwe and Hall (1998) in terms of exposure to a shock of a welfare loss rather than exposure to poverty per se. Chaudhuri, Jalan, and Suryahadi (2002) define vulnerability from a different perspective. As they attempt to employ the concept of vulnerability as a guide for developing poverty prevention policies, they define vulnerability as the ex-ante probability of risk that a currently non-poor household to enter into poverty or remain the below poverty line if currently poor (Chaudhuri, Jalan, and Suryahadi, 2002).

Other relevant concepts that overlap with the concept of vulnerability to poverty are also defined in the literature on poverty.

The concept of vulnerability to poverty is linked to the concept of multi-period poverty. Meanwhile, vulnerability to poverty estimates the risk of falling into poverty at a specific period of time in a forward-looking perspective, i.e. the risk is estimated one period ahead in time, multi-period poverty provides a measure of the effective incidence of poverty over time. It is a retrospective indicator of the vector of realized consumption over time. It is a summary indicator of the incidence of poverty experienced by an individual through her observed stream of consumption during a vector of time periods. The three measures of multi-period poverty are total poverty, chronic poverty, and transient poverty. Total multi-period poverty measure for an individual is the calculation of the stream of experienced consumption over the time dimension. Chronic poverty is the long-term incidence of poverty that persists over time. Transient poverty is a measure of a temporary case of the incidence of poverty during one period of time compared to the other periods in the vector of the time dimension.

Another concept that is also closely linked to the concept of vulnerability to poverty is the concept of expected poverty. It is an indicator of individual poverty that measures the expected value of all the plausible incidents of poverty that an individual could experience. It is calculated through a probability measure of expected poverty that could take above zero value when an individual is expected to fall into poverty.

It is also the case with the concept of the expectation of being poor. It describes a state of an expected value of consumption that falls below the threshold of consumption at the poverty line. This concept is also relevant to the concept of vulnerability to poverty. Nevertheless, it is not sufficient to identify individuals who are vulnerable to poverty. Calculating the expected value of consumption cannot be used as a criterion for the assessment

of well-being. Two random variables may hold the same expected value. Nevertheless, they may fall into different levels of dispersion, accordingly a totally different level of risk.

Another relevant concept that is used as a complementary to the concept of vulnerability to poverty is the concept of the exposure to risk. It includes the exposure to the risk of the inability to smooth consumption over a time vector and the exposure to a downside risk over time. The inability to smooth consumption is defined as the inability of an individual to sustain a particular level of expenditure over a period of time. The variability of consumption is conditional on the variability of the income stream over the same period of time. When the variability of consumption approaches the poverty line threshold of consumption, then individuals are considered exposed to poverty. Nevertheless, unlike the concept of vulnerability to poverty, the concept of inability to smooth consumption is an ex-post measure calculated using past historical information like realized levels of income and consumption. Moreover, though it is calculated over time, the reference point to which consumption is relatively measured is the permanent level of consumption.

The exposure to downside risk is the probability of experiencing a drop in the future level of consumption relative to the current realized level of consumption. When a drop in the level of consumption puts an individual below the consumption threshold at the poverty line, then the individual is considered vulnerable to poverty. The reference point to which consumption is relatively measured is the current level of consumption. Though it is a complementary concept to the concept of vulnerability to poverty, the concept of exposure to risk is incapable of identifying individuals who are vulnerable to poverty for two reasons. First, the wealthy and middle-class groups of the population that do not experience an incidence of poverty are also exposed to the inability of smoothing consumption. Second, poor individuals who are already

below the poverty line are considered exposed to downside risk within the context of this conception.

1.2.2 Measuring Vulnerability to Poverty

The concept of vulnerability to poverty has been at the center of the literature on poverty because it constitutes the basis for strategies of social protection. A broad spectrum of indicators was introduced to the economic literature on poverty for assessing vulnerability to poverty phenomena. The different perspectives for defining vulnerability phenomenon are reflected in different approaches for the models developed to measure vulnerability in the literature. Vulnerability to poverty is measured by the loss in the status quo level of individual welfare. Welfare is in turn measured by levels of realized consumption compared to a threshold of consumption at the poverty line. Changes in levels of individual well-being are the main concern of vulnerability studies. It could be measured at the household level, it could also be aggregated over the long-term with aggregated indicators.

In the case of poverty indicators, any measure of poverty should provide a solution for two problems identified by Sen (1976). First, a poverty measure should enable identifying the proportion of poor people in the population. Second, an index of the poverty level in the population is inferred from the ex-ante, already existing, information on the poor population. These two prerequisites are also relevant when assessing the vulnerability of the population to poverty. Many indices of vulnerability were established in the literature, yet only a few could identify individuals who are considered vulnerable. Other concepts were confused with the concept of vulnerability in the literature on poverty. Concepts such as expectations of being poor, expected poverty, multi-period poverty, and risk exposure are overlapping in the literature on poverty.

Hoddinott and Quisumbing (2003) measure vulnerability to poverty by assessing exposure to the risk of the inability to smooth consumption. Their main concern is the exposure to covariate shocks and idiosyncratic shocks and the associated risk of welfare loss represented by reductions in levels of consumption. An event that causes a reduction in the future consumption of only one individual, or only the members of an individual household, is considered an idiosyncratic shock. When such an event affects neighboring households, an entire community, or an entire society, then it is a covariate shock.

Hoddinott and Quisumbing (2003) link the components of the risk chain represented by the assets that produce income, the context in which a household exists including the exposure to exogenous shocks, and the activities that a household conducts in terms of generating income or averting risk. They provide an ex-post, backward-looking approach to assessing vulnerability which focuses on the impact of shocks on levels of welfare loss. Their approach differs from other ex-ante, forward-looking approaches to assessing vulnerability to poverty that depend on anticipating the loss in future consumption in order to provide an aggregated measure of vulnerability. Hoddinott and Quisumbing (2003) solved the data collection problem that appeared when matching household-level data with secondary data by supplementing the former with the latter.

The individual response to risk exposure or shock exposure requires household-level data derived from cross-sectional surveys on households' behavior. Taking only this level of data is inadequate in the sense that vulnerability should express well-being change from one point in time to another, i.e. intertemporal variability of indicators, and the associated behavioral change. Where single-period cross-sectional data is adequate to capture idiosyncratic household characteristics, it should be supplemented with historical time-series

data as intertemporal variability is essential to capture the impact of exposure to large covariate shocks.

Hoddinott and Quisumbing (2003) approach to assessing vulnerability to poverty is best measured using panel data that express the precise change over time in variables' mean values. It also outperforms retrospective studies by providing accurate data on events in the past. It is also suitable for fixed analysis as it allows controlling for the invariant characteristics of households.

Hoddinott and Quisumbing (2003) model is constructed as:

$$\Delta \ln c_{jtv} = \sum_{i=1}^{n1} \alpha_i S(i)_{tv} + \sum_{i=1}^{n2} \beta_i S(i)_{jtv} + \sum_{v=1}^{n3} \delta_v D_v + \gamma X_{jv} + \Delta \varepsilon_{jtv}$$

c_{jtv} represents the effective realization of the random consumption of individual j at the time period t .

$\Delta \ln c_{jtv}$ is the change in the logarithm of c_{jtv} , located in the community v in period t . It is the growth rate of per capita household consumption.

$S(i)_{tv}$ denotes the various covariate shocks that affect locality v .

$S(i)_{jtv}$ represents the idiosyncratic shocks that affect the individual or household j

D_v is a dummy variable equals to one when individual j belongs to locality v and to zero otherwise

X_{jv} is a vector of some observable characteristics of j

$\Delta \varepsilon_{jtv}$ is a random component

Scalars α_i , β_i , δ_v , and vector γ are the parameters to be estimated.

In this design, the shared risk of the community can be examined through the statistical significance of the parameter α_i . Whereas the idiosyncratic risk can be evaluated based on the statistical significance of the parameter β_i . In addition, the covariate shocks affecting each locality can be summarized through the rate of growth of mean income of v , $\Delta \ln \overline{y_{tv}}$, and the idiosyncratic shocks can be summarized in a particular way through the rate of growth of the income for each j , $\Delta \ln y_{jtv}$

$$\Delta \ln c_{jtv} = \alpha \Delta \ln \overline{y_{tv}} + \beta \Delta \ln y_{jtv} + \sum_{v=1}^{n3} \delta_v D_v + \gamma X_{jv} + \Delta \varepsilon_{jtv}$$

The parameters α and β act as measures of risk exposure to covariate shocks and idiosyncratic shocks.

In summary, according to this approach, the criterion for identifying vulnerable people in the context of poverty analysis can be stated as follows. An individual is vulnerable to poverty when she is at risk of being poor given her inability to smooth consumption over time.

Data collection problems appear when matching household-level data of household characteristics with time-series secondary data of changes in levels of consumption, idiosyncratic shocks, and covariate shocks.

Though covariate shocks could be exogenous by nature, the individual response to shocks is variant and could be endogenous. Dercon, Hoddinott, and Woldehanna (2005) dealt with the problem of endogeneity of household behavior towards risk exposure. Using household-level, single-period, cross-sectional data, they developed a probit model where the dependent variable that measures the probability of a household reporting risk is regressed over

variables of household characteristics. Upon checking the chi-squared statistic for the joint significance of the independent variables, when shocks are correlated with household characteristics, this effect is aggregated in the panel data model by the use of a dependent variable that measures the percentage of households reporting exposure risk to shocks.

Another way of solving the data collection problems is used by Dercon, Hoddinott, and Woldehanna (2005) developing on Tesliuc and Lindert's (2002) approach. The risk of exposure to idiosyncratic shocks and covariate shocks is first quantified, then it is assumed that the predicted consumption of households who are not affected by any shock is expressed as follows:

$$\ln c_{jtv} = \alpha + \gamma X_{jv} + \Delta \varepsilon_{jtv}$$

Then, the impact of shocks on vulnerability is predicted by subtracting the above equation from the following equation:

$$\ln c_{jtv} = \alpha \Delta \overline{\ln y_{tv}} + \beta \Delta \ln y_{jtv} + \gamma X_{jv} + \Delta \varepsilon_{jtv}$$

Another line of research is based on the concept of risk as the expected value of suffering a fall below a certain target threshold, which in this case is the poverty line.

First introduced by Christiansen and Boisvert (2000) and Pritchett et al. (2000), according to this approach, the vulnerability to poverty of the individual j , in period t , is defined as the expected value of the FGT poverty index over the state of nature he faces in $t+1$.

$$V_{jt} = F(z) = \Pr (\tilde{y}_{j,t+1} \leq z)$$

$$V_{jt} = \Phi \left(\frac{\ln z - E \left(\frac{\ln \tilde{y}_{j,t+1}}{X_{jt}} \right)}{\frac{\sigma \ln \tilde{y}_{j,t+1}}{X_{jt}}} \right)$$

Where $\Phi(\cdot)$ is the Gaussian cumulative distribution, while $E \left(\frac{\ln \tilde{y}_{j,t+1}}{X_{jt}} \right)$ and $\sigma_{\ln \tilde{y}_{j,t+1} \mid X_{jt}}$ are the conditional expected value and the standard deviations of random variable $\ln \tilde{y}_{j,t+1}$ respectively.

In summary, according to this approach, the criterion for identifying vulnerable people in the context of poverty analysis can be stated as follows: An individual is vulnerable to poverty in period t if, and only if, her probability of being poor in the period $t+1$ is greater than or equal to 0.5.

The intuition for this is that only those who have a significant probability of being poor in the near future should be considered vulnerable. Moreover, given that in a standard normal distribution $\Phi(0) = 0.5$, then, the prior criterion is equivalent to the following: An individual j is vulnerable to poverty in period t if, and only if,

$$E(\ln c_{j,t+1} \mid X_{jt}) \leq \ln z$$

Another approach, proposed by Ligon and Schechter (2003), in which vulnerability measure is defined as the difference between the utility of obtaining a reference level of consumption under certainty (e.g. as defined by the poverty line) and the expected utility of consumption.

$$V_{jt} = U_{jt}(z) - E[U_{jt}(\tilde{y}_{j,t})]$$

$$V_{jt} = [U_{jt}(z) - U_{jt}(E[\tilde{y}_{j,t}])]$$

$$\begin{aligned}
& +\{U_{jt}(E[\tilde{y}_{j,t}]) - E[U_{jt}(E[\tilde{y}_{j,t} | \bar{x}_t])]\} \\
& +\{E(U_{jt}(E[\tilde{y}_{j,t} | \bar{x}_t])) - E[U_{jt}(\tilde{y}_{j,t})]\}
\end{aligned}$$

The component in the first bracket measures the expected poverty, meanwhile, idiosyncratic risk is measured by the component of the second bracket, and aggregate risk is measured by the component of the third bracket.

The estimation of this vulnerability index also requires the selection of the functional form of $U(\cdot)$. Ligon and Schechter (2003) suggested using the constant relative risk aversion (CRRA) function:

$$U(c_j) = \frac{c_j^{1-\gamma}}{1-\gamma}, \gamma > 0$$

where γ is a constant relative risk aversion coefficient.

In summary, according to this approach, the criterion for identifying vulnerable people in the context of poverty analysis can be stated as follows. An individual is vulnerable to poverty if, and only if $E[U_{jt}(\tilde{y}_{j,t})] < U_{jt}(z)$

Finally, Chiwaula et al. (2011), the probability of being poor is calculated by taking the poverty gap as a proportion of the interval $[E(\tilde{y}_{jt}) - \sigma_{\tilde{y}_{jt}}, E(\tilde{y}_{jt}) + \sigma_{\tilde{y}_{jt}}]$ where $\sigma_{\tilde{y}_{jt}}$ is the standard deviation of $\tilde{y}_{jt}$

$$V_{jt} = \Pr(\tilde{y}_{jt} \leq z)$$

$$= \begin{cases} 0 & \text{if } [E(\tilde{y}_{jt}) - \sigma_{\tilde{y}_{jt}}] \geq z \\ \frac{z - [E(\tilde{y}_{jt}) - \sigma_{\tilde{y}_{jt}}]}{2\sigma_{\tilde{y}_{jt}}} & \text{if } [E(\tilde{y}_{jt}) - \sigma_{\tilde{y}_{jt}}] < z < [E(\tilde{y}_{jt}) + \sigma_{\tilde{y}_{jt}}] \\ 1 & \text{if } [E(\tilde{y}_{jt}) + \sigma_{\tilde{y}_{jt}}] \leq z \end{cases}$$

Thus, the identification criterion deduced from this expression is as follows. An individual is vulnerable to poverty in if, and only if $E(\tilde{y}_{jt}) - \sigma_{\tilde{y}_{jt}} < z$

1.2.3 Poverty Transition Analysis

When panel data welfare surveys exist, logit models are widely used in the literature to analyze the determinants of the events that trigger poverty transitions. Some changes like policy reforms or regime transition may lead vulnerable households to enter the poverty zone. They may also cause other groups of households to exit poverty. As poverty analysis is mostly conducted at a cross-sectional level, the households' characteristics are used to determine levels of expenditure. However, poverty transition analysis requires panel data welfare survey with a long-term time-series dimension. Panel data welfare surveys are extremely rare in developing countries, not alone in the Arab countries, particularly during the post-Arab uprisings' era. The availability of panel data household welfare surveys allows for the effective use of both logit and probit models to develop poverty transitional estimates and poverty movement maps in countries where panel data surveys are available.

McKernan and Ratcliffe (2002) analyze the events associated with poverty, particularly events that trigger entries into poverty and existing poverty in different timeframes. McKernan and Ratcliffe use a discrete-time multivariate hazard model to examine the dynamics of poverty transition, the events that trigger poverty entries and exist, and the change of those events over

time. The study timeframe is focused on time periods. Pre-reform 88-92 and post-reform 96-99 of federal welfare policies in the US. Since individuals and households experience multiple events at the same period of time, the dependence on descriptive analysis does not enable disentangling the impact created by one event on poverty transition from the impact of other events or idiosyncratic characteristics of households. Idiosyncratic characteristics of households like dwelling conditions, employment status, and household demographics significantly impact the probability of poverty entry and exit. Households that demonstrate high employment change have a higher likelihood of entering or exiting poverty.

Saczewska-Piotrowska (2014) uses discrete-time event history logit models to analyze the determinants of poverty in Poland upon a transformation of the Polish economy. She develops two versions of logit models for poverty entry and poverty exit. Where the first version describes the years that the household spends out of the poverty zone, the second version captures the effect of the household's characteristics, like the household's size, educational level of the head, the age of the household's head, and the source of income, on the household's probability of entering or exiting poverty zone. She concludes that households with unemployed heads or unemployed other household members are identified with a higher risk of entering poverty and a low chance of exiting poverty. The case is the same for households with heads that are aged above 60. Rural areas dwellers are identified with a higher probability of entering poverty and a lower probability of poverty exit. Thus, households' characteristics are statistically significant determinants of the probability of poverty transit status.

Andriopoulou and Tsakloglou (2011) also include household characteristics in their multivariate discrete hazard analysis to study households' transition into and out of poverty in 14 European countries from 1994 to 2000. The inclusion of variables of household demography and employment status showed a significant effect on the household's probability of entering

or exiting poverty. They also have a significant effect on the duration of staying in poverty where households with a higher number of dependents demonstrate a higher probability of staying in poverty for longer periods. Meanwhile, households with younger heads show a higher propensity to exit poverty in shorter periods.

1.2.3.1. Poverty Transition Analysis Using Synthetic Panel Data

Among the main purposes of conducting vulnerability analyses, is the provision of policy recommendations for combating chronic poverty and poverty prevention. Poverty transition studies provide the basis for policies that are aimed at targeting households that are vulnerable to chronic poverty. Chronic poverty combating and poverty prevention policies require the availability of panel data welfare surveys that are significantly rare in developing countries. The absence of panel data welfare surveys in developing countries necessitates the need for finding alternative sources of data depending on cross-sectional-level welfare surveys. Poverty transition analyses depending on multiple rounds of cross-sectional welfare surveys have been introduced to the literature on the poverty movement. Cross-sectional welfare surveys have been used to infer proxy measures of poverty transitions and indicators of chronic poverty.

Lucchetti (2018) provides an innovative approach, defined as a machine learning mechanism using cross-sectional data, in order to predict intra-generational mobility and welfare dynamics. Lucchetti implements and validates a Least Absolute Shrinkage and Selection Operator (LASSO) technique to analyze poverty dynamics and changes in transitions of household welfare in the absence of panel data welfare surveys. The LASSO procedure is combined with multiple imputations by Predictive Mean Matching (PMM) technique to provide a high confidence interval of poverty transition measures derived from existing panel data. Repeated cross-section rounds of existing panel data validate the used technique to

monitor poverty transition in a sample of Latin American countries: Peru, Argentina, Nicaragua, and Chile.

Compared to other synthetic panel generating techniques of using cross-sectional data, the LASSO technique imposes less restrictive assumptions about the correlation of error terms across multiple rounds of cross-sectional surveys. The LASSO technique estimates changes in income level for each household's observation across the multiple rounds of surveys when panel data exists. It also provides point estimates of measures of welfare dynamics rather than providing upper or lower bounds. When validated using existing panel data, LASSO estimates are almost statically identical to household poverty transition measures and poverty rates. The predicted intra-generational poverty transition measures are also empirically supported by robustness and sensitivity test results. When panel data are unavailable, the LASSO alternative cross-sectional level technique is recommended and significantly accurate in predicting poverty transition measures with an almost 95 percent confidence interval. Particularly when multiple rounds of cross-sectional welfare surveys exist (Lucchetti, 2018).

Bolch et al. (2021) introduce an alternative approach for identifying the chronically poor populations using cross-sectional data on poverty. Using proportional hazard models, Bolch et al. (2021) tested the proxy measures that were developed upon the use of cross-sectional welfare surveys in order to identify the income-poor population and the households that are in multidimensional poverty. The study puts forward two main speculations about the vulnerability of the poor population to chronic poverty. The first is that fractions of population households that are under multidimensional poverty and income poverty have a high probability of sustaining income poverty in the future. Meanwhile, fractions that are identified as income-poor but are not under multidimensional poverty have a lower probability of sustaining poverty in the future time. The second speculation is made about the period of time

a household spend in poverty. Longer spans of income poverty and multidimensional poverty are correlated with a higher probability of chronic poverty. The longer the poverty timespan that a household sustains, the higher the probability of remaining poor in the future time. The empirical evidence in three Latin American countries supported the two speculated conjectures. Bolch et al. used proportional hazard models to predict the likelihood of sustaining poverty depending on the household's past status of income poverty and multidimensional poverty. The empirical evidence supports the need for identifying fractions of the chronically poor population for poverty eradication policies. The need for monetary indicators that measure the impact of a household's history of monetary poverty and multidimensional poverty is challenging with the absence of panel data welfare surveys. Alongside the lack of panel data surveys, they are conducted with insufficient frequencies or limited timespans, with limited sampling size and higher attenuation. The suggested alternative proxy measures of chronic poverty that depend on cross-sectional welfare surveys may overcome the deficiencies of panel data surveys (Bolch et al., 2021).

In the absence of panel data set required for intra-generation poverty transition analysis, Cruces et al. (2015) suggest a technique for generating a synthetic panel data set that could be used to monitor poverty transition using cross-sectional level survey data. They used existing panel data for three Latin American countries in order to validate their proposed technique. The synthetic panel data set is predicted by estimating both future level and past level of household consumption expenditure and/or income. Estimation models are built upon a set of assumptions on the structural error that allows for predicting both lower bound and upper bound for the distribution of poverty transitions. The validation results appeared to be highly promising. The technique used to generate a synthetic panel was seen to be remarkably inspiring for the estimation of joint distributions and probabilities of poverty transition in multiple periods of time using cross-sectional data. The applied sensitivity and stress tests show

that the approach is robust. The span of the synthetic panel can also be extended to other dimensions. It could be employed for welfare measures comparison analyses. It is also functional in the prediction of long-term poverty transition models as it is sufficiently robust to long-term intervals. Finally, it is adequately robust to be used in estimating two transition lines rather than one. In summary, the application of the suggested approach of using cross-sectional data is adequately functional in the absence of panel data in poverty transition analyses.

Cruces et al. (2015) build upon Dang et al. (2014) technique to generate synthetic panel data. Two points of time are designated with two rounds of cross-sectional data that survey log household's consumption expenditure y_{it} , and/or income, and poverty line z at each round. The main focus point is the proportion of households who are identified as poor in the first round of the survey and have exited poverty or have remained in poverty in the second round. Alongside the proportion of the households that are identified as non-poor in the first round and that have entered poverty in the second round or that have remained non-poor in the second round of the survey. Probabilities of entering or exiting poverty in the second round are identified. A poor household in the first round who exits poverty in the second round is defined by the probability $\Pr(y_{i2} > z)$ where his first-round consumption expenditure is $y_{i1} < z$. A poor household in the first round with a consumption level $y_{i1} < z$ that remains in poverty in the second round is defined by the probability $\Pr(y_{i2} < z)$. A non-poor household in the first round who enters poverty in the second round is defined by the probability $\Pr(y_{i2} < z)$ where his first-round consumption expenditure is $y_{i1} > z$. A non-poor household in the first round with a consumption level $y_{i1} > z$ that remains non-poor in the second round is defined by the probability $\Pr(y_{i2} > z)$.

1.3 Data and Methodology

In this chapter, a measure of vulnerability to poverty is estimated in order to trace development prospects in the Arab world after the Arab uprisings. Vulnerability to poverty is estimated by the variance of the household's future consumption relevant to a threshold level of consumption measured at the poverty line. The future level of the household's consumption expenditure is predicted by a group of observable household characteristics like the household's head educational attainment, age, sector of employment, number of household members, number of income earners, and housing conditions. An ordinary least squares (OLS) regression of the natural logarithm of per capita expenditure on the explanatory variables that capture the household's characteristics is used to predict the household consumption expenditure.

1.3.1 Data

The data used in the chapter are taken from the Economic Research Forum microdata catalog on the MENA region. The cross-sectional data used in this section are derived from household-level surveys conducted in a bundle of Arab countries for different years. The timeframe of the study is selected to represent the effect of Arab uprisings on vulnerability to poverty. Thus, the years are selected for each country before and after the Arab uprisings.

Household income, expenditure, and consumption survey (HIECS) that was conducted in Egypt for 3 years, 2008, 2012, and 2015 in order to capture the impact of Arab uprisings. Household income, expenditure, and consumption survey in Egypt was first conducted in 1955. It was conducted by the Committee of Statistics in Egypt. The first round was launched for a pilot survey in three villages in one governorate, the governorate of Giza. The pilot survey was conducted on both of individual level and a household level on a sample of 750 households

though the sampling target was to be 4000 households. The following rounds of the survey were conducted in all governorates in Egypt in the years: 1959, 1965, 1975, 1982, 1991, 1996, 2000, 2005, 2008, 2012, and 2015. The databases of the last three rounds are used in this section. The 2008 household income, expenditure, and consumption survey in Egypt was carried out on a sample of 48,658 households in all governorates of Egypt divided between rural and urban areas. The dividing percentage was 47.2% in urban areas and 52.8% in rural areas. Households were surveyed over 15 days. The 2013 household income, expenditure, and consumption survey in Egypt was carried out on a sample of 24,863 households in all governorates of Egypt divided between rural and urban areas. The dividing percentage was 45.4% in urban areas and 54.6% in rural areas. In this particular round, 8,769 of the surveyed households were panel households, and 16,094 were new households. Households were surveyed over 15 days. The 2015 household income, expenditure, and consumption survey in Egypt was carried out on a sample of 25,000 households in all governorates of Egypt divided between rural and urban areas. The dividing percentage was 45 % in urban areas and 55% in rural areas. In this particular round, the survey was undertaken consecutively over 24 waves with a one-week time interval for each. By the second half of the year 2015, surveyed households were revised to capture changes in income and consumption patterns due to seasonal factors.

Household socio-economic survey (IHSES) was conducted in Iraq for 2 years 2008 and 2012. Iraq was the first Arab country in providing surveys on household income and expenditure since the foundation of the Central Statistical Organization. The first household-level survey was conducted in 1946, then surveys were carried out again in 1954 and in 1961, then they were followed by a series of surveys with the time interval of 3-5 years: 1972, 1976, 1979, 1985, 1988, 1993, 2002, 2008, and 2012 with the last couple of surveys that were

established with the cooperation of Kurdistan Region Statistics Office in the Federal Region of Kurdistan-Iraq.

The Iraq household socio-economic survey (IHSES) provides statistics on individual-level and household-level data. It provides data on household consumption expenditure, disposable income, individual and household characteristics, household size, housing conditions, and living conditions. The 2008 Iraq household socio-economic survey was the first conducted on a national level in all governorates of Iraq including the federal region of Kurdistan-Iraq. The survey timeframe was over one year for a sample of 17,822 households. The 2012 Iraq household socio-economic survey was the second conducted to include all governorates of Iraq and the federal region of Kurdistan-Iraq. The survey timeframe was over one year though it was not a panel survey following the 2008 round, the 2012 round for a sample of 25,146 households.

National survey on the household budget, consumption, and standards of living (EBCNV) was conducted in Tunisia for the years 2008 and 2012. The first National Survey on Household Budget, Consumption and Standard of Living in Tunisia was conducted in 1968 by the National Institute of Statistics in Tunisia. The second was in 1975, then re-conducted every five years ever since: 1968, 1975, 1980, 1985, 1990, 1995, 2000, 2006, and 2011.

The 2008 National Survey on Household Budget, Consumption, and Standard of Living was carried out on both individual and household levels with a sample size of 12,318 households. It provides detailed statistics on individual and household consumption of goods and services. The data were collected through multiple stages random sampling procedure in all governorates of Tunisia. It was classified on two sampling criteria, namely the geographical location of the governorate and the type of living areas that are classified by size as small cities, medium cities, large cities, and non-communal areas.

The 2012 National Survey on Household Budget, Consumption, and Standard of Living was carried out on both individual and household levels with a sample size of 11,281 households. It provides detailed statistics on individual and household consumption of goods and services. The data were collected through multiple stages random sampling procedure in all governorates of Tunisia. It was classified on two sampling criteria, namely the geographical location of the governorate and the type of living areas that are classified by size as: small cities, medium cities, large cities, and non-communal areas.

Household expenditure and income survey (HEIS) was conducted in Jordan on the years 2008, 2012, and 2015. The Household Expenditure and Income survey in Jordan was first conducted by the Department of Statistics in 1966. Other rounds followed on 1980, 1987, 1992, 1997, 2003, 2007, 2008, 2012, and 2015. It provides statistical data on household consumption expenditure, disposable income, individual and household characteristics, housing condition, and living conditions covering many governorates in the Kingdom.

The 2008 Household Expenditure and Income survey in Jordan was conducted on a two-stage classified clusters sampling procedure. In the first stage, the sample was uniformly selected and clustered proportionally to the size of the area population. In the second stage, a sub-group of each district in the governorate clustered proportionally to the administrative classification of the district in question. The two-stage sampling procedure aimed to guarantee that each sample selected on a sub-district level is as representative as possible of the population in question. The 2008 round was conducted for a sample of 12,678 individuals divided into urban and rural areas covering all the governorates of the Kingdom.

The 2012 Household Expenditure and Income survey in Jordan was conducted on a two-stage classified clusters sampling procedure. In the first stage, the sample was uniformly selected and clustered proportionally to the size of the area population. In the second stage, a

sub-group of each district in the governorate clustered proportionally to the administrative classification of the district in question. The two-stage sampling procedure aimed to guarantee that each sample selected on a sub-district level is as representative as possible of the population in question. The 2011 round was conducted for a sample of 15,472 individuals divided into urban and rural areas covering all the governorates of the Kingdom.

The 2015 Household Expenditure and Income survey in Jordan aimed to provide a large sample in each governorate and sub-district in the Kingdom for the purpose of providing a poverty map. It was also conducted on a two-stage classified clusters sampling procedure. In the first stage, the sample was uniformly selected and clustered proportionally to the size of the area population. In the second stage, a sub-group of each district in the governorate clustered proportionally to the administrative classification of the district in question. In the second stage, a 10-household sample was selected in each cluster with the backup of 5 households on a panel data basis using the same sampling technique. The two-stage sampling procedure aimed to guarantee that each sample selected on a sub-district level is as representative as possible of the population in question. The 2014 round was conducted for a sample of 25,845 individuals divided into urban and rural areas covering all the governorates of the Kingdom.

Household's characteristics variables that are included in the model

- Household composition and dwelling characteristics
 - Number of persons HNUM
 - Number of persons aged under CH14
 - Number of persons aged NUM65
 - Number of earners EARN

- Head's and spouse's characteristics
 - Educational level of the head EDUHD
 - Status of employment of the head MASHD
- Annual household expenditure
 - Total expenditure TOTEXP
- Annual household income
 - Total disposable income TOTDINC

1.3.2 Methodology

1.3.2.1 Vulnerability to Poverty - Theoretical Framework

This chapter is intended to trace development prospects in the Arab world in the aftermath of the Arab uprisings. In order to assess changes in levels of well-being brought by the transitions incurred in the Arab world, the chapter employs the dynamic nature of measures of vulnerability that fit in with the transitional context of the Arab uprisings. Major parts of development policies are aimed to eradicate poverty. A mandatory analytical toolkit for policies of poverty alleviation includes poverty assessment techniques, identifying the poor population, and identifying characteristics of those who are under the poverty line. Nevertheless, individuals who are identified as poor today may not remain in poverty tomorrow. It is also the case for those who are identified as non-poor and may fall into poverty in the future.

Meanwhile poverty is a stochastic phenomenon, vulnerability to poverty is not. The concept of vulnerability to poverty was introduced to the literature on poverty as a guiding toolkit for anti-poverty policy interventions. Forward-looking poverty prevention policies are functional in targeting proportions of the households that are likely going to be poor in the future, i.e. groups of the population that are vulnerable to poverty.

Within the context of poverty prevention policies, household-level vulnerability is defined as the probability of a currently poor or non-poor household experiencing a consumption reduction in the near future. Poverty and vulnerability to poverty are complementary concepts. The household's realized level of consumption expenditure gauges the household's observed status of poverty. The ex-post realization of poverty status is defined by whether the household's realized consumption expenditure is above or below a threshold of expenditure measured at the poverty line. The predicted probability of poverty in the future is stated by a future expected level of consumption expenditure. Household-level vulnerability to poverty is the ex-ante probability of the expected consumption expenditure falling below a threshold of expenditure measured at the poverty line.

Conventional methods of measuring vulnerability use per capita expected expenditure and its variation from a particular expenditure threshold. The natural logarithm of per capita expected expenditure is used upon the assumption that it is normally distributed. The variance of expected expenditure from a level of necessity expenditure measured at the poverty line is also required to identify the probability of being poor next period. When this probability is significant, individuals are more vulnerable to poverty either due to the inability to sustain their level of consumption, or due to the risk of uncertainty, in other words, high variability in future consumption. The conventional way to estimate future per capita expenditure in the next period is by using a regression model of current expenditure to predict future expenditure.

Having only cross-sectional household-level data at their disposal, Chaudhuri, Jalan, and Suryahadi (2002) provide a unique approach for empirically estimating household-level vulnerability. As cross-sectional data make up the basis of poverty assessment, they are as insightful as longitudinal data in measuring vulnerability to poverty.

Poverty and vulnerability assessment based on cross-sectional data analysis are insightful in predicting future poverty for many reasons. Surveys based on cross-sectional data allow for observing dispersions in levels of consumption expenditure for different groups of the population. Each group of households is distinguished by a set of observed characteristics that separate them from other groups in the population. For instance, households that are dwellers of urban areas are classified in a particular group that is distinguished from rural areas dwellers. However, urban-area dwellers could disperse in terms of another household characteristic that determines the household level of consumption expenditure. For example, the level of educational attainment of the household's head or the number of income earners in each household. The likelihood of falling into poverty in the future for a household in one group is defined by the variation in the expected level of consumption expenditure. Future expenditure is determined by the observed household characteristics. When this variation is caused by differentials in household characteristics, then the likelihood of future poverty is predicted with a sufficient level of confidence that cross-sectional analysis permits.

Starting with their definition of vulnerability to poverty as the probability of experiencing a well-being shock represented by a reduced level of future consumption, Chaudhuri et al. (2002) consider the ex-post realization of expenditure, in other words, the household's current level of expenditure, as the household's poverty status. The ex-ante probability of the next period's expenditure is measured in terms of its variance from an expenditure threshold. This probability of variation in future expenditure is used as a measure

of a household's vulnerability to poverty. Chaudhuri et al. (2002) depend on the substantial margin of error that exists in expenditure measurements. Because of this measurement error, the estimated variance of the effect of idiosyncratic shocks on a household's expenditure is overstated. They use the structure errors in the expenditure equation to measure the variance of future expenditure. They add the assumption that the expected expenditure follows a Gaussian normal distribution. Thus, albeit a household's high expected expenditure, she could still be vulnerable if the variance is significantly high. This vulnerability is caused by either the low level of future expenditure or by its high variability.

Thus, vulnerability to poverty is defined in terms of the ex-ante likelihood that a currently non-poor household to enter poverty in the next period, or a currently poor household to remain below the poverty line in the next period. Meanwhile vulnerability to poverty is defined as the exposure to adverse welfare shock, this definition is conceptually different than other definitions provided in the literature (Glewwe and Hall, 1998; Alwang, et al., 2001). In this particular definition, the currently poor households are included in the groups of the population that are vulnerable to poverty. Poor households that experience a significant likelihood of remaining in poverty even if they do not suffer an adverse shock of welfare are included in the vulnerable population. However, the currently non-poor households that are in a welfare status that allows them to survive and remain non-poor are excluded from the vulnerable population. Even if they are highly probable to face an adverse welfare shock in the next period, they are good enough to avoid falling into poverty.

In econometric terminology, vulnerability to poverty at period t is expressed by the following equation where $c_{h,t+1}$ is the level of consumption expenditure of household h in the next period, and z is the level of necessity expenditure measured at the poverty line:

$$V_{ht} = \Pr (c_{h,t+1} \leq z)$$

The current level of household vulnerability at time t is measured in terms of household expected consumption expenditure in the next period, $t+1$. This intertemporal correlation between vulnerability and future consumption expenditure reflects the conceptual difference between poverty and vulnerability. Meanwhile poverty is an ex-post indicator for the observed level of household's well-being, vulnerability is a forward-looking, ex-ante indicator for the expected level of household's well-being.

Measuring a household's vulnerability mandates inferring prospected future consumption expenditure. The household's expected future expenditure is inferred by the current expenditure which is determined by a vector of household characteristics, a vector of variables that express general economic circumstances, and an error term that includes the unobserved household's related factors that affect consumption level. In other words, the idiosyncratic consumption shocks that are relevant to the household's own characteristics and living conditions.

$$c_{h,t+1} = c(X_h, \gamma_t, e_{ht})$$

Accordingly, the above household's vulnerability equation is reformulated as follow:

$$V_{ht} = \Pr (c_{h,t+1} = c(X_h, \gamma_t, e_{ht}) \leq z \mid X_h, \gamma_t, e_{ht})$$

The vector of X_h includes idiosyncratic variables that could be the household's head educational attainment or age or sector of employment, number of household members, number of income earners, housing condition, or any other relevant factor that directly impacts the level of the household's consumption expenditure.

γ_t denotes aggregate shocks, i.e. any unpredicted macroeconomic institutional change or structural change. Nevertheless, the impact of aggregate shocks on the household's level of consumption expenditure is assumed to be invariant in the formulation of the model.

1.3.2.2 Vulnerability to Poverty - Empirical Model

The dynamic nature of vulnerability analysis mandates the existence of panel data that do not exist for Arab countries. In order to assess changes in levels of well-being incurred by the transitional nature of the Arab uprisings, this chapter attempts to apply an unconventional approach that allows for using cross-sectional data in order to measure levels of vulnerability in a sample of Arab countries before and after the Arab uprisings.

The theoretical approach provided by Chaudhuri, Jalan, and Suryahadi (2002) to measure vulnerability shows that a household's vulnerability to poverty is a non-linear function of levels of the household's expected consumption expenditure. The likelihood that a household will fall into poverty in the future does not depend only on the future level of the household's consumption expenditure, but it also depends on intertemporal volatility in the value of the future stream of expenditure. When comparing a household of a state-employed low-income head with an expected consumption expenditure that is similar to a household of a small business proprietor, the state-employed household's head could be less vulnerable to falling into poverty due to the stability of its source of income. The variance of future consumption expenditure relative to a particular threshold is as relevant as expected expenditure in assessing vulnerability. Predicting both of these two relevant factors requires longitudinal data in which the same household is screened over time. Once available, longitudinal data allows for easily assessing the intertemporal variance of a household's expected consumption expenditure. However, when the range of the cross-sectional coverage of longitudinal data is limited, then the possibility of making such an assessment is weak.

Unlike longitudinal data which is almost rare, surveys on household income and consumption levels are widely available on a cross-sectional level for the MENA region. They constitute the basis of all poverty assessment analyses in the region. The suggested approach by Chaudhuri (2000) is to make use of the advantages that cross-sectional level surveys provide. However, in order to infer information on vulnerability to poverty using only cross-sectional level data, simplifying assumptions are mandatory to be put forth, particularly assumptions that restrain the unobserved heterogeneity in the household's expected consumption expenditure.

The model starts with estimating the current consumption expenditure level c_h . Consumption expenditure is determined by a group of observable household characteristics X_h like household's head educational attainment, age, sector of employment, number of household members, number of income earners, and housing conditions. An ordinary least squares (OLS) regression of the natural logarithm of per capita expenditure is conducted on explanatory variables that capture the household's characteristics.

$$\ln c_h = X_h \beta + e_h$$

The variance of this regression $\sigma_{e,h}^2$ is the variance of the idiosyncratic component of household consumption expenditure. Estimates of β and a single estimate of the standard deviation σ are accordingly obtained.

In poverty assessment studies, consumption expenditure is estimated using the household's consumption behavior and determinants of consumption expenditure. In these conventional models, it is implicitly assumed that the variance of the disturbance term is invariant for all households as it stems from measurement error. The disturbance term in this equation captures the effect of idiosyncratic shocks on levels of the household's consumption expenditure. Differentials in the idiosyncratic factors cause different levels of per capita

household consumption expenditure that are otherwise assumed to be equivalent. In this equation, it is implicitly assumed that for each household, the effect of idiosyncratic shocks over consumption expenditure, represented by shocks of individual circumstances, is independently distributed. Thus, the disturbance term is caused by either measurement error or by identical unobserved factors. The variance of the logarithm of consumption expenditure is identical for all households.

The first assumption that Chaudhuri (2000) makes to enable the use of cross-sectional data to assess household vulnerability is regarding the homoscedasticity assumption. When the natural logarithm of the consumption expenditure is used to assess vulnerability, the assumption of homoscedasticity is restrictive as the variance within this context captures the intertemporal variance of log expenditure. This assumption precludes the probability that a household with a lower expenditure level may experience higher volatility in expenditure. In the economic literature, evidence exists that poor households' levels of income and consumption expenditure are volatile. The homoscedasticity assumption implies that consumption expenditure predicted mean and predicted variance are correlated among households. Thus, the possibility that a lower-mean expenditure household may experience higher volatility of consumption expenditure than a higher mean expenditure household is ruled out.

The second assumption is regarding the structure of the economy γ_t , in other words, the impact of aggregate shocks on household level of vulnerability to poverty. It is assumed that the state of the economy is relatively stable. Therefore, the impact of aggregate shocks, caused by structural economic conditions, on levels of household's consumption expenditure is also ruled out. So, γ_t is considered fixed and the volatility of household expected consumption expenditure is a function of only the idiosyncratic factors that a household faces

in the future. Uncertainty of household's expected consumption expenditure that is caused by uncertain future economic shocks is ignored.

These two assumptions are mandated because vulnerability is estimated using cross-sectional level data rather than longitudinal data. The use of only cross-sectional level does not allow for defining the parameters that cause the persistence of levels of expenditure. The vector of γ_t parameters cannot be generated without a time-series record of repeated cross-sectional economic behavior of consumption expenditure observed over a long enough period of time.

Chaudhuri et al. (2002) use the standard deviation of the error term to predict vulnerability. The variance of the idiosyncratic component of the household consumption expenditure is predicted by the household's observable characteristics.

$$\sigma_{e,h}^2 = X_h \theta$$

To avoid generating an inefficient or biased prediction, they correct for heteroscedasticity by regressing the variance of the error term on household characteristics.

Following Amemiya (1977)'s, household future consumption expenditure is predicted using a three-step procedure of feasible generalized least squares (FGLS). The obtained vector of coefficients of this regression β_s , and its variance $\sigma_{e,h}^2$, are used directly to predict the expected logarithm of household consumption expenditure. The squared estimated residual from the OLS regression is regressed over the same independent variables of household characteristics.

$$\hat{e}_{OLS,h}^2 = X_h \theta + \eta_h$$

The estimates of this regression are used to transform the equation into the following form:

$$\frac{\hat{e}_{OLS,h}^2}{X_h \hat{\theta}(OLS, h)} = \frac{X_h \theta}{X_h \hat{\theta}(OLS, h)} + \frac{\eta_h}{X_h \hat{\theta}(OLS, h)}$$

An asymptotically efficient FGLS estimate $\hat{\theta}_{FGLS}$ is obtained by the OLS regression of this equation, where the $X_h \hat{\theta}_{FGLS}$ is a consistent estimate of $\sigma_{e,h}^2 = X_h \theta$

Thus,

$$\widehat{\sigma}_{e,h} = \sqrt{X_h \hat{\theta}_{FGLS}}$$

These estimates are used to predict the following equation:

$$\frac{\ln c_h}{\widehat{\sigma}_{e,h}} = \left(\frac{X_h}{\widehat{\sigma}_{e,h}} \right) \beta + \frac{e_h}{\widehat{\sigma}_{e,h}}$$

$\hat{\beta}_{FGLS}$ estimates are consistent and asymptotically efficient estimates of β .

Using $\hat{\beta}$ and $\hat{\theta}$, the natural logarithm of expected expenditure and its variance are obtained

$$\hat{E} [\ln c_h \mid X_h] = X_h \hat{\beta}$$

$$\hat{V} [\ln c_h \mid X_h] = \sigma_{e,h}^2 = X_h \hat{\theta}$$

Upon the assumption that the logarithm form of household consumption expenditure has a normal distribution, where Φ is the cumulative density of Gaussian normal distribution, these obtained estimates are used to predict an estimate of household vulnerability to poverty.

The household's vulnerability measure is calculated as the probability of expected expenditure to fall below the poverty line expenditure lnz :

$$v_h = \widehat{Pr} [lnc_h < lnz \setminus X_h] = \Phi \left(\frac{lnz - X_h \hat{\beta}}{\sqrt{X_h \hat{\theta}}} \right)$$

The empirical approach used by Chaudhuri et al. (2002) to estimate household vulnerability to poverty is to a large extent derived from regression methods used in poverty assessment studies. Nevertheless, in conventional poverty analyses, the regression variance is attributed to omitted variables or some measurement errors. It is considered identical for all households so there is no such separate equation that allows for the variance to depend on the households' idiosyncratic characteristics. In poverty assessment analysis, the logarithm of consumption expenditure as a function of the household idiosyncratic characteristics is obtained by OLS regression from which estimates of β coefficients and a single estimate of the standard deviation σ are accordingly obtained. Upon using the assumption that the logarithm of consumption expenditure is normally distributed, these estimates are employed to infer the likelihood that a household will become poor in the next period of time. The main difference in using the same approach to estimate vulnerability to poverty lies in relaxing the assumption that the variance of the regression is identical for all households. As the variance of the disturbance reflects the intertemporal variance of household consumption expenditure, this assumption of homoscedasticity is relaxed. Allowing for the intertemporal variance to be a function of household idiosyncratic characteristics goes in line with the empirical evidence that poor households face high volatility of consumption expenditure over time. This in turn allows for the possibility that a household with a lower average consumption expenditure could experience higher volatility of consumption expenditure than a household that is better off in terms of consumption expenditure.

When the problem of heteroscedasticity exists, then the efficiency of the estimated parameters is reduced. It could also result in biased estimates of parameters. The problem of heteroscedasticity is corrected in this model by the use of the standard deviation of the regression disturbance term to directly calculate the household's vulnerability indicator. Therefore, the possibility of predicting biased estimates for the parameters used in calculating the household vulnerability indicator is accounted for. Thus, the three-step procedure used has eliminated the possibility of predicting a biased estimator for household vulnerability to poverty.

1.3.3 Poverty Transition Analysis Using Synthetic Panel Data

1.3.3.1 Poverty Transition Analysis - Theoretical Framework

In order to complete the picture, predicted measures of vulnerability should be validated by a poverty transition analysis. Upon measuring levels of vulnerability to poverty, the results are to be validated using a poverty transition matrix. In the absence of panel data required for intra-generation poverty transition analysis in Arab countries, this section aims to generate a synthetic panel data set that could be used to monitor poverty transition using cross-sectional level survey data.

Dang et al. (2014) analyze poverty dynamics and the movements in and out of poverty using cross-sectional data from two Asian countries, Indonesia and Vietnam. They validate their results using existing panel data. They infer a poverty map using repeated rounds of cross-sectional welfare surveys over two years. They estimate lower and upper bounds for poverty transition measures using parametric and non-parametric approaches. They validate their results by comparing them to true poverty transition measures using panel data. The validation results confirm the effectiveness of the methods that use cross-sectional data for making inferences about poverty dynamics.

The upper and lower bounds of poverty transition measures are estimated using a model predicting consumption expenditure by time-invariant household's idiosyncratic characteristics survey in the first round of the cross-sectional survey. The parameters obtained by this regression are used to estimate the first period's consumption expenditure for households surveyed in the second round of the survey. Analysis of movement in and out of poverty can be constructed by comparing levels of consumption expenditure obtained from the second round with estimates of consumption expenditure from the first round. Upper and lower bounds of movement in and out of poverty are provided instead of exact point estimates because the autocorrelation among predictors of regressions using information from two rounds of the survey must be examined. Two approaches are provided to estimate measures of poverty transition, a parametric and a non-parametric approach. The non-parametric approach is not based on a specific assumed structure for the distribution of the error term. The range between the upper and the lower bound produced by this technique depends on the extent of the predictive power that the time-invariant household characteristics hold in explaining household consumption expenditure. Information on the correlation among error terms is inferred from other sources. Evidence is provided that this correlation falls within a zero-to-one range. On the contrary, the parametric approach used in this chapter is based on assumptions made on the correlation of error terms. The width of the bounds produced by this technique is smaller if compared to the ones produced by the non-parametric approach. The first assumption imposed by this technique is about the underlying population. It is assumed that the first and the second round of the cross-sectional surveys are drawn from the same population. The second assumption is about the correlation of error terms of the regressions in both rounds of the survey. Each regression is constructed in each round to predict consumption expenditure by the household's time-invariant characteristics. A theorem that the error terms in both rounds of the cross-sectional survey are completely independent is also put forth.

The assumptions made regarding the underlying population and the joint distribution of the two residuals in the two rounds of the cross-sectional survey, and the associated corollaries and theorems that have been imposed are critical to estimate poverty transition measures. When different sets of assumptions on the correlation of error terms are imposed, different estimates of the bounds of poverty transition measures are produced. Meanwhile in the first non-parametric approach, no assumptions on the joint distribution of the error terms were imposed, in the second parametric approach, the bivariate normal joint distribution of the two error terms is imposed. However, before conducting any further steps in any of the approaches, the assumption made on the underlying population in the two rounds of the survey must be confirmed. Thus, it must be confirmed that the same distributions for the idiosyncratic characteristics in the two rounds of the survey exist. Then using the theorem of the complete independence of the two error terms, the error term in the first round is drawn more than once and averaged in order to estimate the upper bound of the poverty transition measure. Nevertheless, when estimating the lower bound, as the predicted errors of each household are used in the regression, there is no need for multiple draws of the error term.

The supremacy of the non-parametric approaches lies in the limited number of assumptions needed to obtain the upper and lower bounds of the estimates on the degree of poverty transition. However, the range between the upper and the lower bounds produced using this technique is more dispersed and could be too large to be practical. In order to obtain a narrower range, a rich set of regressors of the time-invariant household characteristics is mandatory. The full set of variables needed for a more accurate estimate is not currently available for most countries, not alone developing countries where panel data does not even exist to validate the resulting estimates. A narrower range could be produced with the currently available set of variables could be obtained by using the alternative parametric approach. Thus, a set of assumptions are imposed regarding the structure of the error terms distribution. With

the currently in-hand set of variables that represent the idiosyncratic characteristics of the households, further binary variables could be included such as variables indicating dwellers of particular geographic areas, for instance, rural or urban areas. When panel data exists, then the estimates obtained by using only one round of the cross-sectional survey are possible to be compared to the true estimates obtained by the panel data.

The parametric approach used in this chapter is less data-demanding than the non-parametric approach. This could be more suitable for countries that are less rich with variables derived from welfare survey data. With the inclusion of assumptions on the joint distribution of the error term, and the correlation among the first and the second rounds' errors, a narrower range between the upper and the lower estimate is more plausible to be obtained (Dang et al., 2014). Thus, the approach used in this particular chapter follows the parametric approach in which the joint distribution of the error term is assumed to be a bivariate normal one, and the correlation between the error terms in both rounds is assumed to be non-negative.

1.3.3.2 Constructing Synthetic Panel Data - Empirical Approach

The empirical approach employed in this chapter accommodates the lack of panel data required for intra-generation poverty transition analysis in Arab countries. This empirical approach aims to generate a synthetic panel data set that could be used to monitor poverty transition using cross-sectional level survey data.

Welfare dynamic analysis forms the basis for strategies of well-informed development policy. Designing effective and efficient poverty eradication policies requires a comprehension of welfare dynamic mechanisms underlying poverty transition trends. For instance, even if two successive rounds of a cross-sectional household survey reflected a slight reduction in the poverty rate, this reduction does not explain the nature of poverty transition mechanisms. It could reflect a situation in which households who were identified as poor in the first round

have completely exited poverty in the second round, nevertheless, they have been replaced by households who were identified as non-poor in the first round but entered poverty in the second round. This slight reduction could also reflect a stagnation case where no improvement has been achieved in households' level of welfare (Dang and Lanjouw, 2013).

However, welfare dynamic analysis requires panel data that is absent in many developing countries. Studies of welfare dynamics proposed the use of synthetic panel data as a solution to overcome the lack of actual panel data in developing economies. Methods of constructing synthetic panel data are derived from literature on survey-to-census imputation techniques (Elbers et al., 2003). They differ from methods of pseudo-panel data. They require at least two rounds of cross-sectional surveys and are constructed at a higher disaggregated level (Dang et al., 2014; Dang and Lanjouw, 2013). The synthetic panel data set is predicted by estimating both future levels and past levels of household consumption expenditure. Estimation models are built upon a set of assumptions on the structural error that allows for predicting both of lower bound and upper bound of transitional estimates. Constructed synthetic panel data were validated against actual panel data in some Asian countries (Dang et al., 2014) and other Latin countries (Ferreira et al., 2013; Cruces et al., 2015).

Meanwhile in the literature on poverty dynamics that is based on panel data surveys, poverty transition is analyzed using the conditional probability concept, both Dang et al. (2014) and Cruces et al. (2015) propose the concept of poverty dynamics within the context of a joint probability of non-poor households to fall into poverty at a point of time in the future. With conventional panel data analysis, poverty transition is introduced as the probability of falling into poverty at a point of time in the future given the household is identified as a non-poor in the previous period of time.

Using cross-sectional level surveys, both Dang et al. (2014) and Cruces et al. (2015) analyses are based on the joint probability that a household that is identified as non-poor in the first round will enter poverty in the second round of the survey. Since a household is interviewed only once, either in the first or in the second round of the repeated cross-sectional survey, the joint probability of a household entering or exiting poverty cannot be estimated by using the repeated rounds of a cross-sectional survey. Nevertheless, the correlation between a household's level of consumption expenditure and the household's time-invariant idiosyncratic characteristics can be predicted at each round.

$$y_{it} = \beta'_t x_{it} + \varepsilon_{it} \quad t = 1, 2$$

Here, x_{it} is a vector of household i time invariant idiosyncratic characteristic in t round of the survey and ε_{it} is the error term. It is assumed that the same population is surveyed in the two rounds of the cross-sectional survey. So, the household's consumption expenditure is predicted by the time-invariant household characteristics surveyed in both rounds. Therefore, surveyed households in the second round who hold the same characteristics as those of households surveyed in the first round would achieve the same level of consumption expenditure as that of the first round and vice versa.

Dang et al. (2014) estimate the proportion of households that are below the poverty line in round one but they exit poverty and become above the poverty line in round two. The probability of exiting poverty in the second round is expressed as:

$$\Pr (y_{i1} < z_1 \text{ and } y_{i2} > z_2)$$

This probability is captured by the joint distribution of the residuals ε_{i1} and ε_{i2} in both rounds and is rewritten as:

$$\Pr (\varepsilon_{i1} < z_1 - \beta'_1 x_{i1} \text{ and } \varepsilon_{i2} > z_2 - \beta'_2 x_{i2})$$

The correlation between the two residuals depicts the correlation of the unexplained parts of the household's consumption expenditure in the two rounds. In other words, the part that is not explained by the household's idiosyncratic characteristics and included in the error terms in both rounds. The less the correlation between the two error terms, the greater the probability of poverty transition as the consumption expenditure in the second round will be less associated with the consumption expenditure in the first round (Dang et al, 2014). Two sets of assumptions are made on the correlation between the first and second round's error terms. This correlation is assumed to be nonnegative in one case. An extreme case of perfect correlation between the two error terms is also assumed to predict poverty transitions' upper and lower bounds.

If this correlation is assumed to be zero, then the first-round consumption expenditure is to be predicted by a randomly selected replacement of each household in the second round drawn from the first-round predicted residuals' distribution $\hat{\varepsilon}_{i1}^2$.

Consumption expenditure in the first round $\hat{y}_{i1}^2$ is predicted by observations from the second round, particularly by averages of the household's time-invariant idiosyncratic characteristics x_{i1}^2 , alongside the ordinary least square (OLS) estimates of the $\hat{\beta}_1$ parameter. The subscript i refers to the household that is surveyed in the second round.

The estimates of poverty transition measures are derived from the following equation:

$$\hat{y}_{i1}^{2U} = \hat{\beta}_1' \hat{x}_{i1}^2 + \hat{\varepsilon}_{i1}^2$$

The upper bound for the probability that the proportion of poor households in the first round that exit poverty in the second round is given by:

$$\Pr (y_{i2}^2 > z \text{ and } \hat{y}_{i1}^{2U} < z)$$

$$\Pr (\varepsilon_{i1} < z_1 - \beta_1'x_{i1} \text{ and } \varepsilon_{i2} > z_2 - \beta_2'x_{i2})$$

As the estimate of expenditure is randomly drawn from the error distribution, the movement into and out of poverty is estimated by repeating the procedure R times and taking the average of the above equation. Since the correlation between the error terms is assumed to be zero, the above equation estimates the upper bound of poverty movement. Dang et al. (2014) suggest that the lower bound of poverty movement is estimated upon the assumption of perfect positive correlation. When perfect correlation is assumed, then first-round consumption expenditure is directly predicted by the second-round estimates of residuals $\hat{\varepsilon}_{i2}^2$:

$$\hat{y}_{i1}^{2L} = \hat{\beta}_1' \hat{x}_{i1}^2 + \hat{\varepsilon}_{i2}^2$$

The lower bound of poverty movement is predicted and the proportion of the first-round poor households who exited poverty in the second round is given by the probability

$$\Pr (y_{i2}^2 > z \text{ and } \hat{y}_{i1}^{2L} < z)$$

Nevertheless, in the case of predicting the lower bound of poverty movement, the consumption expenditure is not drawn from the estimated error distribution. Therefore, there is no need to repeat the procedure. Using a household-specific residual term drawn from the second-round observations, a measure of poverty transition is estimated. The transitions into and out of poverty are predicted across two rounds of the survey where the same error term is applicable to consumption expenditure. The estimated lower bound of the poverty movement measure is ruled out of the measurement error.

Cruces et al. (2015) employ the parametric estimation framework suggested by Dang et al. (2014) to develop poverty transitional estimates using cross-sectional data. The

parametric framework is preferred because it is easily applicable even by using primitive household welfare surveys available in developing countries. It also allows for estimating narrower ranges of the bounds of transitional estimates when assumptions on the distribution of error terms are imposed.

The model used is constructed upon the assumption that the error terms $\varepsilon_{i1}, \varepsilon_{i2}$ produced by the regression made of data in both rounds have a bivariate normal distribution. The correlation of error terms is non-negative. The correlation coefficient is $\rho > 0$ and the standard deviation of ε_{i1} is $\sigma_{\varepsilon 1}$ and of ε_{i2} is $\sigma_{\varepsilon 2}$. The assumption of log-normality distribution is commonly used to approximate distributions of consumption expenditure.

The percentage of the poor population in the first period who exit poverty in the second period $P(y_{i1} < z_1 \text{ and } y_{i2} > z_2)$ is given with the use of Φ_2 , the bivariate normal distribution function

$$P(y_{i1} < z_1 \text{ and } y_{i2} > z_2) = P(\beta'_1 x_{i2} + \varepsilon_{i1} < z_1 \text{ and } \beta'_2 x_{i2} + \varepsilon_{i2} > z_2)$$

$$P(y_{i1} < z_1 \text{ and } y_{i2} > z_2) = \Phi_2 \left(\frac{z_1 - \beta'_1 x_{i2}}{\sigma_{\varepsilon 1}}, -\frac{z_2 - \beta'_2 x_{i2}}{\sigma_{\varepsilon 2}}, -\rho \right)$$

Evidence exists in the literature regarding the non-negative correlation coefficient of the error terms (Sungur, 2007). For any x, y distributions, ρ is non-negative given by $\frac{\partial \Phi_2(x, y, \rho)}{\partial \rho} = \phi_2(x, y, \rho) > 0$.

Thus, the correlation coefficient ρ indicates the difference between the bounds of the transitional estimate and the true level of household's consumption expenditure. The correlation coefficient has a negative sign in the equation and $\rho \in [0, 1]$. The lower the value of the correlation coefficient ρ , the higher the probability of poverty movement, i.e. the

probability that a household changes its poverty status in the second period. In the non-parametric approach, lower and upper bounds of transitional estimates are produced upon assuming the minimum value of the coefficient correlation for the upper bound, and the maximum value for the lower bound. In the parametric framework, the correlation coefficient takes a value between 0 and 1. A more precise estimate for the value of the correlation coefficient allows for estimating a narrower range for the transitional estimates' bounds.

In the parametric framework, the two error terms in both rounds of the survey have a bivariate normal distribution. The correlation coefficient is non-negative and the standard deviations $\sigma_{\varepsilon 1}$, $\sigma_{\varepsilon 2}$. The correlation coefficient has two hypothesized highest and lowest values with $\rho \in [\rho_S, \rho_H]$ where $0 < \rho_S < \rho_H < 1$. When actual panel data exists, proper values of the correlation coefficient are obtained upon checking the panel data available for the periods of time in question. If panel data for the current period of time does not exist, values are obtained upon checking historical data available for previous years.

In the parametric approach, the upper bound of the transitional estimate indicating poverty movement among different poverty statuses are given as calculated probabilities using the hypothesized smallest value of the correlation coefficient. For the probability of being poor in the first round and remaining poor in the second round, the upper bound is:

$$P^U(y_{i1} < z_1 \text{ and } y_{i2} < z_2) = \Phi_2\left(\frac{z_1 - \beta'_1 x_{i2}}{\sigma_{\varepsilon 1}}, \frac{z_2 - \beta'_2 x_{i2}}{\sigma_{\varepsilon 2}}, \rho_S\right)$$

For the probability of being poor in the first round and exiting poverty in the second round, the upper bound is:

$$P^U(y_{i1} < z_1 \text{ and } y_{i2} > z_2) = \Phi_2\left(\frac{z_1 - \beta'_1 x_{i2}}{\sigma_{\varepsilon 1}}, -\frac{z_2 - \beta'_2 x_{i2}}{\sigma_{\varepsilon 2}}, -\rho_S\right)$$

For the probability of being non-poor in the first round and entering poverty in the second round, the upper bound is:

$$P^U(y_{i1} > z_1 \text{ and } y_{i2} < z_2) = \Phi_2\left(-\frac{z_1 - \beta'_1 x_{i2}}{\sigma_{\varepsilon 1}}, \frac{z_2 - \beta'_2 x_{i2}}{\sigma_{\varepsilon 2}}, -\rho_S\right)$$

For the probability of being non-poor in the first round and remaining non-poor in the second round, the upper bound is:

$$P^U(y_{i1} > z_1 \text{ and } y_{i2} > z_2) = \Phi_2\left(-\frac{z_1 - \beta'_1 x_{i2}}{\sigma_{\varepsilon 1}}, -\frac{z_2 - \beta'_2 x_{i2}}{\sigma_{\varepsilon 2}}, \rho_S\right)$$

Lower bounds of transitional estimates are obtained using the same procedure but using the hypothesized highest value of the correlation coefficient instead ρ_H . When the true value of the correlation coefficient is specified, then the special case that the bounds of transitional estimates are reduced to a point estimate occurs.

As is the case with the non-parametric framework, the time-invariant variables that represent the idiosyncratic household characteristics should hold the same distributions in both rounds. Transitional estimates are calculated using estimated parameters from both rounds of the survey but using the data from the second period's survey. However, the same procedures could be applied using the data from the first round of the survey. Similar results are supposed to be obtained accordingly.

Transitional estimates on poverty movements are obtained among different poverty status. For example, moving from the status of poverty in the first round of the cross-sectional survey to the status of non-poverty in the second round of the survey. Transitional estimates of the reversal poverty movement are also obtained. For instance, from being non-poor in the first round of the survey to being poor in the second round of the survey. Transitional estimates of

poverty movement among similar statuses, like for instance remaining in poverty status or remaining in non-poverty status are also obtained.

In addition to the transitional estimates on poverty movement, the possibility of obtaining estimates of joint distribution on the basis of multiple threshold lines also exists. For instance, providing transitional estimates on vulnerability transition. This allows for monitoring the transition of moving from poverty status to a vulnerability to poverty status and vice versa. This approach is functional in monitoring household poverty status and vulnerability to poverty status. For instance, moving from a vulnerability status or high vulnerability status in the first round of the cross-sectional survey to a poverty status in the second round of the survey. Transitional estimates for the movement from vulnerability to poverty status to poverty status are crucial in validating vulnerability measures predicted in one round of the cross-sectional welfare survey. Transitional estimates predicted by this chapter building on Dang et al. (2014) and Cruces et al. (2015) are aimed to observe vulnerability to poverty transitions. Transitional estimates predicted by this method work on a nationwide level. It also could be developed for smaller groups of the population. Group-level transitional estimates are functional in designing poverty prevention policies and policies that target groups of the population who are in chronic poverty or are highly vulnerable to poverty. Such group-level transitional estimates provide policymakers with a toolkit to prioritize these groups of the population in policy allocations. Group-level transitional estimates also have the advantage of being less demanding for large samples of the population. This is particularly an essential characteristic of welfare surveys in developing countries where large samples are hard to achieve.

When presenting the results, in order to check the applicability of the key assumption of normality, the error terms in the regressions in both periods of the survey of household

consumption expenditure on time-invariant idiosyncratic household characteristics are plotted. The distributions of the error terms in both periods of the survey are visually very similar. Accordingly, the hypothetical case that all the key assumptions are satisfied is used to provide poverty transitional estimates.

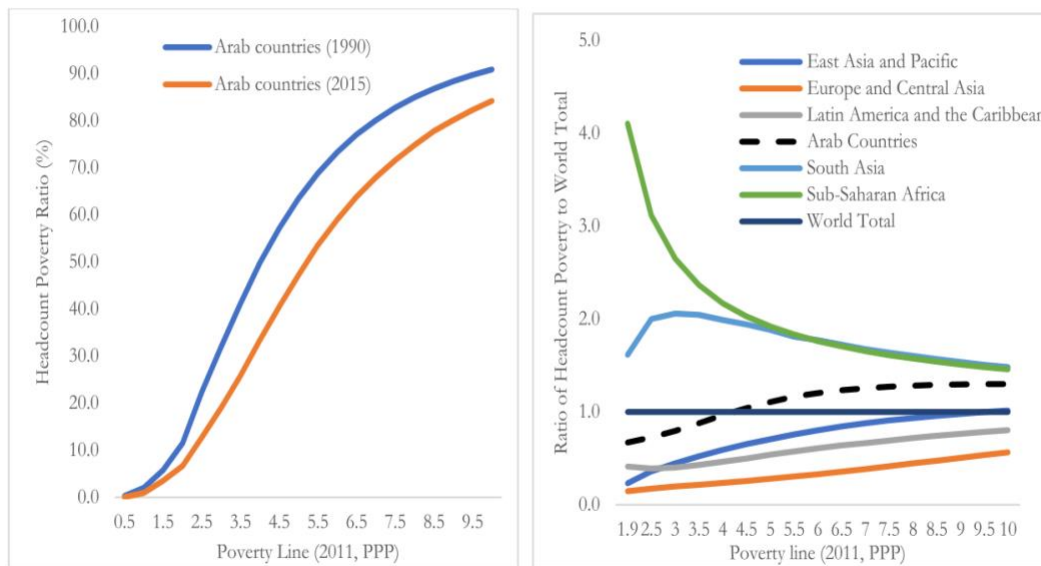
1.4 Discussion and Findings

1.4.1 Post-Arab Uprisings Poverty Profile in MENA

The aim of this chapter is to assess changes in levels of well-being brought about by the transitional context of the Arab uprisings. In order to evaluate development prospects in the aftermath of the Arab uprisings, it is mandatory to describe the pre-revolution development context in our sample of Arab countries.

Some MENA countries, particularly Jordan, Tunisia, Egypt, Morocco, Libya, and Yemen, denoted in 2011 as Arab countries in transition (ACTs), in general, have witnessed a period of remarkable economic growth rate during the two decades that preceded the Arab uprisings. In particular, during the years between 2000 and 2010, rates of economic growth were satisfactory in ACTs (Ghanem, 2016). Accordingly, with the exception of Yemen, rates of extreme poverty (set at \$2 a day) declined in all of Jordan, Tunisia, Egypt, and Morocco during the decade that immediately preceded the Arab revolution. As shown in Figure 1, until 2008 income poverty on average was considered low in the MENA region relative to other regions of the world. However, some countries were excluded from these statistics like Yemen and Djibouti which recorded the highest rates of income poverty in the world for years (Ncube and Anyanwn, 2012).

Figure 1-Headcount Poverty Ratio – Arab Countries – Poverty Line (2011, PPP)



Source: Abu-Ismaïl and Al-Kiswani (2018) from World Bank online Datasets POVCAL.NET

With the limit of \$2 a day for the lower-middle-class status, proportions of the households that are below the poverty line declined in many ACTs. However, the increases in the proportions of middle-class of the population were more leaning toward the lower bound of the middle-class status. Large proportions of Arab households transited out of poverty. Nevertheless, they remained at the lower-middle-class status closer to the threshold of the poverty line. In Egypt, 36.5 million of the population were in a lower-middle-class position by the early 1990s. This proportion increased to 57.2 million right before the Egyptian revolution. In Morocco, this proportion increased from 14.4 million in the 1990s to 19 million in 2010. The lower-middle-class proportion of the households stuck in lower-middle class status was 4.5 million and did not change since the 1990s (Ghanem, 2016). It is considered a huge proportion relative to the entire population of Tunisia which was 10.64 million in 2010.

In general, poverty rates are higher in rural areas of ACTs than in urban areas. Gaps in standards of living between rural and urban areas are common themes in ACTs. World

Development Indicators show that poverty rates in Egypt and Yemen are double in rural areas than in urban areas. In Morocco, the poverty rate in rural areas is three times higher than the poverty rate in urban areas. Cross-regional variations in poverty rates also exist in ACTs. In terms of regional poverty rates, Egypt is divided into 4 main regions. Metropolitan region that includes large cities like Cairo and Alexandria. Border region that includes infertile lands close to eastern and western boards with Libya and Sinai. The upper region that includes the southern part of the Nile valley, and the lower region that includes the fertile area of the Nile delta. Each of these regions in its turn is divided into rural and urban areas. The upper region of Egypt is considered a very special case. For socio-economic reasons, the region has been outcasted from growth despite the fact that 50 percent of Egypt's population are dwellers of the upper region. 67 percent of the poor population in Egypt and 83 percent of the extremely poor households are dwellers of that particular region. Meanwhile 71.5 percent of extremely poor households live in rural areas of the upper region, urban areas of the same region have 11.6 percent of the extremely poor, and 11.3 of the poor households (Ghanem, 2016)

Cross-regional differentials in poverty rates also exist in Tunisia. Though divided into 8 regions, regional differentials are common among regions. Poverty rates are higher in western regions relative to other parts of the country. Poverty rates are also much higher in rural areas compared to urban areas. 23.3 percent of the households are poor in the midwestern part against 25.9 percent in the northwestern part, and poverty rates in rural areas are twice the rates of poverty in urban areas.

Updated World Bank statistics on poverty between the years 2013 and 2015 show an escalating extreme poverty rate in the Arab world. A fifth of the population in the Arab countries is in extreme poverty with two of the populations either below the poverty line or vulnerable to multidimensional poverty. Rates of extreme poverty were declining since the

1990s in the Arab world. Nevertheless, rates of vulnerability to poverty are increasing in association with increased rates of deprivation in health, education, and basic water and sanitation services (Abu-Ismaïl and Al-Kiswani, 2018b).

The multidimensional poverty index (MPI) developed by ESCWA report 2017 measures household poverty in a sample of 10 countries in the MENA region (Abu-Ismaïl and Al-Kiswani, 2018a). The MPI is constructed on 3 dimensions of individual welfare. The dimension of education is gauged using the school attendance indicator and years of schooling indicator. The dimension of health is gauged using indicators for nutrition, child mortality, and early pregnancy. Standards of living are gauged using nine indicators that reflect basic household assets including access to safe resources of drinking water, access to electricity, and access to proper sanitation services. For each indicator, deprivation rates are used to express the household's deprivation status relative to rates of poverty and acute poverty. For instance, for the dimension of education, particularly for years of schooling indicator, a household is considered in acute poverty if none of the household's members has completed primary education. This is considered the deprivation threshold for acute poverty. For poverty, the deprivation threshold is set at a secondary education level. A household is considered in poverty if none of the household members has completed secondary school. Upon comparing households' deprivations scores, households are classified into deprivation status of multidimensional poverty or acute multidimensional poverty (Abu-Ismaïl and Al-Kiswani, 2018a). Taking a sample of 10 MENA countries to calculate household deprivation and the percentage of households that are in acute poverty, the ESCWA measure of multidimensional poverty classifies Egypt, Tunisia, Jordan, and Algeria among the MENA countries that have low levels of acute poverty. Iraq and Morocco are clustered among the countries with a low level of acute poverty and medium levels of poverty. Yemen and Sudan are among the countries with high levels of acute poverty (ESCWA Report, 2017). It is shown that 13.4% of

these countries' population, amounts to 38.2 million are in acute poverty, and 40.6% of the households, amounts to 116.1 million, are in poverty. Acute poverty is associated with high rates of household deprivation. It is shown that the incidence of child deprivation is high in the Arab states. 44.1% of the children, which amounts to 52.5 million, are below the poverty line, and 29.3 million are in acute poverty.

Poverty in the Arab states is attributed to the post-Arab uprisings' economic and political conditions that caused a decline in economic growth rates. Declining growth rates and the associated insufficient public policy and strategic planning caused differential in standards of living and individual levels of welfare. The resulting rising poverty rates caused dire social consequences and increased rates of vulnerability to poverty. ESCWA measures of multidimensional poverty show that 25% of the population of MENA countries is vulnerable to severe poverty. The incidence of household poverty is more probable than the incidence of falling into acute poverty. Yet, household vulnerability to severe poverty rates contradict the statements on low rates of poverty in the MENA region. High rates of household deprivation increase rates of vulnerability to falling into severe poverty. In the first cluster of countries which includes Egypt, Tunisia, Jordan, and Algeria, 11.8% of the households are vulnerable to acute poverty. In the second cluster of Iraq and Morocco, the percentage of households that are vulnerable to acute poverty is 16.2%. In Yemen and Sudan, it is 20.4%. When it comes to vulnerability to poverty rather than acute poverty, the first and second clusters of countries are characterized by low rates of incidence of poverty. Nevertheless, 27.1% of households in the first cluster of countries are vulnerable to poverty. The percentage is 31% in the second cluster of countries. So, 40% of the population in the MENA region is vulnerable to poverty while almost 60% of the population is either below the poverty line or is vulnerable to poverty.

Differentials in rates of poverty and acute poverty exist at the national level of each country among rural and urban areas. Differentials in household characteristics are also reasons for differentials in household's vulnerability to poverty. Poverty rates and acute poverty are higher in rural areas relative to urban areas. Large-sized households with more educated heads are less vulnerable to severe poverty. Households with less educated heads are 8 times more vulnerable to fall into acute poverty, and so do lower-income households in the bottom quantile of wealth.

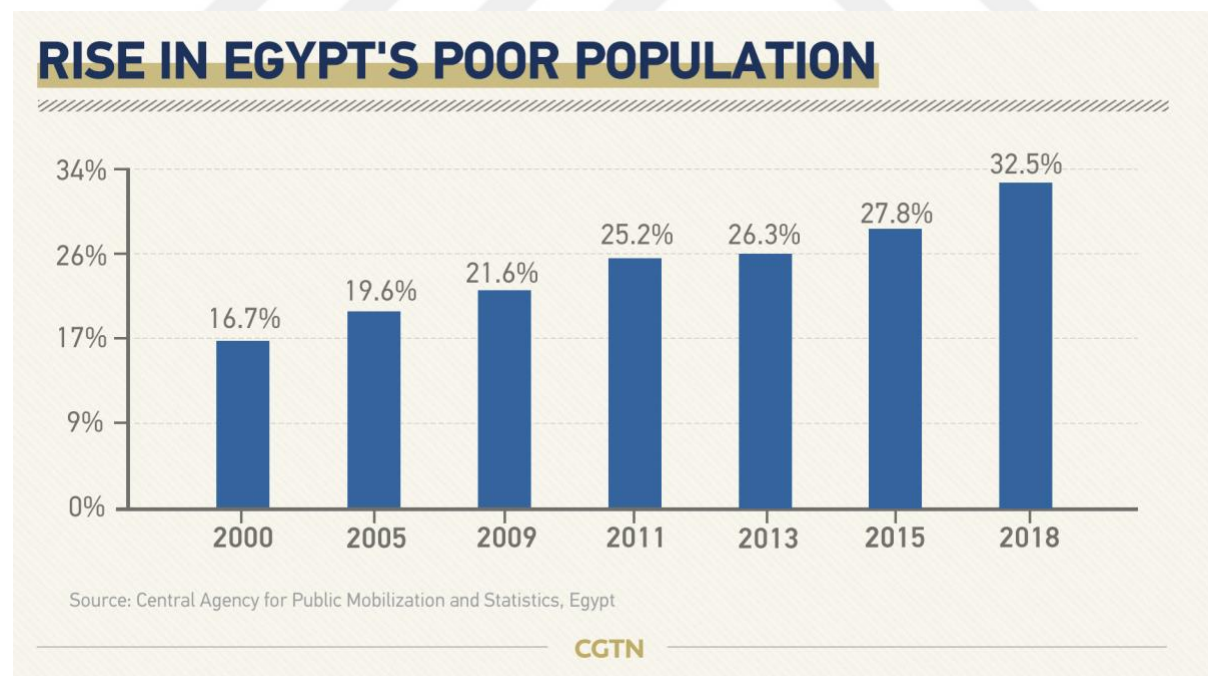
A common finding in all countries was the observed large contribution of the dimension of education to the multidimensional poverty measure. Deprivation of access to education both in terms of school attendance and years of schooling is a primary source of multidimensional poverty and acute multidimensional poverty. The dimension of living conditions particularly in terms of ownership of assets and adequate housing conditions has the second largest contribution in many countries (Abu-Ismaïl and Al-Kiswani, 2018a).

Similarities exist in the experience of Tunisia and Egypt with the Arab uprisings. Unlike the case in Libya, Syria, and Yemen, in both Tunisia and Egypt the regime was toppled by a nonviolent civil uprising. The civil uprising in Egypt toppled Hosni Mubarak who ruled the country for 30 years a couple of weeks after the beginning of the uprising on January 25th, 2011. Nevertheless, the president who was elected in the aftermath of the uprising was again ousted by a coup d'état one year later, the thing that remarks the uniqueness of Egypt's experience with the Arab uprisings. The president was ousted accordingly on January 2013 causing a rift in both the political and economic arenas. On the political wise, the rift is represented by a polarization between two coalitions: The 2013 Coalition that pioneered the coup d'état, and the Legitimacy Coalition that represents the opposition current. On the economic wise, the debate is over the efficiency of economic policies in encouraging growth

where, on one side, calls for the adoption of mega strategic projects of infrastructure, and on the other side call for economic reforms inspired by IMF policies and the prioritization of providing more protection to the vulnerable groups of the population. Figure 2 demonstrates the rise in the percentage of the poor population in Egypt immediately in the aftermath of the Arab uprisings.

Though the percentage of the population under the poverty line at the US \$2 per day threshold was rising, Figure 3 shows a volatile pattern of the change in the percentage of the poor population under the US \$5.5 per day threshold. The percentages were decreasing until 2015. But there was a subsequent hike between the years 2015 and 2017.

Figure 2-Rise in Egypt's Poor Population (2000-2018)



Source: Bhaya A. G. (2019) Central Agency for Public Mobilization and Statistics – Egypt

Egypt has undergone two rounds of political transitions in a short-run timeframe. This is what makes Egypt's experience with the Arab uprisings wave of democratization a unique one relative to other Arab countries. The prolonged process of initial transition in 2011, then the consequent counter-revolution in 2013, slowed down measures of economic growth and caused dire consequences on living standards that have witnessed deterioration in the post-revolution era. In order to enhance its legitimacy, the current incumbent government addressed mega projects that contributed to the deterioration of the socio-economic situation and the massive wave of illegal migration to Europe through Libyan borders among the youth. Redirecting the subsidies to social development towards mega infrastructure projects that may yield revenue only in the long run has caused an inflationary impact associated with escalating rates of unemployment.



Figure 3-Poverty in Egypt - % Under US \$5.50 Per Day

Figure 3.A – Poverty in Egypt - % Under US \$5.50 Per Day (1990-2017)

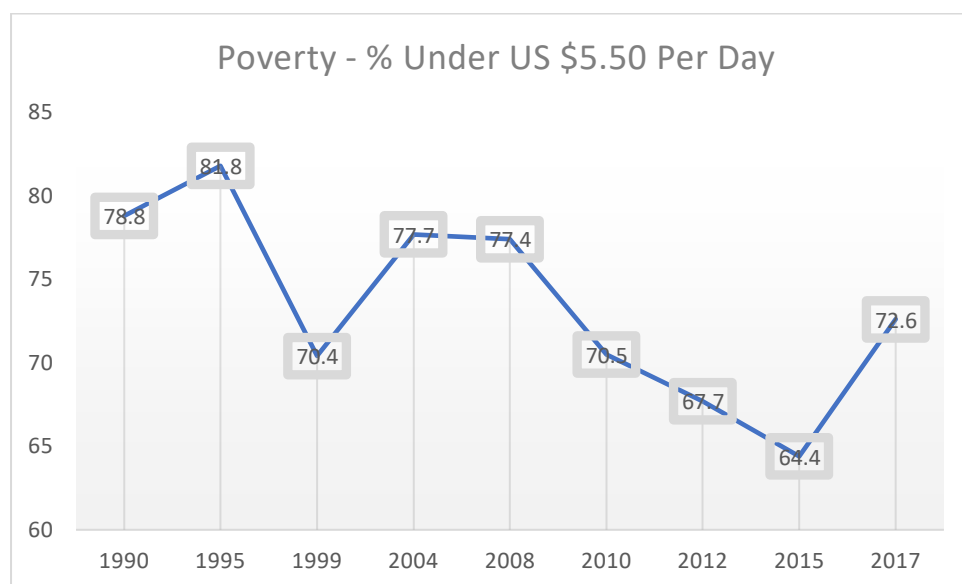
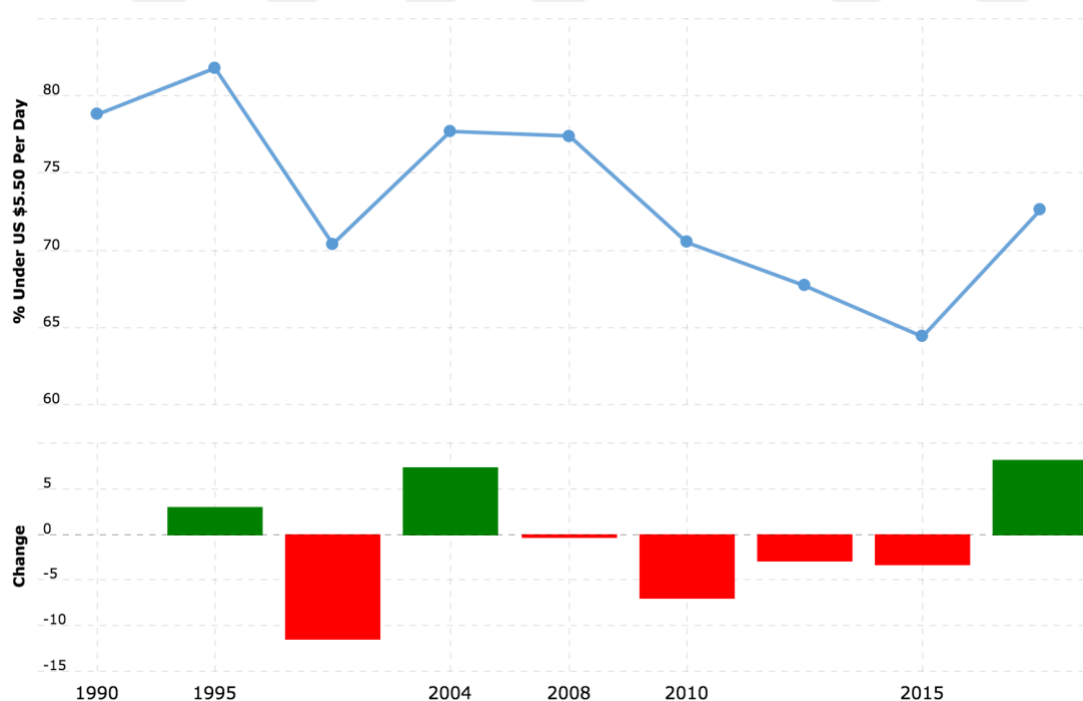


Figure 3.B – Poverty in Egypt - % Under US \$5.50 Per Day & Percentage Change (1990-2017)

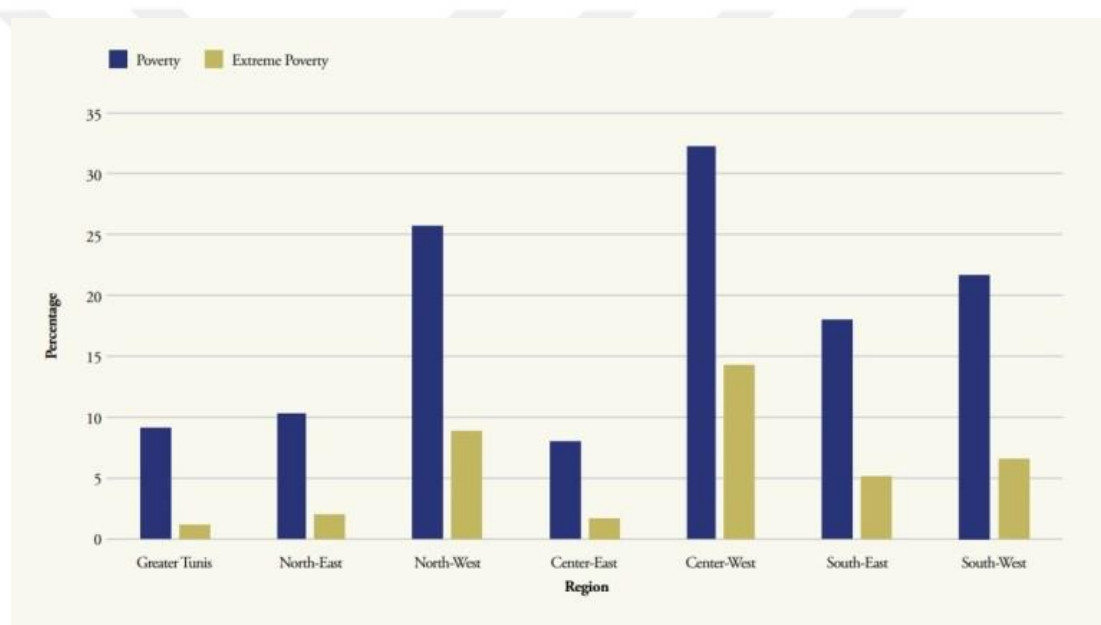


Date Source: World Bank Egypt Poverty Rate 1990-2021.

www.macrotrends.net. Retrieved 2021-11-30 Macrotrends

Post-revolution poverty profile in Tunisia does not present any substantial improvements in household standards of living or consumption expenditure levels. For some groups of the poor population, standards of living even worsened between the years 2010 and 2012. Poor household housing conditions were getting worse, particularly in rural areas where poverty is more concentrated compared to urban areas (Revenga et al., 2016). As shown in Figure 4, the remarkable characteristic of changes in levels of well-being in Tunisia after the Arab uprisings is the increased regional disparities in rates of poverty and extreme poverty.

Figure 4 - Tunisia 2010 Poverty and Extreme Poverty Rates by Region



Source: The National Institute of Statistics Database – General Census of the Population and the Household 2014 by Governorates.

In 2012, gaps between the poor and non-poor populations were widening. Unemployment rates were observed to be higher among the poor population relative to the non-poor population. Access to basic services and property ownership was observed with limited ranges among the poor populations. A large share of the poor population and a relatively smaller share of the non-poor population constitute the bottom 40 percent of the population in terms of consumption expenditure level. Gaps in standards of living did not exist

only among poor and non-poor groups of the population, they also existed among different regions where coastal regions have always had privileges relative to other regions of the country (Dridi, 2021). These poverty gaps and disparities in standards of living among different regions and social groups are evidence of the mismanagement of policy reforms conducted after 2011. Strategies of development planning and policy reforms that were announced in the post-revolution era did not alter levels of social justice.

Alongside rising poverty gaps and regional disparities in standards of living, achieving improvements in levels of investments in business startups and local human development has been among the priorities of the consecutive governments of Tunisia in the post-revolution era. The National Development Plan (ESCWA2016) has set the outlines for policy reforms and development strategies for the years 2016-2020. The national plan aimed to reduce the regional gap in development indicators by 30%. It also aimed to achieve the target of a 4% GDP growth rate and a 30% increase in levels of high growth rate economic activities. The poverty rate was supposed to be reduced by 2%. The unemployment rate was supposed to be reduced from 15% to 12% with the creation of 400,000 job opportunities. Nevertheless, not much has been achieved so far. The current situation in Tunisia shows larger development disparities among different regions. 90% of employment opportunities are concentrated in coastal areas which constitute almost 80% of the urban areas. Recent intense urbanization rates led to the concentration of economic activities and employment opportunities in the privileged coastal regions. Meanwhile, internal regions remained behind in terms of urbanization. They constitute a major part of the country's rural areas that are still dominated by a primitive agrarian sector and farming activities.

The already fragile Tunisian economy suffered further deterioration due to the political instability that was inflicted on the country after the 2011 revolution. Particularly during recent

years that witnessed a decrease of GDP by 8.6%, an increase in public debt by 87.6% as a percentage of GDP, an increase of 10.2% of the budget deficit, and a huge burden of external debt that reached 30 billion dollars (Dridi, 2021). By the end of 2020, the poverty rate increased from 14% to 21%, and the unemployment rate also increased from 15% to 17.5%.

1.4.2 Interpreting and Using Vulnerability Estimates

This section is dedicated to explaining how to interpret vulnerability estimates used in the data analysis section. In this section, a household vulnerability measure is generated for each household in the population. Interpreting the results requires more than merely demonstrating the distribution of vulnerability measures of each household. The key properties of the generated distribution are to be summarized using wisely selected summary statistics.

The mean of household vulnerability rate is one of the useful summary measures in interpreting the properties of the underlying vulnerability distribution. Another useful summary measure is the proportion of the population that is considered vulnerable, in other words, the proportion of the households whose vulnerability measure is higher than a particular threshold of vulnerability.

In the absence of the impact of aggregate shocks on levels of consumption, a particular group's mean vulnerability level is almost the same as the group's observed poverty rate. The groups of the population who have higher vulnerability level contributes more to the total measure of mean vulnerability than the groups with lower vulnerability level. When compared to poverty assessment measures that depend only on the average rate of poverty, mean vulnerability level captures a better view of the groups who are on the verge of becoming poor regardless of their current poverty status.

The second summary measure that is used to assess vulnerability level is the fraction of the vulnerable population. Household vulnerability level is measured relative to a particular vulnerability threshold. A household that experiences a vulnerability level that is higher than this particular threshold is considered vulnerable. The choice of vulnerability threshold to large extent is arbitrary. Nevertheless, two vulnerability thresholds are widely considered in assessing household vulnerability level. The first is the population poverty rate which represents the population's average vulnerability level. A household that experiences a vulnerability level that is higher than the observed poverty rate is considered vulnerable. However, two different populations with totally different fractions of poor households could have the same observed poverty rate, but with different incidents of poverty. In a population where a fraction of 20% has a vulnerability level that equals 1 and a fraction of 80% with a vulnerability level that equals 0, the observed poverty rate is 20%. It is also 20% in a population where 100% of the population with a vulnerability level that equals 0.20. In the former population, 20% of the population is vulnerable to poverty, meanwhile, the entire population is vulnerable to poverty in the latter though both populations experience the same poverty threshold. Thus, an alternative threshold is suggested. Denoted as the high vulnerability threshold, the 0.50 threshold is also used in vulnerability assessment. A household that experiences a vulnerability level that exceeds the 0.50 threshold faces a high probability to fall into poverty and is considered highly vulnerable.

The vulnerability to poverty ratio suggested by Pritchett et al. (2000) is used to measure the extent to which vulnerability is dispersed in the population. It is the ratio of the proportion of vulnerable population with a vulnerability level that exceeds a given threshold to the proportion of the poor population. The higher the vulnerability to poverty ratio, the more egalitarian the vulnerability distribution is as it indicates that vulnerability is widely dispersed in the population. Meanwhile, the lower the vulnerability to poverty ratio, the less egalitarian

the distribution. A low ratio of vulnerability to poverty indicates that vulnerability is concentrated in a small proportion of the population.

1.4.3 Egypt

Table 1 shows aggregate poverty and vulnerability to poverty profiles in Egypt for the years 2008, 2012, and 2015. The notion that poverty measures and vulnerability measures are different is confirmed by the results in that not all poor households are identified as vulnerable to poverty, and not all vulnerable households are identified as poor. In other words, the status of being currently under the poverty line does not perfectly determine the probability for a household to experience poverty at some point in the future.

The vulnerability threshold is given by the population poverty rate. It is the rate by which the incidence of poverty observed each year is measured in the given population. A remarkable proportion of currently poor households are vulnerable to poverty at a given time in the future. Notwithstanding, a proportion of currently poor households that are not necessarily to be vulnerable to poverty in the future exist. Alongside a proportion of currently non-poor households that are still vulnerable to poverty at a future point in time. Some currently non-poor households could experience a high ex-ante probability of poverty, in other words, a high level of vulnerability to poverty. In 2008 in Egypt, a large proportion of non-poor households were highly vulnerable to poverty at a given point in the future. On the contrary, some currently poor households may experience a low ex-ante probability of poverty, accordingly are considered nonvulnerable to poverty despite their current incidence of poverty.

Table 1 - Aggregate Poverty and Vulnerability Profiles, - Egypt 2008, 2012, 2015

Aggregate Poverty and Vulnerability Profiles, Egypt 2008									
	Overall	Amongst the poor	Amongst the non-poor	Amongst the vulnerable	Amongst the non- vulnerable	Amongst the highly vulnerable	Expenditure Gap	Vulnerability to Poverty Ratio	Mean Vulnerability
Mean per capita consumption expenditure*	17,087	10,413	23,758	12,097	23,658	9,735	14,023	1.14	0.53
Fraction poor	0.50	1.00	0.00	0.74	0.19	0.93			
Fraction vulnerable	0.57	0.84	0.30	1.00	0.00	1.00			
Fraction highly vulnerable	0.25	0.49	0.49	0.43	0.00	1.00			
Aggregate Poverty and Vulnerability Profiles, Egypt 2012									
Mean per capita consumption expenditure	25,813	15,339	33,634	17,885	34,669	12,675	20,958	1.23	0.50
Fraction poor	0.43	1.00	0.00	0.70	0.12	0.98			
Fraction vulnerable	0.53	0.87	0.27	1.00	0.00	1.00			
Fraction highly vulnerable	0.15	0.34	0.26	0.28	0.00	1.00			
Aggregate Poverty and Vulnerability Profiles, Egypt 2015									
Mean per capita consumption expenditure	38,013	23,702	50,873	27,954	50,363	9,219	41,653	1.16	0.55
Fraction poor	0.47	1.00	0.00	0.71	0.18	0.43			
Fraction vulnerable	0.55	0.83	0.30	1.00	0.00	1.00			
Fraction highly vulnerable	0.26	0.55	0.49	0.47	0.00	1.00			

Source: Own calculations based on Economic Research Forum dataset.

*Measured in constant local currency converted by purchasing power parity (PPP) conversion factor

Table 1 shows that in 2008, the overall percentage of households observed in poverty is 50%. 57% were observed to be vulnerable to poverty, and 25% were observed to be highly vulnerable. The estimated probability of experiencing poverty at a given period of time in the future for 57% of the population's households is higher than the mean risk of the incidence of poverty. The average risk of the incidence of poverty understates the proportion of households that are falling into poverty at a given time in the future. The mean vulnerability rate in 2008 was 53%. The mean probability for an average household to fall into poverty in the future,

whether currently poor or non-poor, is 50%. The vulnerability to poverty ratio is 1.14 indicating that the proportion of the vulnerable population exceeds the proportion of the poor population.

Table 1 shows a high range of differentials in mean per capita consumption expenditure level. Expenditure is measured in constant local currency converted by purchasing power parity (PPP) converting factor. The overall average per capita consumption expenditure is 17,807. Among the poor households, the average is 10,414 which is almost 7,400 less than the overall average. Among the non-poor households, the average per capita consumption expenditure is 23,760. The consumption gap relative to the average poor population is 13,346. The gap of 11,561 also exists among the poor vulnerable households with a 12,098 average consumption expenditure, and poor non-vulnerable households with an average of 23,659. The average consumption expenditure among highly vulnerable households is 9,736. So, the largest gap of 14,023 in average consumption expenditure is between the average amongst the non-poor households and the average amongst the highly vulnerable households.

Out of the nationwide 50% poor households, 74% are vulnerable to poverty. Only 18% of the non-vulnerable households are currently poor. Almost 94% of the highly vulnerable to poverty households are currently in poverty. Out of the nationwide 57% vulnerable households, 84% are among the currently poor households. 30% of the nationwide vulnerable households are currently non-poor. Out of the nationwide 25% highly vulnerable households, almost 49% of them are currently poor, and 49% are currently non-poor. Moreover, almost 43% of the vulnerable households are considered highly vulnerable to poverty in the future.

In 2012, the overall percentage of households observed in poverty slightly decreased to 43%. Also, the percentage of households who are vulnerable to poverty slightly decreased to 53%. The percentage of the highly vulnerable population decreased to 15%. The estimated probability of experiencing poverty at a given period of time in the future for 53% of the

population's households is higher than the mean risk of the incidence of poverty. The average risk of the incidence of poverty understates the proportion of households that are falling into poverty at a given time in the future. The mean vulnerability rate in 2012 was slightly decreased to 50%. The mean probability for an average household to fall into poverty in the future, whether currently poor or non-poor, decreased to 50% in 2012. The vulnerability to poverty ratio is 1.23 indicating that the proportion of vulnerable households exceeds the proportion of poor households. It also indicates that the population became slightly more egalitarian in terms of poverty distribution. The proportion of poor households and vulnerable households slightly decreased in 2012, and the distribution of vulnerability to poverty became more egalitarian.

Differentials in mean per capita consumption expenditure level have significantly increased in 2012. The overall average per capita consumption expenditure increased to 25,814. Among the poor households, the average is 15,393 which is almost 10,421 less than the overall average. Among the non-poor households, the average per capita consumption expenditure is 33,634. The consumption gap relative to the average of the poor population is 18,241. The gap of 16,784 also exists among the poor vulnerable households with a 17,885 average consumption expenditure and poor non-vulnerable households average of 34,669. The average consumption expenditure among the highly vulnerable household is 12,676. So, the largest gap of 20,959 in average consumption expenditure is between the average amongst the non-poor households and the average amongst the highly vulnerable households.

Out of the nationwide 43% poor households, 70% are vulnerable to poverty. Only 19% of the non-vulnerable households are currently poor. Almost 98% of highly vulnerable to poverty households are currently in poverty. Out of the nationwide 53% vulnerable households, 87% are among the currently poor households. 27% of the nationwide vulnerable households are currently non-poor. Out of the nationwide 15% highly vulnerable households, almost 34%

of them are currently poor, and 26% are currently non-poor. Moreover, almost 28% of the vulnerable households are considered highly vulnerable to poverty in the future. These results in general confirm the notion that is stated by the increased vulnerability to poverty ratio relative to the one of 2008. In other words, vulnerability to poverty is more dispersed and the distribution of vulnerability to poverty became more egalitarian among the fractions of the poor and non-poor population.

In 2015, the overall percentage of households observed in poverty increased again to 47%. Also, the percentage of households who are vulnerable to poverty slightly increased to 55%. The percentage of the highly vulnerable population increased to 26 %. The estimated probability of experiencing poverty at a given period of time in the future for 55% of the population's households is higher than the mean risk of the incidence of poverty. The average risk of the incidence of poverty understates the proportion of households that are falling into poverty at a given time in the future. The mean vulnerability rate in 2015 increased to 55%. The mean probability for an average household to fall into poverty in the future, whether currently poor or non-poor, increased to 55% in 2015. The vulnerability to poverty ratio is 1.16 indicating that the proportion of the vulnerable population exceeds the proportion of the poor population. It also indicates that the population became slightly less egalitarian in terms of poverty distribution. The proportion of poor population and vulnerable population was slightly increased again in 2015, and the distribution of vulnerability to poverty became less egalitarian.

Differentials in mean per capita consumption expenditure level have significantly increased in 2015. The overall average per capita consumption expenditure increased to 38,014. Among the poor households, the average is 23,703 which is almost 14,311 less than the overall average. Among the non-poor households, the average per capita consumption expenditure is 50,874. The consumption gap relative to the average poor population is 27,171.

The gap of 22,408 also exists among the poor vulnerable population with a 27,955 average consumption expenditure and the poor non-vulnerable population average of 50,364. The average consumption expenditure among the highly vulnerable household is 9,220. So, the largest gap of 41,651 in average consumption expenditure is between the average amongst the non-poor population and the average amongst the highly vulnerable population.

Out of the nationwide 47% poor households, 71% are vulnerable to poverty. Only 19% of the non-vulnerable households are currently poor. Almost 98% of highly vulnerable to poverty households are currently in poverty and 43% are highly vulnerable. Out of the nationwide 55% vulnerable households, 83% are among the currently poor households. 30% of the nationwide vulnerable households are currently non-poor. Out of nationwide 26% highly vulnerable households, almost 55% of them are currently poor, and 49% are currently non-poor. Moreover, almost 26% of the vulnerable households are considered highly vulnerable to poverty in the future. These results in general confirm the notion that is stated by the increased vulnerability to poverty ratio relative to the one of 2008. However, the vulnerability to poverty ratio increased relative to the one of 2012. In other words, vulnerability to poverty is less dispersed and the distribution of vulnerability to poverty became less egalitarian among the fractions of the poor and non-poor population.

Table 2 provides further detailed aggregates on poverty and vulnerability to poverty in Egypt but within different segments of the population, particularly by geographical location as households classified into dwellers of rural and urban areas.

Table 2 - Poverty and Vulnerability within Different Segments: by Geographical Location - Egypt 2008, 2012, 2015

Poverty and Vulnerability within Different Segments: by Geographical Location, Egypt 2008						
	Population Share	Fraction Poor	Fraction Vulnerable	Fraction Highly Vulnerable	Mean Vulnerability	Vulnerability to Poverty Ratio
By Location						
Rural	0.54	0.59	0.70	0.33	0.52	1.18
Urban	0.46	0.39	0.41	0.15	0.56	1.05

Poverty and Vulnerability within Different Segments: by Geographical Location, Egypt 2012						
	Population Share	Fraction Poor	Fraction Vulnerable	Fraction Highly Vulnerable	Mean Vulnerability	Vulnerability to Poverty Ratio
By Location						
Rural	0.56	0.49	0.62	0.19	0.40	1.27
Urban	0.44	0.35	0.42	0.09	0.44	1.17

Poverty and Vulnerability within Different Segments: by Geographical Location, Egypt 2015						
	Population Share	Fraction Poor	Fraction Vulnerable	Fraction Highly Vulnerable	Mean Vulnerability	Vulnerability to Poverty Ratio
By Location						
Rural	0.56	0.56	0.64	0.88	0.31	1.15
Urban	0.44	0.36	0.44	0.19	0.71	1.20

Source: Own calculations based on Economic Research Forum dataset

In 2008, the poor population in the sample surveyed was divided into 54% dwellers of rural areas against 46% dwellers of urban areas. Meanwhile 39% of the households who resided in urban areas in 2008 were observed to be poor, 59% of the households who resided in rural areas were under the poverty line. The fraction of the vulnerable population in rural areas is 70% against 41% in urban areas. In rural areas, the fraction of the highly vulnerable population is 33% against 15% in urban areas. The mean vulnerability rate in rural areas was up to 52%. However, it is higher in urban areas where it is up to 56%. Thus, there is a 56% probability for

an average household in urban areas to be vulnerable to poverty at a future point in time. The vulnerability to poverty ratio is higher in rural areas than in urban areas. In rural areas, the ratio is 1.18 against 1.05 in urban areas. In both communities, the ratios indicate that the fraction of households that are vulnerable to poverty exceeds the fraction of poor households. But in rural areas, the community is more egalitarian in terms of vulnerability distribution as vulnerability to poverty is more highly dispersed in rural areas than of what it is in urban areas.

In 2012, the poor population in the sample surveyed was divided into 56% dwellers of rural areas against 44% dwellers of urban areas. Meanwhile 33% of the households who resided in urban areas in 2012 were observed to be poor, 49% of the households who resided in rural areas were under the poverty line. The fraction of the vulnerable population in rural areas decreased to 62% against 42% in urban areas which slightly increased from the percentage in 2008. In rural areas, the fraction of the highly vulnerable population decreased to 19%, and 9% in urban areas. The mean vulnerability rate in rural areas was up to 40%. It is higher in urban areas where it is up to 44%. However, mean vulnerability rates in both rural and urban areas were lower than the mean rates of vulnerability to poverty in 2008. Thus, in 2012, there is a 44% probability for an average household in urban areas to be vulnerable to poverty at a future point in time. The vulnerability to poverty ratio is higher in rural areas than in urban areas. In rural areas, the ratio is 1.27 against 1.17 in urban areas. In both communities, the ratios indicate that the fraction of households that are vulnerable to poverty exceeds the fraction of the poor population. But in rural areas, the community is more egalitarian in terms of vulnerability distribution as vulnerability to poverty is more highly dispersed in rural areas than of what it is in urban areas.

In 2015, the poor population in the sample surveyed was divided into 56% dwellers of rural areas against 44% dwellers of urban areas. Meanwhile 56% of the households who resided

in urban areas in 2015 were observed to be poor, 36% of the households who resided in rural areas were under the poverty line. The fraction of the vulnerable population in rural areas has slightly increased to 64% against 44% in urban areas which has also slightly increased from the percentage in 2012. In rural areas, the fraction of the highly vulnerable population significantly increased to 88% compared to 19% in 2012. It also increased to 19% in urban areas compared to 9% in 2012. The mean vulnerability rate in rural areas was up to 31%. However, it is higher in urban areas where it is up to 71%. In 2015, there is a 71% probability for an average household in urban areas to be vulnerable to poverty at a future point in time. The vulnerability to poverty ratio is slightly higher in urban areas than in rural areas. In rural areas, the ratio is 1.15 against 1.20 in urban areas. In both communities, the ratios indicate that the fraction of households that are vulnerable to poverty exceeds the fraction of poor households. But in rural areas, the community is less egalitarian in terms of vulnerability distribution as vulnerability to poverty is more highly dispersed in urban areas than of what it is in rural areas.

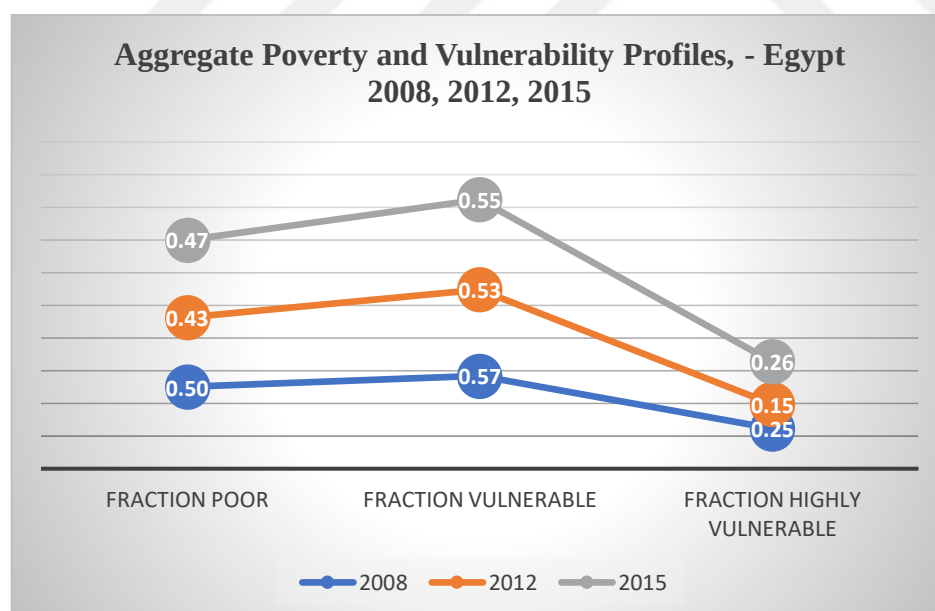
1.4.3.1 Post-Revolution Profile of Vulnerability to Poverty in Egypt

In summary, the change in the profile of poverty and vulnerability to poverty in Egypt is monitored during the years 2008, 2012, and 2015. Household surveys in this section were intentionally selected during these years in order to observe the repercussions of the political and economic changes brought by the Arab uprisings on the household level of welfare in Egypt. After the Arab uprisings, Egypt witnessed two rounds of political transitions that were undergone on a short-run timeframe. The two-phase political transition confined measures of economic growth and cast dire repercussions on household levels of welfare that deteriorated in the post-revolution era.

Vulnerability to poverty measures slightly decreased in 2012, the period immediately after the political transformation in which President Mohammed Mursi was in office. The proportion of households that were vulnerable to poverty in 2012 slightly decreased from 57% in 2008 to 53% in 2012. Also, the proportion of households that were highly vulnerable to poverty decreased from 25% in 2008 to 15% in 2012. However, vulnerability measures increased again in the period that followed the military coup d'état that ousted President Mursi in 2013. In 2015, the proportion of households that were vulnerable to poverty increased from 53% in 2012 to 55%. Also, the proportion of households that were highly vulnerable to poverty increased from 15% in 2012 to 26% in 2015.

Figure 5 plots the change in fractions of poor households, vulnerable households, and highly vulnerable households in Egypt during the years 2008, 2012, and 2015.

Figure 5-Aggregate Poverty and Vulnerability Profiles – Egypt 2008, 2012, 2015



Source: Own calculations based on Economic Research Forum dataset

The comparison of vulnerability profiles over the three years is detailed as follows. As presented in Table 1 and Table 2, they provide aggregates on levels of vulnerability to poverty in Egypt during the years 2008, 2012, and 2015, the proportion of households who were vulnerable to poverty in 2008 was 57% and the proportion of the households who were highly vulnerable to poverty was 25%. Amongst the households that were under the poverty line, 74% of the poor households were vulnerable to poverty and 93% of the poor households were highly vulnerable to poverty. 70% of rural area dwellers were vulnerable to poverty against 41% of the dwellers of urban areas. The gap in annual levels of household consumption expenditure was 14,023 amongst the non-poor fraction of the households and the highly vulnerable fraction of the population. The mean vulnerability rate was 53% and the vulnerability to poverty ratio was 1.14.

Vulnerability to poverty measures slightly decreased in 2012. The proportion of households who were vulnerable to poverty in 2012 slightly decreased from 57% in 2008 to 53% in 2012. Also, the proportion of households who were highly vulnerable to poverty decreased from 25% in 2008 to 15% in 2012. Amongst the households that were under the poverty line, 70% of the poor households were vulnerable to poverty in 2012 compared to 74% in 2008. However, meanwhile 93% of poor households were highly vulnerable to poverty in 2008, 98% of the poor households became highly vulnerable to poverty in 2012. Though the percentage of vulnerable households who are dwellers in rural areas decreased from 70% in 2008 to 62% in 2012, the percentage of vulnerable households in urban areas was slightly increased from 41% in 2008 to 42% in 2012. The gap in annual levels of household consumption expenditure amongst the non-poor fraction of the population and the highly vulnerable fraction of the population increased from 14,023 in 2008 to 20,959 in 2012. The mean vulnerability rate slightly decreased from 53% in 2008 to 50% in 2012. The vulnerability to poverty ratio was 1.23 in 2012 compared to 1.14 in 2008. This slight increase in the

vulnerability to poverty ratio indicates that vulnerability to poverty became more dispersed among fractions of the population and that vulnerability distribution became more egalitarian.

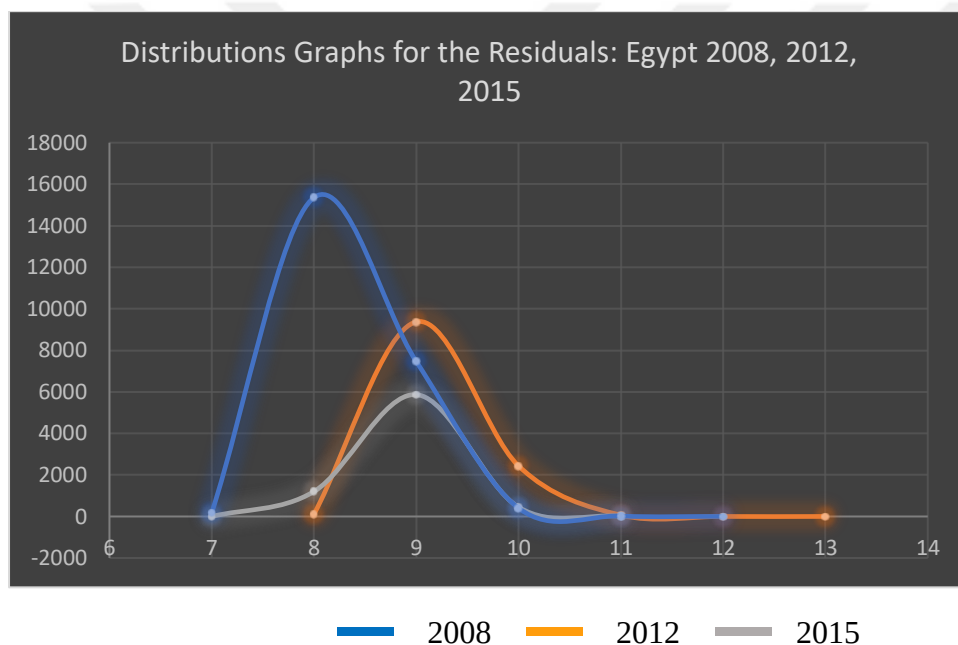
However, vulnerability measures increased again in the period that followed the military coup d'état that has ousted President Mursi in 2013. In 2015, the proportion of households that were vulnerable to poverty increased from 53% in 2012 to 55%. Also, the proportion of the households who were highly vulnerable to poverty increased from 15% in 2012 to 26% in 2015. Amongst the households that were under the poverty line, 83% of the poor households were vulnerable to poverty in 2015 compared to 70% in 2012. However, meanwhile 93% of poor households were highly vulnerable to poverty in 2012, 43% of poor households were highly vulnerable to poverty in 2015. The percentage of vulnerable households that are dwellers in rural areas increased from 62% in 2012 to 64% in 2015. The percentage of vulnerable households in urban areas slightly increased from 42% in 2012 to 44% in 2015. The gap in annual levels of household consumption expenditure between the non-poor fraction of the population and the highly vulnerable fraction of the population significantly increased from 20,959 in 2012 to 41,654 in 2015. The mean vulnerability rate slightly decreased from 50% in 2012 to 55% in 2015. The vulnerability to poverty ratio was 1.23 in 2012 compared to 1.16 in 2015. This slight decrease in the vulnerability to poverty ratio indicates that vulnerability to poverty became less dispersed among fractions of the population and that vulnerability distribution became less egalitarian.

1.4.3.2 Poverty Transition Matrices in Egypt 2008, 2012, 2015

Transitional estimates are calculated under the condition that all the assumptions made regarding the bivariate normal distribution of the error terms and the correlation among them are satisfied. In order to check the applicability of the key assumption of bivariate normality, the error terms of the regressing household's consumption expenditure on time-invariant

idiosyncratic household characteristics are plotted in Figure 6 in all three rounds survey. The figure captures the bell curve distribution of the error term that indicates the normal distribution. The distributions of the error terms are visually very similar. Moreover, the distribution of the error term in each round of the survey passed the Shapiro-Wilk test of normality. Thus, following Dang et al. (2014) empirical approach, it was possible to construct the synthetic panel data needed to predict the parametric transitional estimate used for poverty transition analysis.

Figure 6 - Distributions Graphs for the Residuals: Egypt 2008, 2012, 2015



Source: Own calculations based on Economic Research Forum dataset.

As the cross-sectional welfare survey on consumption expenditure is available for three years in Egypt, two synthetic panel data are produced using data from three rounds of the survey for the years 2008, 2012, and 2015. The purpose behind the analysis of transitional estimates in Egypt is to monitor the repercussions of the Arab uprisings on the poverty movement during the years before and after the Arab uprisings.

Table 3 shows the estimated percentages of households who are expected to move among poverty status from 2008 to 2012. Two percentages are derived from two bounds of each transitional estimate. Each bound of the transitional estimate is calculated using the generated synthetic panel data for each year of the survey. Accordingly, at the lower bound, 10% of the households that were poor in 2008 will exit poverty in 2012. At the upper bound, the percentage is 20%. So, the expected range of the percentage of households who will exit poverty and will become non-poor in 2012 is between 10% to 20%. The expected range of the percentage of households who were poor in 2008 and will remain in poverty in 2012 is between 9% to 20%. The expected range of the percentage of households who were identified as non-poor in 2008 and will enter poverty in 2012 is between 20% to 31%. The expected range of percentage of the households who were identified as non-poor in 2008 and will remain as non-poor in 2012 is between 39% to 50%.

Table 3 - Poverty Transition Matrix from Synthetic Panel Data - Egypt 2008, 2012

Status in 2008	Status in 2012	Lower Bound Estimate	Upper Bound Estimate
Poor	Poor	0.20	0.09
Poor	Non-poor	0.10	0.20
Non-poor	Poor	0.20	0.31
Non-poor	Non-poor	0.50	0.39
R-squared	0.77		
Observations	7,528		

Source: Own calculations based on Economic Research Forum dataset

Table 4 shows the estimated percentages of households who have moved among poverty status from 2012 to 2015. Accordingly, at the lower bound, 7% of the households that were poor in 2012 will exit poverty in 2015. At the upper bound, the percentage is 9%. So, the expected range of the percentage of households who will exit poverty and will become non-poor in 2015 is between 7% to 9%. The expected range of the percentage of households that were poor in 2012 and will remain in poverty in 2015 is between 34% to 36%. The expected range of percentage of households who were identified as non-poor in 2012 and will enter poverty in 2015 is between 41% to 44%. The expected range of percentage of households who were identified as non-poor in 2012 and will remain as non-poor in 2015 is between 13% to 16%.

Table 4 - Poverty Transition Matrix from Synthetic Panel Data - Egypt 2012, 2015

Status in 2012	Status in 2015	Lower Bound Estimate	Upper Bound Estimate
Poor	Poor	0.36	0.34
Poor	Non-poor	0.07	0.09
Non-poor	Poor	0.41	0.44
Non-poor	Non-poor	0.16	0.13
R-squared	0.74		
Observations	7,528		

Source: Own calculations based on Economic Research Forum dataset

The percentages of the households who have changed their poverty status derived using both upper and lower bounds of transitional estimates support the findings given by vulnerability to poverty analysis. After the political change brought about by the Arab uprisings in Egypt, measures of poverty have witnessed a reduction, and levels of household poverty in

terms of consumption expenditure were slightly ameliorated. This slight improvement has been reversed again between the years 2012 to 2015 when poverty rates increased again. These findings are supported by transitional estimates. Between the years 2008 to 2012, approximately 20% to 31% of the non-poor households in 2008 are estimated to enter poverty in 2012. Between the years 2012 to 2015, which is after the second political transition caused by the military coup d'état of 2013, the estimated percentage was remarkably increased. It was estimated that approximately 41% to 44% of the non-poor households in 2012 will enter poverty in 2015.

1.4.4 Tunisia

Table 5 shows aggregate poverty and vulnerability to poverty profiles in Tunisia for the years 2008 and 2012. In 2008 in Tunisia, a large proportion of non-poor households were highly vulnerable to poverty at a given point in the future. On the contrary, some currently poor households may experience a low ex-ante probability of poverty, accordingly are considered nonvulnerable to poverty despite their current incidence of poverty.

Table 5 shows that in 2008, the overall percentage of households observed in poverty is 54%. 52% of households nationwide were observed to be vulnerable to poverty, and 21% were observed to be highly vulnerable. The estimated probability of experiencing poverty at a given period of time in the future for 52% of the population's households is higher than the mean risk of the incidence of poverty. The average risk of the incidence of poverty understates the proportion of households that are falling into poverty at a given time in the future. The mean vulnerability rate in 2008 was 52%. The mean probability for an average household to fall into poverty in the future, whether currently poor or non-poor, is 52%. The vulnerability to

poverty ratio is 0.97 indicating that the proportion of the poor population exceeds the proportion of the vulnerable population.

Table 5 - Aggregate Poverty and Vulnerability Profiles, - Tunisia 2008, 2012

	Aggregate Poverty and Vulnerability Profiles, Tunisia 2008						Expenditure Gap	Vulnerability to Poverty Ratio	Mean Vulnerability
	Overall	Amongst the poor	Amongst the non-poor	Amongst the vulnerable	Amongst the non-vulnerable	Amongst the highly vulnerable			
Mean per capita consumption expenditure *	7,681	3,734	12,265	7,432	7,952	5,944	8,530	0.97	0.52
Fraction poor	0.54	1.00	0.00	0.55	0.52	0.63			
Fraction vulnerable	0.52	0.54	0.50	1.00	0.00	1.00			
Fraction highly vulnerable	0.21	0.14	0.45	0.40	0.00	1.00			
	Aggregate Poverty and Vulnerability Profiles, Tunisia 2012						Expenditure Gap	Vulnerability to Poverty Ratio	Mean Vulnerability
	Overall	Amongst the poor	Amongst the non-poor	Amongst the vulnerable	Amongst the non-vulnerable	Amongst the highly vulnerable			
Mean per capita consumption expenditure	10,320	5,900	17,378	10,905	9,154	9,717	11,477	0.49	0.63
Fraction poor	0.61	1.00	0.00	0.59	0.69	0.52			
Fraction vulnerable	0.66	0.63	0.73	1.00	0.00	1.00			
Fraction highly vulnerable	0.32	0.27	0.40	0.49	0.00	1.00			

Source: Own calculations based on Economic Research Forum dataset

*Measured in constant local currency converted by purchasing power parity (PPP) conversion factor

Table 5 shows a high range of differentials in mean per capita consumption expenditure level. In 2008, The overall average per capita consumption expenditure is 7,682. Among the poor households, the average is 3,735 which is almost 3,950 less than the overall average. Among the non-poor households, the average per capita consumption expenditure is 12,266. The consumption gap relative to the average poor population is 8,531. The largest gap of 8,530 exists among the poor population and the non-poor population. The average consumption expenditure among the highly vulnerable household is 5,954.

Out of the nationwide 54% poor households, 55% are vulnerable to poverty. 52% of the non-vulnerable households are currently poor. Almost 63% of the highly vulnerable to poverty households are currently in poverty. Out of the nationwide 52% vulnerable households, 54% are among the currently poor households. 50% of the nationwide vulnerable households are currently non-poor. Out of the nationwide 21% highly vulnerable households, almost 14%

of them are currently poor, and 45% are currently non-poor. Moreover, almost 40% of the vulnerable households are considered highly vulnerable to poverty in the future.

In 2012, the overall percentage of households observed in poverty increased to 61%. Meanwhile the percentage of households who are vulnerable to poverty that was significantly increased to 66%. The percentage of the highly vulnerable population increased to 32 %. The estimated probability of experiencing poverty at a given period of time in the future for 63% of the population's households is higher than the mean risk of the incidence of poverty. The average risk of the incidence of poverty understates the proportion of households that are falling into poverty at a given time in the future. The mean vulnerability rate in 2012 increased to 63%. The mean probability for an average household to fall into poverty in the future, whether currently poor or non-poor, increased to 63 % in 2012. The vulnerability to poverty ratio is 1.7 indicating that the proportion of the vulnerable households exceeds the proportion of the poor households. It also indicates that the population became more egalitarian in terms of poverty distribution. The proportion of the poor population significantly increased in 2012, but the distribution of vulnerability to poverty became more egalitarian.

Differentials in mean per capita consumption expenditure level have significantly increased in 2012. The overall average per capita consumption expenditure increased to 11,478. Among the poor households, the average is 5,901 which is almost 5,000 less than the overall average. Among the non-poor households, the average of per capita consumption expenditure is 17,378. The largest gap of 11,477 in average consumption expenditure is between the average amongst the non-poor population and the average amongst the poor population.

Out of the nationwide 61% poor households, 59% are vulnerable to poverty. 69% of the non-vulnerable households are currently poor. Almost 52% of the highly vulnerable to

poverty households are currently in poverty. Out of the nationwide 66% vulnerable households, 63% are among the currently poor households. 73% of the nationwide vulnerable households are currently non-poor. Out of the nationwide 32% highly vulnerable households, almost 27% of them are currently poor, and 40% are currently non-poor. Moreover, almost 49% of the vulnerable households are considered highly vulnerable to poverty in the future. These results in general confirm the notion that is stated by the increased vulnerability to poverty ratio relative to the one of 2008. In other words, vulnerability to poverty is less dispersed and the distribution of vulnerability to poverty became less egalitarian among the fractions of the poor and non-poor population.

Table 6 provides further detailed aggregates on poverty and vulnerability to poverty in Tunisia but within different segments of the population, particularly by geographical location as households classified into dwellers of rural and urban areas.

Table 6 - Poverty and Vulnerability within Different Segments: by Geographical Location - Tunisia 2008, 2012

Poverty and Vulnerability within Different Segments: by Geographical Location, Tunisia 2008						
	Population Share	Fraction Poor	Fraction Vulnerable	Fraction Highly Vulnerable	Mean Vulnerability	Vulnerability to Poverty Ratio
By Location						
Rural	0.38	0.70	0.51	0.22	0.49	0.73
Urban	0.62	0.44	0.53	0.20	0.52	1.22
Poverty and Vulnerability within Different Segments: by Geographical Location, Tunisia 2012						
	Population Share	Fraction Poor	Fraction Vulnerable	Fraction Highly Vulnerable	Mean Vulnerability	Vulnerability to Poverty Ratio
By Location						
Rural	0.36	0.79	0.23	0.23	0.30	0.30
Urban	0.64	0.52	0.34	0.33	0.29	0.65

Source: Own calculations based on Economic Research Forum dataset

In 2008, the poor population in the sample surveyed was divided into 38% dwellers of rural areas against 62% dwellers of urban areas. Meanwhile 44% of the households that resided in urban areas in 2008 were observed to be poor, 70% of the households that resided in rural

areas were under the poverty line. The fraction of the vulnerable population in rural areas is 51% against 53% in urban areas. In rural areas, the fraction of the highly vulnerable population is 22% against 20% in urban areas. The mean vulnerability rate in rural areas was up to 49%. However, it is higher in urban areas where it is up to 52%. Thus, there is a 52% probability for an average household in urban areas to be vulnerable to poverty at a future point in time. The vulnerability to poverty ratio is lower in rural areas than in urban areas. In rural areas, the ratio is 0.73 against 1.22 in urban areas. In urban areas, the ratio indicates that the fraction of households that are vulnerable to poverty exceeds the fraction of the poor population. The case is the opposite in rural areas where the fraction of poor households exceeds the fraction of vulnerable households. The urban area community is more egalitarian in terms of vulnerability distribution as vulnerability to poverty is more highly dispersed in urban areas than of what it is in rural areas.

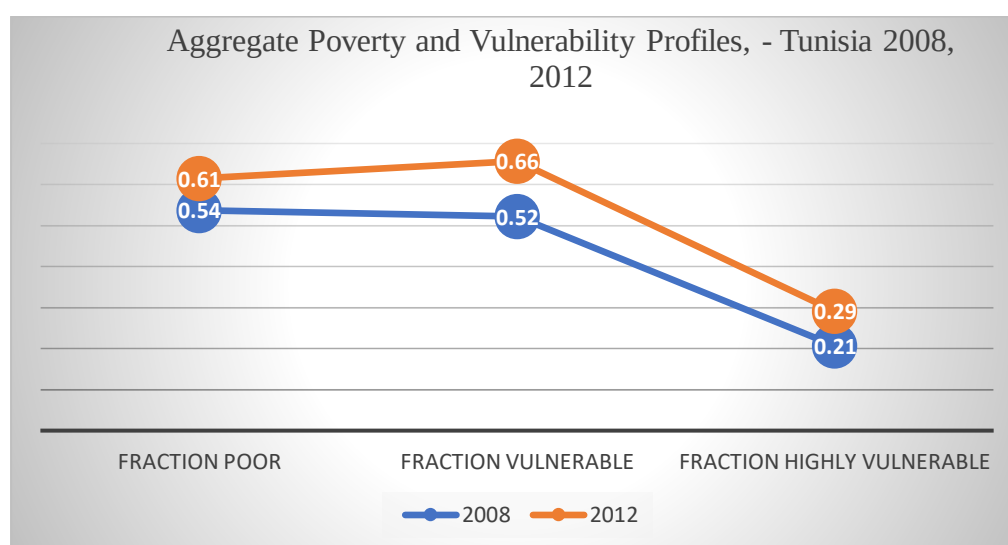
In 2012, the poor population in the sample surveyed was divided into 36% dwellers of rural areas against 64% dwellers of urban areas. Meanwhile 52% of the households who resided in urban areas in 2012 were observed to be poor, 79% of the households that resided in rural areas were under the poverty line. The fraction of the vulnerable population in rural areas decreased to 23% against 34% in urban areas that decreased relative to the percentage of 2008. In rural areas, the fraction of the highly vulnerable population decreases to 23%, and it was 33% in urban areas. Thus, the vulnerable households in rural areas in 2012 are all highly vulnerable to poverty in the future. The mean vulnerability rate in rural areas was up to 30%. It is 29% in urban areas. However, mean vulnerability rates in both rural and urban areas were lower than the mean rates of vulnerability to poverty in 2008. Thus, in 2012, there is a 29% probability for an average household in urban areas to be vulnerable to poverty at a future point in time, and a 30% probability for an average household in rural areas to be vulnerable to poverty at a future point in time. The vulnerability to poverty ratio is higher in urban areas than

in rural areas. In rural areas, the ratio is 0.30 against 0.65 in urban areas. In both communities, the ratios indicate that the fraction of poor households exceeds the fraction of households that are vulnerable to poverty. But in rural areas, the community is less egalitarian in terms of vulnerability distribution as vulnerability to poverty is not as dispersed in rural areas as it is in urban areas.

1.4.4.1 Post-Revolution Profile of Vulnerability to Poverty in Tunisia

In summary, the change in the profile of poverty and vulnerability to poverty in Tunisia is monitored during the years 2008 and 2012. The proportion of households who were vulnerable to poverty in 2008 was 52% and the proportion of households who were highly vulnerable to poverty was 21%. Vulnerability to poverty measures increased in 2012. The proportion of households that were vulnerable to poverty in 2012 increased from 52% in 2008 to 66% in 2012. The proportion of households that were highly vulnerable to poverty increased from 21% in 2008 to 32% in 2012. Almost half of the households who are identified as vulnerable in 2012 are among the highly vulnerable households. Thus, the mean vulnerability rate significantly increased in 2012. Figure 7 plots the change in fractions of poor households, vulnerable households, and highly vulnerable households in Tunisia during the years 2008 and 2012.

Figure 7 - Aggregate Poverty and Vulnerability Profiles, - Tunisia 2008, 2012



Source: Own calculations based on Economic Research Forum dataset

The comparison of vulnerability profiles over the two years is detailed as follows. As presented in Tables 5 and Table 6 that provide aggregates on levels of vulnerability to poverty in Tunisia during the years 2008 and 2012, the proportion of households who were vulnerable to poverty in 2008 was 52% and the proportion of the households who were highly vulnerable to poverty was 21%. Amongst the households that were under the poverty line, 55% of the poor households were vulnerable to poverty and 63% of the poor households were highly vulnerable to poverty. 51% of rural area dwellers were vulnerable to poverty against 53% of the dwellers of urban areas. The gap in annual levels of household consumption expenditure was 8,531 amongst the poor fraction of the population and the non-poor fraction of the population. The mean vulnerability rate was 52% and the vulnerability to poverty ratio was 0.97.

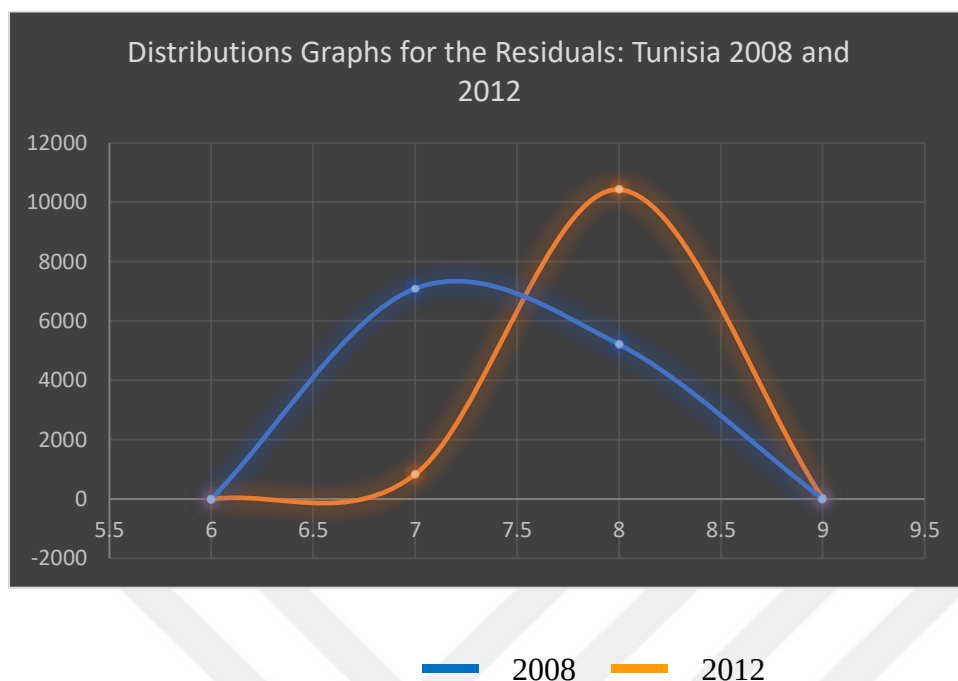
Vulnerability to poverty measures increased in 2012. The proportion of households that were vulnerable to poverty in 2012 has increased to 66%. The proportion of households that were highly vulnerable to poverty increased to 32% in 2012. Almost half of the households who are identified as vulnerable in 2012 are among the highly vulnerable households.

Though the percentage of vulnerable households who are dwellers in rural areas decreased from 51% in 2008 to 23% in 2012, almost all dwellers of rural areas became highly vulnerable to poverty in the future. The gap in annual levels of household consumption expenditure amongst the non-poor fraction of the households and the highly vulnerable fraction of the population increased from 8,531 in 2008 to 11,478 in 2012. The mean vulnerability rate increased from 52% in 2008 to 63% in 2012 in spite of the reduction in the fraction of households that are vulnerable to poverty. The increase in the mean vulnerability rate was caused by the increase in the fraction of the highly vulnerable population. The vulnerability to poverty ratio was 0.49 in 2012 compared to 0.97 in 2008. This significant decrease in the vulnerability to poverty ratio indicates that vulnerability to poverty became less dispersed among fractions of the population and that vulnerability distribution became less egalitarian. Particularly among dwellers of rural and urban communities in so that almost all dwellers of rural areas became highly vulnerable to poverty in 2012.

1.4.4.2 Poverty Transition Matrix in Tunisia 2008, 2012

In order to check the applicability of the key assumption of bivariate normality, the error terms of the regressing household's consumption expenditure on time-invariant idiosyncratic household characteristics are plotted in Figure 8 for both rounds survey. The figure captures the bell curve distribution of the error term that indicates the normal distribution. The distribution of the error term in each round of the survey passed the Shapiro-Wilk test of normality. Thus, following Dang et al. (2014) empirical approach, it was possible to construct the synthetic panel data needed to predict the parametric transitional estimate used for poverty transition analysis.

Figure 8 - Distributions Graphs for the Residuals: Tunisia 2008 and 2012



Source: Own calculations based on Economic Research Forum dataset

As the cross-sectional welfare survey on consumption expenditure is available for only two years in Tunisia, synthetic panel data is produced using data from two rounds of the survey for the years 2008 and 2012. The purpose behind the analysis of transitional estimates in Tunisia is to monitor the repercussions of the Arab uprisings on the poverty movement during the years before and after the Arab uprisings.

Table 7 shows percentages of households who have moved among poverty status from 2008 to 2012. Two percentages are derived from two bounds of each transitional estimate. Each bound of the transitional estimate is calculated using the generated synthetic panel data for each year of the survey. Accordingly, at the lower bound, 29% of the households that were identified as non-poor in 2008 will enter poverty in 2012. At the upper bound, the percentage is 35%. So, the expected range of percentage of the households who were identified as non-poor in 2008 and will enter poverty in 2012 is between 29% to 35%. The expected range of the percentage of households who will exit poverty and will become non-poor in 2012 is between

8% to 9%. The expected range of the percentage of households who were poor in 2008 and will remain in poverty in 2012 is between 31% to 44%. The expected range of percentage of the households who were identified as non-poor in 2008 and will remain as non-poor in 2012 is between 18% to 26%.

Table 7 - Poverty Transition Matrix from Synthetic Panel Data - Tunisia 2008, 2012

Status in 2008	Status in 2012	Lower Bound Estimate	Upper Bound Estimate
Poor	Poor	0.44	0.31
Poor	Non-poor	0.09	0.08
Non-poor	Poor	0.29	0.35
Non-poor	Non-poor	0.18	0.26
R-squared	0.82		
Observations	11,281		

Source: Own calculations based on Economic Research Forum dataset

The estimated percentages of the households that have changed their poverty status support the findings given by vulnerability to poverty analysis. Vulnerability to poverty rates witnessed an increase after the political change brought by the Arab uprisings in Tunisia. It is estimated that approximately 31% to 44% of the poor households in 2008 will remain in poverty in 2012. Moreover, 29% to 35% of the households that were identified as non-poor in 2008 will enter poverty in 2012.

1.4.5 Iraq

Table 8 shows aggregate poverty and vulnerability to poverty profiles in Iraq for the years 2008 and 2012. In 2008, a large proportion of non-poor households were highly vulnerable to poverty at a given point in the future.

Table 8 - Aggregate Poverty and Vulnerability Profiles, - Iraq 2008, 2012

	Aggregate Poverty and Vulnerability Profiles, Iraq 2008							Vulnerability to Poverty Ratio	Mean Vulnerability
	Overall	Amongst the poor	Amongst the non-poor	Amongst the vulnerable	Amongst the non-vulnerable	Amongst the highly vulnerable	Expenditure Gap		
Mean per capita consumption expenditure *	11,732	6,200	17,481	11,323	12,061	5,944	11,280	0.87	0.52
Fraction poor	0.51	1.00	0.00	0.53	0.49	0.60			
Fraction vulnerable	0.45	0.47	0.42	1.00	0.00	1.00			
Fraction highly vulnerable	0.19	0.31	0.39	0.43	0.00	1.00			
	Aggregate Poverty and Vulnerability Profiles, Iraq 2012							Vulnerability to Poverty Ratio	Mean Vulnerability
	Overall	Amongst the poor	Amongst the non-poor	Amongst the vulnerable	Amongst the non-vulnerable	Amongst the highly vulnerable	Expenditure Gap		
Mean per capita consumption expenditure	10,320	5,900	17,378	11,721	11,745	9,717	11,477	0.78	0.63
Fraction poor	0.52	1.00	0.00	0.61	0.46	0.64			
Fraction vulnerable	0.41	0.48	0.33	1.00	0.00	1.00			
Fraction highly vulnerable	0.22	0.65	0.46	0.54	0.00	1.00			

Source: Own calculations based on Economic Research Forum dataset.

*Measured in constant local currency converted by purchasing power parity (PPP) conversion factor

Table 8 shows that in 2008, the overall percentage of households observed in poverty is 51%. 45% of households nationwide were observed to be vulnerable to poverty, and 19% were observed to be highly vulnerable. The estimated probability of experiencing poverty at a given period of time in the future for 52% of the population's households is higher than the mean risk of the incidence of poverty. The average risk of the incidence of poverty understates the proportion of households that are falling into poverty at a given time in the future. The mean vulnerability rate in 2008 was 52%. The mean probability for an average household to fall into poverty in the future, whether currently poor or non-poor, is 52%. The vulnerability to

poverty ratio is 0.87 indicating that the proportion of the poor population exceeds the proportion of the vulnerable population.

Table 8 shows a high range of differentials in mean per capita consumption expenditure level. In 2008, The overall average per capita consumption expenditure is 11,733. Among the poor households, the average is 6,201. Among the non-poor household, the average per capita consumption expenditure is 17,481. The largest gap of 11,281 exists among the poor and the non-poor households.

Out of the nationwide 51% poor households, 53% are vulnerable to poverty. 49% of the non-vulnerable households are currently poor. Almost 60% of highly vulnerable to poverty households are currently in poverty. Out of the nationwide 45% vulnerable households, 47% are among the currently poor households. 42% of the nationwide vulnerable households are currently non-poor. Out of the nationwide 19% highly vulnerable households, almost 31% of them are currently poor, and 39% are currently non-poor. Moreover, almost 43% of the vulnerable households are considered highly vulnerable to poverty in the future.

In 2012, the overall percentage of households observed in poverty slightly increased to 52%. Meanwhile the percentage of households that are vulnerable to poverty decreased to 41%. The percentage of the highly vulnerable population increased to 22 %. The estimated probability of experiencing poverty at a given period of time in the future for 63% of the population's households is higher than the mean risk of the incidence of poverty. The average risk of the incidence of poverty understates the proportion of the population who are falling into poverty at a given time in the future. The mean vulnerability rate in 2012 increased to 63%. The mean probability for an average household to fall into poverty in the future, whether currently poor or non-poor, increased to 63 % in 2012. The vulnerability to poverty ratio is 0.78 indicating that the proportion of the poor population exceeds the proportion of the

vulnerable population. It also indicates that the population became less egalitarian in terms of poverty distribution.

Differentials in mean per capita consumption expenditure level have increased in 2012. The overall average per capita consumption expenditure decreased to 10,320. Among the poor households, the average is 5,901. Among the non-poor households, the average per capita consumption expenditure is 17,378. The largest gap of 11,477 in average consumption expenditure is between the average amongst the non-poor households and the average amongst the poor households.

Out of the nationwide 52% poor households, 61% are vulnerable to poverty. 46% of the non-vulnerable households are currently poor. Almost 64% of highly vulnerable to poverty households are currently in poverty. Out of the nationwide 41% vulnerable households, 48% are among the currently poor households. 33% of the nationwide vulnerable households are currently non-poor. Out of the nationwide 22% highly vulnerable households, almost 65% of them are currently poor, and 46% are currently non-poor. Moreover, almost 54% of the vulnerable households are considered highly vulnerable to poverty in the future. These results in general confirm the notion that is stated by the increased vulnerability to poverty ratio relative to the one of 2008. In other words, vulnerability to poverty is less dispersed and the distribution of vulnerability to poverty became less egalitarian among the fractions of the poor and non-poor population.

Table 9 provides further detailed aggregates on poverty and vulnerability to poverty in Iraq but within different segments of the population, particularly by geographical location as households classified into dwellers of rural and urban areas. In 2008, the poor population in the sample surveyed was divided into 32% dwellers of rural areas against 68% dwellers of urban areas. Meanwhile 48% of the households who resided in urban areas in 2008 were

observed to be poor, 57% of the households who resided in rural areas were under the poverty line. The fraction of the vulnerable population in rural areas is 54% against 44% in urban areas. In rural areas, the fraction of the highly vulnerable population is 21% against 19% in urban areas. The mean vulnerability rate in rural areas was up to 68%. It is higher than the one in urban areas where it is up to 55%. Thus, there is a 55% probability for an average household in urban areas to be vulnerable to poverty at a future point in time. The vulnerability to poverty ratio is lower in rural areas than in urban areas. In rural areas the ratio is 0.80 against 0.92 in urban areas. In both rural and urban areas, the ratio indicates that the fraction of households that are poor exceeds the fraction of the vulnerable population. The urban area community is more egalitarian in terms of vulnerability distribution as vulnerability to poverty is more highly dispersed in urban areas than of what it is in rural areas.

Table 9 - Poverty and Vulnerability within Different Segments: by Geographical Location - Iraq 2008, 2012

Poverty and Vulnerability within Different Segments: by Geographical Location, Iraq 2008						
	Population Share	Fraction Poor	Fraction Vulnerable	Fraction Highly Vulnerable	Mean Vulnerability	Vulnerability to Poverty Ratio
By Location						
Rural	0.32	0.57	0.45	0.21	0.68	0.80
Urban	0.68	0.48	0.44	0.19	0.55	0.92
Poverty and Vulnerability within Different Segments: by Geographical Location, Iraq 2012						
	Population Share	Fraction Poor	Fraction Vulnerable	Fraction Highly Vulnerable	Mean Vulnerability	Vulnerability to Poverty Ratio
By Location						
Rural	0.41	0.60	0.41	0.22	0.46	0.68
Urban	0.59	0.46	0.40	0.22	0.45	0.87

Source: Own calculations based on Economic Research Forum dataset

In 2012, the poor population in the sample surveyed was divided into 41% dwellers of rural areas against 59% dwellers of urban areas. Meanwhile 60% of the households who resided in urban areas in 2012 were observed to be poor, 46% of the households who resided in rural areas were under the poverty line. The fraction of the vulnerable population in rural areas is decreased to 41% against 40% in urban areas that which decreased relative to the percentage

of 2008. In both rural and urban areas, the fraction of the highly vulnerable population was 22%. The mean vulnerability rate in rural areas was up to 68%. It is 87% in urban areas. However, mean vulnerability rates in both rural and urban areas were lower than the mean rates of vulnerability to poverty in 2008. Thus, in 2012, there is a 45% probability for an average household in urban areas to be vulnerable to poverty at a future point in time, and a 46% probability for an average household in rural areas to be vulnerable to poverty at a future point in time. The vulnerability to poverty ratio is higher in urban areas than in rural areas. In rural areas, the ratio is 0.68 against 0.87 in urban areas. In both communities, the ratios indicate that the fraction of poor households exceeds the fraction of households that are vulnerable to poverty. But in rural areas, the community is less egalitarian in terms of vulnerability distribution as vulnerability to poverty is not as dispersed in rural areas as it is in urban areas.

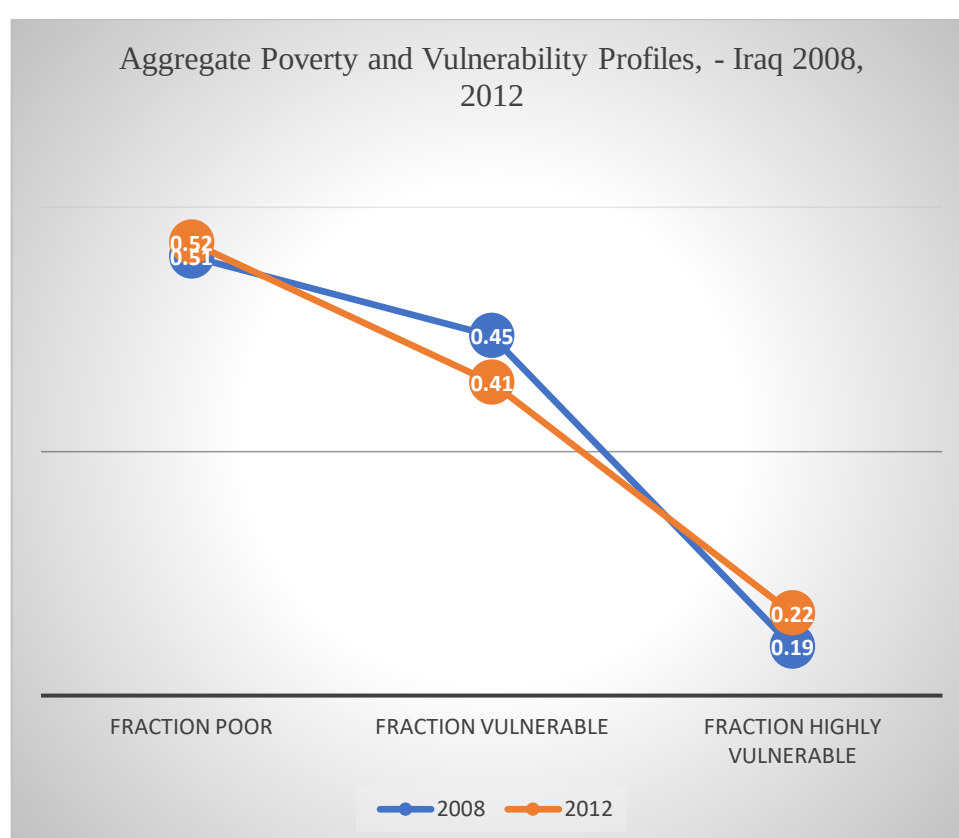
1.4.5.1 Post-Revolution Profile of Vulnerability to Poverty in Iraq

In summary, the change in the profile of poverty and vulnerability to poverty in Iraq is monitored during the years 2008 and 2012. Vulnerability to poverty measures decreased in 2012. The proportion of households that were vulnerable to poverty in 2012 decreased from 45% in 2008 to 41% in 2012. But the proportion of households that were highly vulnerable to poverty increased from 19% in 2008 to 22% in 2012. Figure 9 plots the change in fractions of poor households, vulnerable households, and highly vulnerable households in Iraq during the years 2008 and 2012.

The comparison of vulnerability profiles over the three two is detailed as follows. As presented in Tables 8 and Table 9 that provide aggregates on levels of vulnerability to poverty in Iraq during the years 2008 and 2012, the proportion of households that were vulnerable to poverty in 2008 was 45% and the proportion of the households that were highly vulnerable to poverty was 19%. Amongst the households that were under the poverty line, 53% of the poor

households were vulnerable to poverty and 49% of the poor households were highly vulnerable to poverty. 45% of rural area dwellers were vulnerable to poverty against 44% of the dwellers of urban areas. The gap in annual levels of household consumption expenditure was 11,281 among the non-poor fraction of the population and the non-poor fraction of the population. The mean vulnerability rate was 52% and the vulnerability to poverty ratio was 0.87.

Figure 9 - Aggregate Poverty and Vulnerability Profiles, - Iraq 2008, 2012



Source: Own calculations based on Economic Research Forum dataset

Vulnerability to poverty measures decreased in 2012. The proportion of households that were vulnerable to poverty in 2012 decreased from 54% in 2008 to 41% in 2012. The proportion of households that were highly vulnerable to poverty increased from 19% in 2008 to 22% in 2012.

The percentage of vulnerable households who are dwellers in rural areas decreased from 45% in 2008 to 41% in 2012. The gap in annual levels of household consumption expenditure among the non-poor fraction of the population and the highly vulnerable fraction of the population increased from 11,280 in 2008 to 11,478 in 2012. The mean vulnerability rate increased from 52% in 2008 to 63% in 2012 in spite of the reduction in the fraction of households that are vulnerable to poverty. The vulnerability to poverty ratio was 0.87 in 2012 compared to 0.78 in 2008. The decrease in the vulnerability to poverty ratio indicates that vulnerability to poverty became less dispersed among fractions of the population and that vulnerability distribution became less egalitarian. Particularly among dwellers of rural and urban communities in so that almost all dwellers of rural areas became highly vulnerable to poverty in 2012.

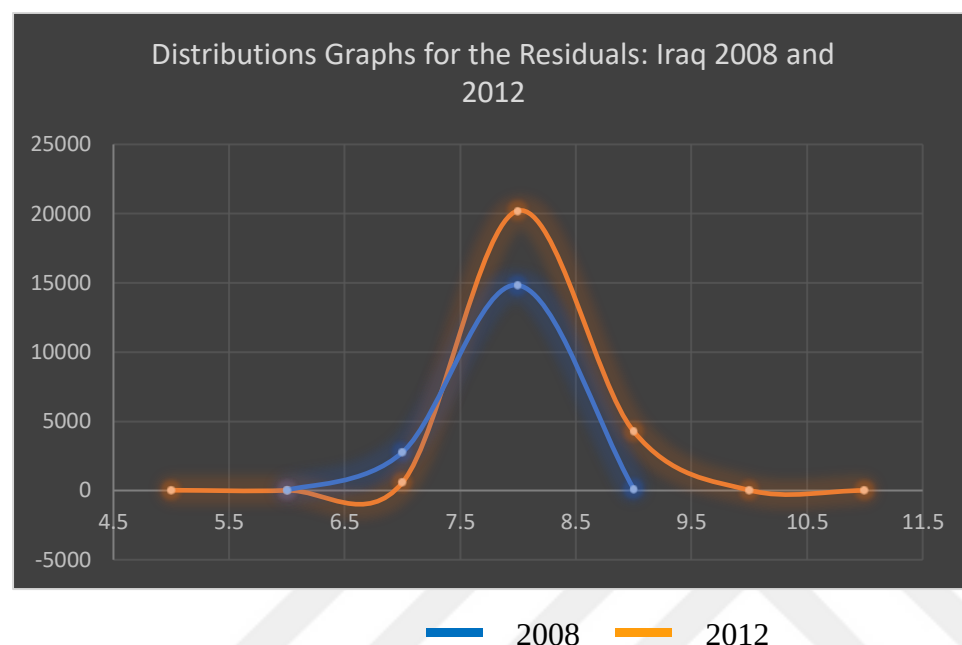
1.4.5.2 Poverty Transition Matrix in Iraq 2008, 2012

In order to check the applicability of the key assumption of bivariate normality, the error terms of the regressing household's consumption expenditure on time-invariant idiosyncratic household characteristics are plotted in Figure 10 in both rounds survey. The distributions of the error terms are visually very similar. The figure captures the bell curve distribution of the error term that indicates the normal distribution. Moreover, the distribution of the error term in each round of the survey passed the Shapiro-Wilk test of normality. Thus, following Dang et al. (2014) empirical approach, it was possible to construct synthetic panel data needed to predict the parametric transitional estimate used for poverty transition analysis. The purpose behind the analysis of transitional estimates in Iraq is to monitor the repercussions of the Arab uprisings on the poverty movement during the years before and after the Arab uprisings.

Table 10 shows percentages of households who have moved among poverty status from 2008 to 2012. Two percentages are derived from two bounds of each transitional estimate.

Each bound of the transitional estimate is calculated using the generated synthetic panel data for each year of the survey.

Figure 10 - Distributions Graphs for the Residuals: Iraq 2008 and 2012



Source: Own calculations based on Economic Research Forum dataset

Accordingly, at the lower bound, 5% of the households that were poor in 2008 will exit poverty in 2012. At the upper bound, the percentage is 12%. So, the expected range of the percentage of households who will exit poverty and will become non-poor in 2012 is between 5% to 12%. The expected range of the percentage of households who were poor in 2008 and will remain in poverty in 2012 is between 39% to 40%. The expected range of percentage of households who were identified as non-poor in 2008 and will enter poverty in 2012 is between 20% to 29%. The expected range of percentage of the households who were identified as non-poor in 2008 and will remain as non-poor in 2012 is between 20% to 35%.

The estimated percentage of the households that were identified as poor in 2008 and will remain in poverty in 2012 is approximately 39% to 40%. Meanwhile, 5% to 12% of the poor

households in 2008 will exit poverty in 2012. It is also estimated that 20% to 29% of the households that were identified as non-poor in 2008 will enter poverty in 2012.

Table 10 - Poverty Transition Matrix from Synthetic Panel Data - Iraq 2008, 2012

Status in 2008	Status in 2012	Lower Bound Estimate	Upper Bound Estimate
Poor	Poor	0.40	0.39
Poor	Non-poor	0.05	0.12
Non-poor	Poor	0.20	0.29
Non-poor	Non-poor	0.35	0.20
R-squared	0.46		
Observations	17,822		

Source: Own calculations based on Economic Research Forum dataset

1.4.6 Jordan

Table 11 shows aggregate poverty and vulnerability to poverty profiles in Jordan for the years 2008, 2012, and 2015. In 2008, the overall percentage of households observed in poverty is 56%. 51% were observed to be vulnerable to poverty, and 37% were observed to be highly vulnerable. The estimated probability of experiencing poverty at a given period of time in the future for 51% of the population's households is higher than the mean risk of the incidence of poverty. The average risk of the incidence of poverty understates the proportion of households that are falling into poverty at a given time in the future. The mean vulnerability rate in 2008 was 51%. The mean probability for an average household to fall into poverty in the future, whether currently poor or non-poor, is 51%. The vulnerability to poverty ratio is 0.92 indicating that the proportion of the poor population exceeds the proportion of the vulnerable population.

Table 11 - Aggregate Poverty and Vulnerability Profiles, - Jordan 2008, 2012, 2015

Aggregate Poverty and Vulnerability Profiles, Jordan 2008									
	Overall	Amongst the poor	Amongst the non-poor	Amongst the vulnerable	Amongst the non-vulnerable	Amongst the highly vulnerable	Expenditure Gap	Vulnerability to Poverty Ratio	Mean Vulnerability
Mean per capita consumption expenditure *	8,376	5,130	12,455	6,410	10,461	6,054	7,325	0.92	0.51
Fraction poor	0.56	1.00	0.00	0.72	0.38	0.77			
Fraction vulnerable	0.51	0.67	0.32	1.00	0.00	1.00			
Fraction highly vulnerable	0.37	0.51	0.20	0.72	0.00	1.00			
Aggregate Poverty and Vulnerability Profiles, Jordan 2012									
Mean per capita consumption expenditure	9,726	5,323.	13,451	7,617	11,803	7,557	8,128	1.08	0.50
Fraction poor	0.46	1.00	0.00	0.61	0.31	0.61			
Fraction vulnerable	0.50	0.66	0.36	1.00	0.00	1.00			
Fraction highly vulnerable	0.48	0.63	0.34	0.96	0.00	1.00			
Aggregate Poverty and Vulnerability Profiles, Jordan 2015									
Mean per capita consumption expenditure	9,170	5,991	12,968	8,498	9,783	8,505	6,977	0.88	0.49
Fraction poor	0.54	1.00	0.00	0.62	0.47	0.62			
Fraction vulnerable	0.48	0.55	0.39	1.00	0.00	1.00			
Fraction highly vulnerable	0.47	0.54	0.38	0.98	0.00	1.00			

Source: Own calculations based on Economic Research Forum dataset

*Measured in constant local currency converted by purchasing power parity (PPP) conversion factor

Table 11 shows a high range of differentials in mean per capita consumption expenditure level. The overall average per capita consumption expenditure is 8,376. Among the poor households, the average is 5,130. Among the non-poor households, the average per capita consumption expenditure is 12,455. A gap of 7,325 also exists among the poor and the non-poor population.

Out of the nationwide 56% poor households, 72% are vulnerable to poverty. Only 38% of the non-vulnerable households are currently poor. Almost 77% of highly vulnerable to poverty households are currently in poverty. Out of the nationwide 51% vulnerable households, 67% are among the currently poor households. 32% of the nationwide vulnerable households are currently non-poor. Out of the nationwide 37% highly vulnerable households, almost 51%

of them are currently poor, and 20% are currently non-poor. Moreover, almost 72% of the vulnerable households are considered highly vulnerable to poverty in the future.

In 2012, the overall percentage of households observed in poverty slightly decreased to 46%. Also, the percentage of households that are vulnerable to poverty slightly decreased to 51%. The percentage of the highly vulnerable population increased to 48%. The estimated probability of experiencing poverty at a given period of time in the future for 50% of the population's households is higher than the mean risk of the incidence of poverty. The average risk of the incidence of poverty understates the proportion of households that are falling into poverty at a given time in the future. The mean vulnerability rate in 2012 slightly decreased to 50%. The mean probability for an average household to fall into poverty in the future, whether currently poor or non-poor, decreased to 50% in 2012. The vulnerability to poverty ratio is 1.8 indicating that the proportion of the vulnerable population exceeds the proportion of the poor population. It also indicates that the population became slightly more egalitarian in terms of poverty distribution. The proportion of the poor population and vulnerable population slightly decreased in 2012, and the distribution of vulnerability to poverty became more egalitarian.

The overall average per capita consumption expenditure increased to 9,725. Among the poor households, the average is 5,323. Among the non-poor households, the average per capita consumption expenditure is 13,451. The largest gap of 8,121 in average consumption expenditure is between the average amongst the non-poor households and the average amongst the poor households.

Out of the nationwide 46% poor households, 61% are vulnerable to poverty. Only 31% of the non-vulnerable households are currently poor. Almost 61% of highly vulnerable to poverty households are currently in poverty. Out of the nationwide 50% vulnerable households, 66% are among the currently poor households. 36% of the nationwide vulnerable population

are currently non-poor. Out of the nationwide 48% highly vulnerable households, almost 63% of them are currently poor, and 34% are currently non-poor. Moreover, almost 96% of the vulnerable population are considered highly vulnerable to poverty in the future. These results in general confirm the notion that is stated by the increased vulnerability to poverty ratio relative to the one of 2008. In other words, vulnerability to poverty is more dispersed and the distribution of vulnerability to poverty became more egalitarian among the fractions of the poor and non-poor population.

In 2015, the overall percentage of households observed in poverty increased again to 54%. But the percentage of households that are vulnerable to poverty slightly decreased to 48%. The percentage of the highly vulnerable population was 47 %. The estimated probability of experiencing poverty at a given period of time in the future for 50% of the population's households is higher than the mean risk of the incidence of poverty. The average risk of the incidence of poverty understates the proportion of households that are falling into poverty at a given time in the future. The mean vulnerability rate in 2015 decreased to 49%. The mean probability for an average household to fall into poverty in the future, whether currently poor or non-poor, increased to 49% in 2015. The vulnerability to poverty ratio is 0.88 indicating that the proportion of the poor population exceeds the proportion of the vulnerable population. It also indicates that the population became slightly less egalitarian in terms of poverty distribution.

The overall average per capita consumption expenditure increased to 9,170. Among the poor households, the average is 5,911. Among the non-poor households, the average per capita consumption expenditure is 12,968. The largest gap of 6,977 in average consumption expenditure is between the average amongst the non-poor households and the average amongst the poor households.

Out of the nationwide 54% poor households, 62% are vulnerable to poverty. 47% of the non-vulnerable households are currently poor. Almost 31% of highly vulnerable to poverty households are currently in poverty and 61% are highly vulnerable. Out of the nationwide 48% vulnerable households, 55% are among the currently poor households. 39% of the nationwide vulnerable households are currently non-poor. Out of the nationwide 47% highly vulnerable households, almost 54% of them are currently poor, and 38% are currently non-poor. Moreover, almost 98% of the vulnerable households are considered highly vulnerable to poverty in the future. These results in general confirm the notion that is stated by the increased vulnerability to poverty ratio relative to the one of 2008. However, the vulnerability to poverty ratio increased relative to the one of 2012. In other words, vulnerability to poverty is less dispersed and the distribution of vulnerability to poverty became less egalitarian among the fractions of the poor and non-poor population.

Table 12 provides further detailed aggregates on poverty and vulnerability to poverty in Jordan but within different segments of the population, particularly by geographical location as households classified into dwellers of rural and urban areas. In 2008, the poor population in the sample surveyed was divided into 22% dwellers of rural areas against 78% dwellers of urban areas. Meanwhile 53% of the households who resided in urban areas in 2008 were observed to be poor, 66% of the households who resided in rural areas were under the poverty line. The fraction of the vulnerable population in rural areas is 60% against 49% in urban areas. In rural areas, the fraction of the highly vulnerable population is 54% against 35% in urban areas. The mean vulnerability rate in rural areas was up to 66%. However, it is higher in urban areas where it is up to 57%. Thus, there is a 57% probability for an average household in urban areas to be vulnerable to poverty at a future point in time. The vulnerability to poverty ratio is lower in rural areas than in urban areas. In rural areas, the ratio is 0.91 against 0.93 in urban

areas. In both communities, the ratios indicate that the fraction of households that are poor exceeds the fraction of the vulnerable population.

In 2012, the poor population in the sample surveyed was divided into 25% dwellers of rural areas against 75% dwellers of urban areas. Meanwhile 91% of the households who resided in urban areas in 2012 were observed to be poor, 50% of the households who resided in rural areas were under the poverty line. The fraction of the vulnerable population in rural areas decreased to 48% against 48% in urban areas that significantly increased relative to the percentage of 2008. In rural areas, the fraction of the highly vulnerable population decreased to 48%, and 48% in urban areas. The mean vulnerability rate in rural areas was up to 53%. It is lower than the one in urban areas where it is up to 55%. Thus, in 2012, there is a 55% probability for an average household in urban areas to be vulnerable to poverty at a future point in time. The vulnerability to poverty ratio is higher in rural areas than in urban areas. In rural areas, the ratio is 0.97 against 0.55 in urban areas. In both communities, the ratios indicate that the fraction of households that are poor exceeds the fraction of the vulnerable population. But in rural areas, the community is more egalitarian in terms of vulnerability distribution as vulnerability to poverty is more highly dispersed in rural areas than of what it is in urban areas.

In 2015, the poor population in the sample surveyed was divided into 37% dwellers of rural areas against 63% dwellers of urban areas. Meanwhile 54% of the households who resided in urban areas in 2015 were observed to be poor, 56% of the households who resided in rural areas were under the poverty line. The fraction of the vulnerable population in rural areas slightly decreased to 42% against 51% in urban areas that also slightly increased relative to the percentage of 2012. In rural areas, the fraction of the highly vulnerable population significantly decreased to 42% compared to 48% in 2012. It increased to 50% in urban areas compared to 48% in 2012. The mean vulnerability rate in rural areas was up to 51%. However, it is lower

than urban areas where it is up to 59%. In 2015, there is a 59% probability for an average household in urban areas to be vulnerable to poverty at a future point in time. The vulnerability to poverty ratio is higher in urban areas than in rural areas. In rural areas, the ratio is 0.95 against 0.76 in urban areas. In both communities, the ratios indicate that the fraction of households that are poor exceeds the fraction of the vulnerable population. But in rural areas, the community is less egalitarian in terms of vulnerability distribution as vulnerability to poverty is more highly dispersed in urban areas than of what it is in rural areas.

Table 12- Poverty and Vulnerability within Different Segments: by Geographical Location - Jordan 2008, 2012, 2015

Poverty and Vulnerability within Different Segments: by Geographical Location, Jordan 2008						
	Population Share	Fraction Poor	Fraction Vulnerable	Fraction Highly Vulnerable	Mean Vulnerability	Vulnerability to Poverty Ratio
By Location						
Rural	0.22	0.66	0.60	0.54	0.66	0.91
Urban	0.78	0.53	0.49	0.35	0.57	0.93
Poverty and Vulnerability within Different Segments: by Geographical Location, Jordan 2012						
	Population Share	Fraction Poor	Fraction Vulnerable	Fraction Highly Vulnerable	Mean Vulnerability	Vulnerability to Poverty Ratio
By Location						
Rural	0.25	0.50	0.49	0.48	0.53	0.97
Urban	0.75	0.91	0.50	0.48	0.55	0.55
Poverty and Vulnerability within Different Segments: by Geographical Location, Jordan 2015						
	Population Share	Fraction Poor	Fraction Vulnerable	Fraction Highly Vulnerable	Mean Vulnerability	Vulnerability to Poverty Ratio
By Location						
Rural	0.37	0.56	0.42	0.42	0.51	0.76
Urban	0.63	0.54	0.51	0.50	0.59	0.95

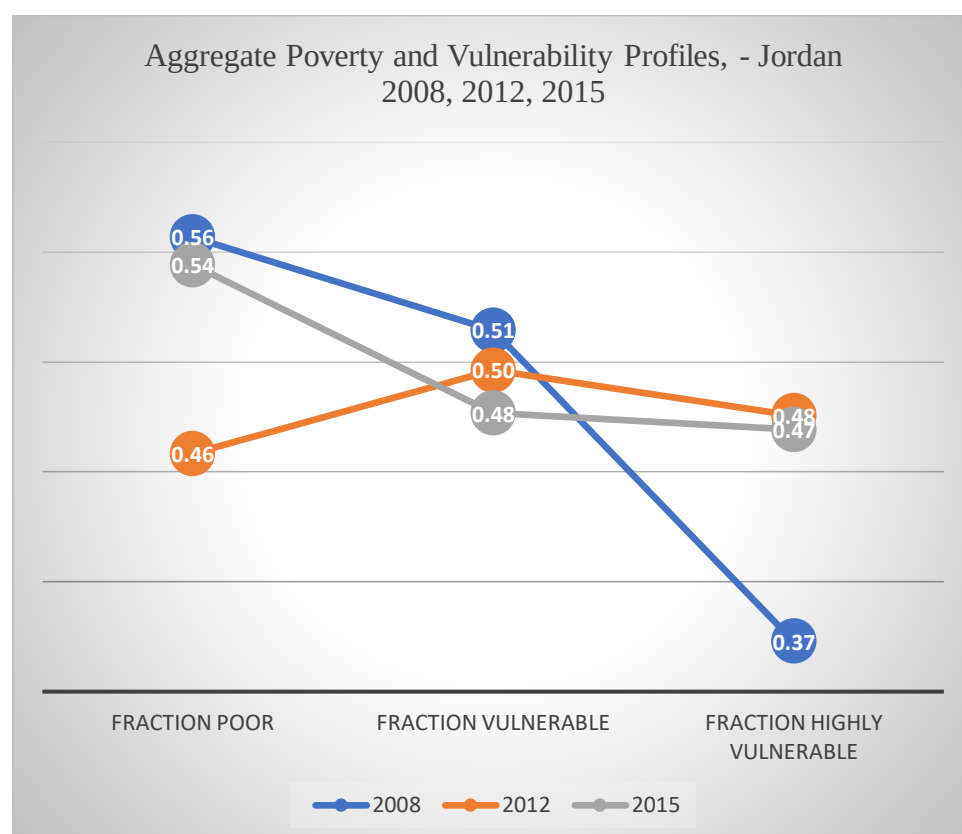
Source: Own calculations based on Economic Research Forum dataset

1.4.6.1 Post-Revolution Profile of Vulnerability to Poverty in Jordan

In summary, the change in the profile of poverty and vulnerability to poverty in Jordan is monitored during the years 2008, 2012, and 2015. Vulnerability to poverty measures experienced a slight reduction in the years after the Arab uprisings. The proportion of households who were identified as vulnerable to poverty decreased from 51% in 2008 to 50%

in 2012, then to 48% in 2015. However, the percentage of households that were identified as highly vulnerable to poverty significantly increased from 37% in 2008 to 47% in 2015. Figure 11 plots the change in fractions of poor households, vulnerable households, and highly vulnerable households in Jordan during the years 2008, 2012, and 2015.

Figure 11 - Aggregate Poverty and Vulnerability Profiles, - Jordan 2008, 2012, 2015



Source: Own calculations based on Economic Research Forum dataset

The comparison of vulnerability profiles over the three years is detailed as follows. As presented in Table 11 and Table 12 that provide aggregates on levels of vulnerability to poverty in Jordan during the years 2008, 2012, and 2015, the proportion of households that were vulnerable to poverty in 2008 was 51% and the proportion of households that were highly vulnerable to poverty was 37%. Amongst the households that were under the poverty line, 72% of the poor households were vulnerable to poverty and 77% of the poor households were highly vulnerable to poverty. 60% of rural area dwellers were vulnerable to poverty against 49% of

the dwellers of urban areas. The gap in annual levels of household consumption expenditure was 7,325 amongst the non-poor fraction of the households and the poor households. The mean vulnerability rate was 51% and the vulnerability to poverty ratio was 0.92.

Vulnerability to poverty measures slightly decreased in 2012. The proportion of households who were vulnerable to poverty in 2012 slightly decreased from 51% in 2008 to 50% in 2012. Nevertheless, the proportion of households that were highly vulnerable to poverty significantly increased from 37% in 2008 to 48% in 2012. Amongst the households that were under the poverty line, 61% of the poor households were vulnerable to poverty in 2012 compared to 72% in 2008. However, meanwhile 38% of poor households were highly vulnerable to poverty in 2008, 31% of the poor households became highly vulnerable to poverty in 2012. Though the percentage of vulnerable households who are dwellers in rural areas decreased from 60% in 2008 to 49% in 2012, the percentage of vulnerable households in urban areas slightly increased from 49% in 2008 to 50% in 2012. The mean vulnerability rate slightly decreased from 51% in 2008 to 50% in 2012. The vulnerability to poverty ratio was 1.8 in 2012 compared to 0.92 in 2008. This slight increase in the vulnerability to poverty ratio indicates that vulnerability to poverty became more dispersed among fractions of the population and that vulnerability distribution became more egalitarian.

The proportion of households that were vulnerable to poverty decreased from 50% in 2012 to 44% in 2015. The proportion of the households that were highly vulnerable to poverty slightly decreased from 48% in 2012 to 47% in 2015. Among the households that were under the poverty line, 62% of the poor households were vulnerable to poverty in 2015 compared to 61% in 2012. However, meanwhile 31% of poor households were highly vulnerable to poverty in 2012, 47% of poor households were highly vulnerable to poverty in 2015. The percentage of vulnerable households that are dwellers in rural areas decreased from 49% in 2012 to 42%

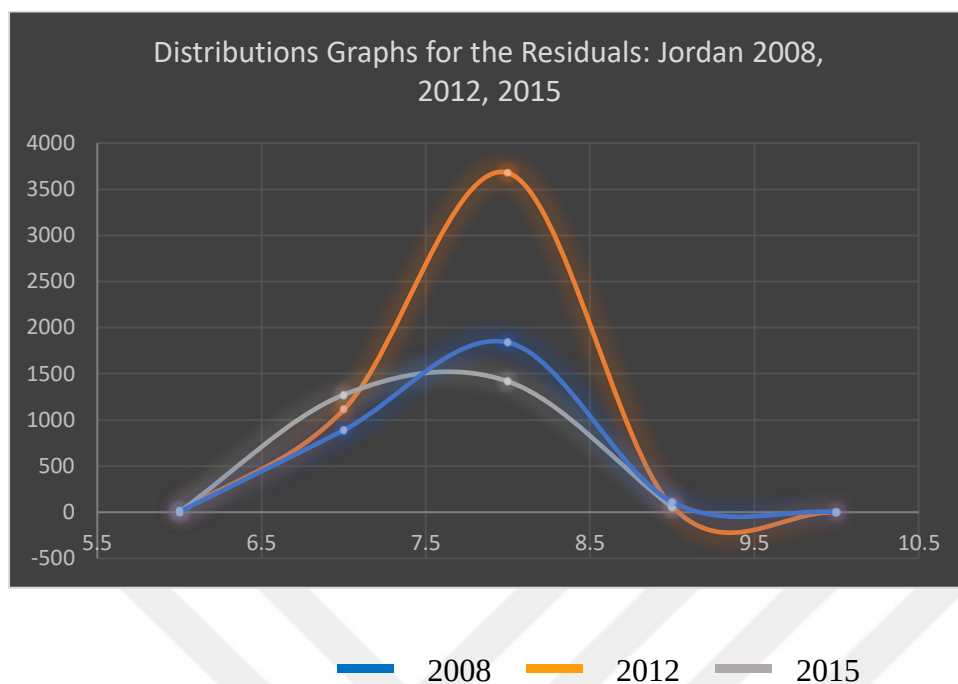
in 2015. The percentage of vulnerable households in urban areas slightly increased from 50% in 2012 to 51% in 2015. The mean vulnerability rate slightly decreased from 50% in 2012 to 49% in 2015. The vulnerability to poverty ratio was 1.8 in 2012 compared to 0.88 in 2015. This slight decrease in the vulnerability to poverty ratio indicates that vulnerability to poverty became less dispersed among fractions of the population and that vulnerability distribution became less egalitarian.

1.4.6.2 Poverty Transition Matrices in Jordan 2008, 2012, 2015

In order to check the applicability of the key assumption of bivariate normality, the error terms of the regressing household's consumption expenditure on time-invariant idiosyncratic household characteristics are plotted in Figure 12 in all three rounds survey. The figure captures the bell curve distribution of the error term that indicates the normal distribution. The distribution of the error term in each round of the survey passed the Shapiro-Wilk test of normality. Thus, following Dang et al. (2014) empirical approach, it was possible to construct synthetic panel data needed to predict the parametric transitional estimate used for poverty transition analysis.

As the cross-sectional welfare survey on consumption expenditure is available for three years in Jordan, two synthetic panel data are produced using data from three rounds of the survey for the years 2008, 2012, and 2015. The purpose behind the analysis of transitional estimates in Jordan is to monitor the repercussions of the Arab uprisings on poverty the movement during the years before and after the Arab uprisings.

Figure 12 - Distributions Graphs for the Residuals: Jordan 2008, 2012 and 2015



Source: Own calculations based on Economic Research Forum dataset

Table 13 shows percentages of households who have moved among poverty status from 2008 to 2012. Two percentages are derived from two bounds of each transitional estimate. Each bound of the transitional estimate is calculated using the generated synthetic panel data for each year of the survey. Accordingly, at the lower bound, 20% of the households that were poor in 2008 will exit poverty in 2012. At the upper bound, the percentage is 27%. So, the expected range of the percentage of households who will exit poverty and will become non-poor in 2012 is between 20% to 27%. The expected range of the percentage of households who were poor in 2008 and will remain in poverty in 2012 is between 29% to 35%. The expected range of percentage of households who were identified as non-poor in 2008 and will enter poverty in 2012 is between 8% to 18%. The expected range of percentage of the households who were identified as non-poor in 2008 and will remain as non-poor in 2012 is between 27% to 36%.

Table 13 - Poverty Transition Matrix from Synthetic Panel Data - Jordan 2008, 2012

Status in 2008	Status in 2012	Lower Bound Estimate	Upper Bound Estimate
Poor	Poor	0.35	0.29
Poor	Non-poor	0.20	0.27
Non-poor	Poor	0.18	0.08
Non-poor	Non-poor	0.27	0.36
R-squared	0.55		
Observations	2,746		

Source: Own calculations based on Economic Research Forum dataset

Table 14 shows percentages of households who have moved among poverty status from 2012 to 2015. Accordingly, at the lower bound, 7% of the households that were poor in 2012 will exit poverty in 2015. At the upper bound, the percentage is 14%. So, the expected range of the percentage of households who will exit poverty and will become non-poor in 2015 is between 7% to 14%. The expected range of the percentage of households that were poor in 2012 and will remain in poverty in 2015 is between 36% to 47%. The expected range of percentage of households who were identified as non-poor in 2012 and will enter poverty in 2015 is between 21% to 37%. The expected range of percentage of households who were identified as non-poor in 2012 and will remain as non-poor in 2015 is between 13% to 24%.

The upper and lower bounds for the percentages of the households who have changed their poverty status after Arab uprisings are estimated. Approximately 8% to 18% of the households that were identified as non-poor in 2008 will enter poverty in 2012. The estimated upper and lower bounds were higher for percentages of transition into poverty. It is estimated that approximately 21% to 27% of the households that were identified as non-poor in 2012 will enter poverty in 2015.

Table 14 - Poverty Transition Matrix from Synthetic Panel Data - Jordan 2012, 2015

Status in 2012	Status in 2015	Lower Bound Estimate	Upper Bound Estimate
Poor	Poor	0.47	0.36
Poor	Non-poor	0.07	0.14
Non-poor	Poor	0.21	0.37
Non-poor	Non-poor	0.24	0.13
R-squared	0.67		
Observations	2,746		

Source: Own calculations based on Economic Research Forum dataset

1.5 Results

This chapter aims to evaluate development prospects in the Arab world in the aftermath of the Arab uprisings. Due to the transitional context of the changes brought to the Arab region by Arab uprisings, assessing development prospects mandates observing the dynamics of changes in the main indicators of well-being. The chapter provides a dynamic measure of well-being that fits in with the transitional context of Arab uprisings. It observes trends of vulnerability to poverty rather than observing changes in poverty rates per se. Literature on the repercussions of the Arab uprisings included a wide range of studies on changes in levels of poverty rates. This chapter introduces the concept of vulnerability to poverty to the literature on economic development after the Arab uprisings. It is also intended to incorporate innovative empirical approaches that accommodate the lack of panel data required for making transitional analyses.

Common approaches to vulnerability analysis are based on panel data welfare surveys that rarely exist in developing countries, not alone in Arab countries where they do not exist at all. In the absence of panel data, vulnerability to poverty analyses using cross-sectional-level data are suggested in order to monitor levels of vulnerability to poverty. The chapter provides a measure of vulnerability to poverty using cross-sectional household-level data in a sample of Arab countries. Repercussions of Arab uprisings on levels of household welfare before and after Arab uprisings were inferred by changes in rates of vulnerability to poverty and by poverty transition maps that demonstrate movement into and out of poverty. The cross-sectional data used in this chapter are derived from the Economic Research Form microdata portal that provides household-level surveys conducted in a bundle of Arab countries. The timeframe of the study is selected to represent the effect of Arab uprisings on rates of vulnerability to

poverty. The years of survey rounds are selected for each country before and after the Arab uprisings.

Vulnerability is measured in terms of the variation of household expected expenditure relative to an expenditure threshold measured at the poverty line. The expected expenditure is predicted by the household's characteristics that determine the household's current level of expenditure. The proportion of vulnerable households and vulnerability rates are estimated accordingly for each year of the survey. Another measure that functions better for comparative analysis is the vulnerability to poverty ratio. This ratio is used to measure dispersion in the vulnerability of the population. Validating the outcomes resulting from vulnerability analyses requires the establishment of poverty transition matrices that allow for monitoring movement into and out of poverty in multiple periods of time. In this chapter, synthetic panel data is generated for each country in each year the cross-sectional welfare survey has been conducted. The generated synthetic panel data sets are used to provide poverty transition matrices that show movement into and out of poverty during the years before and after the Arab uprisings.

The results show that in countries that have witnessed protests and uprisings, vulnerability rates have increased upon the regime transitions incurred by the Arab uprisings. In Egypt, the vulnerability rate slightly decreased in 2012, the period immediately after the political transformation in which President Mohammed Mursi was in office. However, the vulnerability rate has remarkably increased in the period that followed the military coup d'état as 55% of the households became vulnerable to poverty in 2015. Tunisia has witnessed a remarkable increase in vulnerability rate. Meanwhile before the Arab uprisings, almost 50% of the households were vulnerable to poverty, two years later 66% of the households became vulnerable to poverty. In countries that have never witnessed any protests during the wave of Arab uprisings, nationwide average rates of vulnerability to poverty were lower. In both Iraq

and Jordan, though the fractions of the households who are vulnerable to poverty witnessed a slight decrease, almost all of the vulnerable households became highly vulnerable to poverty. The likelihood of such households falling into poverty at some point in the future was extremely high. Between the years 2008 and 2015, the distribution of vulnerability became less egalitarian in all countries in question. Ratios of vulnerability to poverty in all countries were declining. Even in countries where fractions of the vulnerable population have declined, vulnerability rates were higher for smaller fractions of poor households where the majority of the vulnerable groups became highly vulnerable. Disparities of vulnerability distribution among dwellers of rural and urban areas were observed larger. Particularly in Tunisia and Egypt where larger regional poverty and vulnerability gaps were observed.

Studies on vulnerability rates, particularly in other developing economies, in general, have concluded that the proportions of households that face a high risk of falling into poverty in the future outnumber the proportions of the households that are identified as poor at a certain point in time. In the sample of Asian countries studied by Chaudhuri et al. (2002), the proportions of households that are identified as vulnerable were double the proportions of the households that are identified as poor at a certain point in time. These findings comply with the findings observed in Egypt and Tunisia, the two countries that first witnessed the pioneering protests of the Arab revolution. However, the case in both Iraq and Jordan is converse. In both of these two countries, the fractions of households that were identified as poor outnumbered the fractions that were identified as vulnerable to poverty.

Also, in the literature on vulnerability to poverty in developing economies, different sources of vulnerability are identified for different segments of the population. Differentials in sources of vulnerability cause disparities in rates of the vulnerability of dwellers of rural areas and dwellers of urban areas. Dwellers of rural areas have a lower average consumption level

which is identified as a source of vulnerability to poverty. Meanwhile, the source of the vulnerability identified for dwellers of urban areas is volatility in levels of consumption. In our sample of Arab countries, disparities in vulnerability rates of dwellers of rural areas and dwellers of urban areas were observed. In both Egypt and Iraq, the fractions of vulnerable households are larger in rural areas than in urban areas. Meanwhile, in Tunisia and Jordan, dwellers of urban areas are observed to be more vulnerable to poverty than dwellers of rural areas.

Households' movement among different poverty statuses is demonstrated in a poverty matrix for each country. Poverty transition maps developed using synthetic panel data demonstrate the estimated fractions of households who entered into poverty or have exited poverty between the years before and after the Arab uprisings. The results coincide to a large extent with the proportions of households that were identified as vulnerable to poverty in previous years and have either entered or exited poverty in the following years. In Egypt, vulnerability rates have increased after the Arab uprising. Accordingly, the estimated fraction of non-poor households who have entered poverty increased after the Arab uprisings. Meanwhile, in Iraq and Jordan, the fractions of households who have entered poverty in subsequent periods were observed lower relative to both Egypt and Tunisia.

Upon reviewing the findings in studies on poverty transition in other developing economies, it has been observed that large fractions of the population that are identified as poor at a certain time have a large likelihood to remain in poverty. In our sample of Arab countries, estimates for the proportions of households that were identified as poor before the Arab uprisings and remained in poverty after the Arab uprisings were significantly large. Particularly in Egypt, estimates of the fraction of the poor households that remained in poverty were high and became even significantly higher in later years. The estimates observed for fractions of

households that were identified as non-poor before the Arab uprisings and entered poverty after the Arab uprisings were also significantly high.

Within the transitional context of the change brought to the Arab region by the wave of Arab uprisings, the estimated measures of vulnerability to poverty and poverty transitional estimates in the aftermath of the Arab uprisings reflected deteriorating levels of well-being. In both Egypt and Tunisia, the political transition brought by the Arab uprisings put larger proportions of the households at risk of vulnerability to poverty. Egypt's post-revolution experience was unique in that the country underwent two rounds of political transitions in a very short time. The prolonged process of the initial regime transition in 2011, then the consequent counter-revolution in 2013, has slowed down measures of economic growth. Poverty eradication policies and welfare development policies have never been prioritized, the thing that negatively impacted levels of well-being. Other countries that have never witnessed neither any protest of Arab uprisings nor any subsequent political transition were still inflected with political turmoil. In Iraq, particularly after the political turmoil brought by the Arab uprisings in 2014, many large-scale industrial, infrastructure, construction, and housing projects were halted. Levels of well-being were not improved. Though levels of vulnerability to poverty witnessed a slight reduction, a large proportion of vulnerable households became highly vulnerable to poverty with a higher likelihood of falling into poverty at some point in the future.

CHAPTER 2

INEQUALITY OF INCOME DISTRIBUTION IN MENA: MEASURES OF SUBJECTIVE WELL-BEING USING ORDINAL DATA

2.1 Introduction

When social unrest erupted in the MENA region, the region was sustaining high levels of social and economic development during the decade preceding the Arab Uprisings. However, the Arab population's dissatisfaction with their standards of living was escalating. (Ansani and Danielle, 2012; Arampatzi et al., 2015; Ghanem, 2016). Except for Yemen, most of the Arab countries were achieving progress in fulfilling the World Bank's millennium twin goals of poverty eradication and enhancing economic prosperity. According to the World Bank statistics, during the decade before the Arab uprisings, the bottom 40 percent of the population in the MENA region were enjoying high rates of income growth that exceeded rates of expenditure growth. The Gini coefficient, as the World Bank index of inequality, has recorded moderate to low inequality of expenditure in the Arab region between the years 1988 to 2008 (Ianchovichina et al., 2015; Arampatzi et al., 2015). Nevertheless, termed the paradox of "unhappy development" (Graham and Lora, 2009), the MENA region was experiencing declining levels of people's satisfaction with their living conditions that are associated with rapid rates of economic growth (Arampatzi et al., 2015). Arab population's frustration with their quality of life was escalating, particularly amongst the middle-class groups of the population. According to Gallup World Poll, satisfaction measures scored low reflecting declining standards of living. Arab uprisings were neither predictable nor explainable when observing the increasing rates of economic growth in Arab countries (Ianchovichina et al., 2015; Arampatzi et al., 2015; Luciani, 2016).

Arab uprisings took the international community by surprise. When depending solely on economic data, the Arab revolution's protests should have never been happening especially

at that time (Ghanem, 2016; Gordon, 2018). The eruption of popular anger throughout the Arab population shed a light on issues of inequality and non-inclusive growth in the MENA region. The problem did not lie in the rates of economic growth per se, but the rapid rates of economic growth were not associated with improving standards of living. The paradox in the MENA region was caused by the gap between the economic opportunities available in the labor market that mismatch the levels of educational attainment of the youth population. Improved educational attainment has raised people's aspirations and reduced their tolerance to inequality of wealth distribution (Ansani and Danielle, 2012; Arampatzi et al., 2015; Ghanem, 2016). Expectations of the youth population who have acquired better education lowered youth satisfaction with their quality of life and amplified the perception of inequality of opportunity (Campante and Chor, 2012). Individual perceptions of income inequality and deprivation of public services contributed to the emerging revolutions and social unrest. Thus, the Arab inequality puzzle is represented by the gap between the allegedly reported satisfying rates of inequality and people's perception of their own position in the pyramid of income distribution.

Inequality of income distribution and deprivation of basic facilities are cited among the fundamental causes of upheavals and deterioration of economic growth and human development. People's subjective perception of well-being is the main reason for their frustration with living conditions. The subjective perspective of well-being may not be adequately captured by objective aggregate indicators used to gauge levels of inequality and deprivation in the MENA region. The monetary quantification of changes in cardinal variables could be adequately reflected in objective indicators. However, such indicators do not reflect fundamental factors of subjective well-being like people's perception of their quality of life and their aspirations about their future (Ianchovichina et al., 2015). Aggregates like per capita GDP, household expenditure, and other objective measures of individual welfare, all measure levels of utility on the basis of relative income. As the reference level of income evolves over

time, these indicators become less adequate in reflecting realistic levels of individual welfare. Thus, levels of income inequality and deprivation in the Arab region could be higher than what is reported by objective indicators. Such monetary measures partially reflect the elements of utility function related to measuring levels of poverty but not individual well-being. Nonmaterial dimensions of social welfare are supposed to be considered for reflecting a better view of levels of individual well-being (Clarck, Frijters, and Shields, 2008). Deterioration in levels of public services and public health negatively impacts social welfare. Such quality-of-life elements are determinants of individual well-being but are not captured by monetary measures.

The burst of popular anger on the eve of Arab uprisings is well explained by the analysis of subjective well-being indicators. Subjective measures of individual well-being are more functional for making policy recommendations. Economic development policies that boost household consumption may not reach the aim of development. First, development measures inferred by the increases in average per capita income and consumption expenditure do not reflect improvements in levels of individual well-being. Increasing average consumption expenditure may denote a deterioration in levels of public services. Individuals may increase their expenditure on the private sector's services. This case also denotes a deterioration in individual well-being and erosion in savings. The modicum of people's reliance on public services was increased, nevertheless, the decline in the quality of public services obliges people to convert to private sector services like private schooling and private health facilities. Therefore, the increase in levels of individual and household expenditure becomes a biased growth indicator that does not reflect people's frustration with the quality of public services. It only depicts increased per capita consumption, but it does not capture the associated depletion of individual savings spent on private sector services. Increasing critique of per capita

GDP as an ultimate measure of welfare triggered the interest in subjective measures of well-being (Schoder, 2014).

Objective measures of inequality failed to capture the realities beyond people's dissatisfaction rates before the Arab uprisings, not alone levels of income inequality in the aftermath of the Arab uprising. As conventional tools of measuring income inequality reflected misleading trends, this chapter follows unconventional methods for measuring income inequality in the Arab region using household-level ordinal data on people's perceptions of their well-being status. Measuring the inequality of income is a daunting task. Income and wealth information is not easily accessible in the Arab region. The inaccessibility of information is a contributing factor to the lack of studies on economic inequality in the Arab region (Ianchovichina et al., 2015). The contribution that this chapter makes to the literature on changes in levels of well-being after Arab uprisings is represented by providing subjective measures of income inequality using ordinal data.

Conventional approaches to measuring inequality of income distribution are built upon a structure of a known cardinalization of a cardinal equalisand. When data are categorical, or when the cardinalization structure is not known, inequality comparisons become more challenging. Cowell and Flachaire (2011, 2017, 2018) provide an axiomatic approach for measuring inequality of income distribution using ordinal data. They provide a set of inequality indices upon evaluating individual status according to the individual position in data distribution. Using Cowell and Flachaire (2017) axiomatic approach to measuring income inequality, data from World Values Survey (WVS) are used to measure the inequality of income distribution in a sample of Arab countries. The dataset includes measures of inequality for 3 rounds of the WVS for some countries (Egypt, Jordan, and Iraq), and two rounds for others (Tunisia, Algeria, and Lebanon), subject to data availability.

Levels of income, investment, and expenditure that are quantified in monetary terms can be effectively expressed by cardinal measures. Comparative and descriptive analyses are possible and straightforward when cardinal measures are used. However, such methods are not as functional for variables that are not cardinally quantified like health status, educational attainment, and inequality of income distribution. Such variables are more conveniently scaled with the use of ordinal data. Levels of deprivation of public services is an ordinally measurable variable that cannot be easily captured through a cardinal variable.

It is common in studies on evaluation and comparisons of income distribution to locate an individual's status in the distribution according to their own status in society. Empirical frameworks used for measuring social deprivation built upon the concept of individual status in society are extended to measurements of income inequality (Kalmijn and Veenhoven, 2005), (Seth and Alkire, 2014), (Cowell and Flachaire, 2011, 2017, 2018), (Seth and Yalonetzky, 2020). Measuring inequality of income distribution represents one side of the coin. The unequal distribution of essential public service is the other side of the coin that matters for assessing levels of subjective well-being. Since poverty is a multidimensional phenomenon, measures of poverty may not capture all the dimensions of social welfare. Individual well-being is linked to many aspects rather than insufficient levels of income. The ordinal income inequality index developed in this chapter reported higher levels of income inequality in the Arab countries than the moderate to low levels reported by conventional objective measures. Categorical data derived from opinion surveys reflected lower levels of satisfaction with the self-reported perception of own financial well-being.

The following section provides a literature review of the approaches used to provide subjective measures of well-being using categorical data. Section 3 describes the data used in this chapter. It also describes the theoretical approach used to measure income in the Arab

region. Section 4 provides estimated measures and the related data analysis for each country. The main findings are summarized in the conclusion section.

2.2 Literature Review

This chapter provides a class of subjective measures of well-being in order to assess how levels of income inequality and deprivation evolved in Arab countries in the aftermath of the Arab uprisings. It spots the light on how misleading trends of economic growth built upon objective aggregates of growth in Arab countries failed to predict people's levels of dissatisfaction with their standards of living. Therefore, it is essential to provide a review of how ordinal measures of subjective well-being have been approached in the literature. The following review shows how the theoretical and empirical approaches used in this chapter differ from the ones used in the literature. It also emphasizes the supremacy of using subjective measures of well-being to depict people's perceptions of their own levels of well-being.

Inequalities in subjective well-being were addressed first by Kalmijn and Veenhoven (2005). As a response to the critique on using the increases in per capita GDP as a measure of well-being, Kalmijn and Veenhoven emphasize the need to assess social inequalities by evaluating inequality in life satisfaction. The theoretical framework used and the resulting empirical results show a decline in inequality of happiness in a sample of European countries between the years 1973-2001. Kalmijn and Veenhoven (2005) observe that cross-nation comparative analyses on happiness as a subjective measure of well-being uses mean-based measure for making the comparison. Sometimes, standard deviation and Gini coefficient comparisons are used to assess the inequality of happiness. Addressing doubts about the use of such statistics for quantifying inequality of happiness, they analyze the assumptions underlying each of the described statistics. They provide a hypothetical distribution for their proposed notion of inequality of happiness. They define performance criteria according to which they

test the performance of each statistic in assessing inequality of happiness. Kalmijn and Veenhoven (2005) conclude that a few of the statistics are not appropriate to quantify inequality of happiness as they fail the empirical test. The Gini coefficient fails the empirical test as it is a ratio-level measure meanwhile happiness is an interval-level variable. On a theoretical basis, the Gini coefficient is developed for the application to capacity variables rather than intensity variables. Statistics like standard deviation and mean absolute difference are more satisfactory than the Gini coefficient to quantify subjective measures of well-being (Kalmijn and Veenhoven, 2005).

In sectors like health and education, measurements of inequality are of a qualitative nature. Problems of describing qualitative data in numerical terms are solved using different approaches in the literature. In the case of the health status variable, a specific health scale is adopted that captures the ordered nature of subjective responses towards questions of the description of health status. The problem of ordinal scale has been solved in the literature either by assuming some patterns of scaling assumption or by using dichotomous variables of two or more statuses as educated/non-educated, or good health/poor health dichotomization of status.

Since a person with a good health status is in a better-off position than a person with poor health status, numerical values with a categorical health scale are assigned to each response. Using the same categorical scaling approach in developing inequality indices, Allison and Foster (2004) realize that indices used to measure income inequality derived by income data are sensitive to the scales used to convert subjective responses to health questions into cardinal values. The ordering of two different distributions of data could be reversed with small variations in the scale used to measure health status.

When a re-ranking of data is conducted, the resulting measures are not necessarily consistent. This problem is relevant to the difficulty of finding dominance rather than to the

underlying categorical nature of the data. This principle of dominance states that a Likert scale order of a particular range of 1 to 10 is not applicable when scales are relatively dense. In the case of ordinal variables, the stochastic dominance principle is close to the one used in the case of cardinal data when defined by comparing the cumulative shares of the population included in different categories of the ordinal variable. As rescaling alters the value of the means, the values of mean-based inequality measures are also to be altered.

The dominance principle enables the evaluation of the overall level of an ordinal variable and the monitoring of its either increasing or decreasing behavior. Applying the dominance principle allows for the distribution of mean-based orderings to be independent of the used scaling pattern. Thus, distributions that are far away from median values are the more unequal distributions.

Measures of dispersions in which the mean value is used as a reference point are not the ultimate measures to be used in the case of ordinal variables. When arbitrarily chosen patterns of scaling are applied to different categories, the ordering of the categories will be altered. Thus, the median category alongside the cumulative proportions of the population included in each category becomes the ultimate reference point. Lorenz curve comparisons of distributions are based on mean-preserving dispersion. The partial orderings suggested by Allison and Foster (2004) are median-preserving dispersion of distributions (Allison and Foster, 2004).

For Seth and Alkire (2014), theoretical frameworks that are used in the literature to incorporate income inequality into a compound poverty measure may not reflect variations of poverty amongst subgroups of the population. Recently, many measures of multidimensional poverty and deprivation have been developed incorporating the ordinal nature of poverty variables. Such measures give precedence and consideration to inequality among subgroups of

the poor population. Measures that are adapted to inequality are sensitive to distributional changes amongst the poor subgroups of the population. To incorporate the sensitivity to inequality property, other policy-related properties are to be forsaken. In order to understand the contribution of each poverty dimension to levels of overall poverty, any multi-dimensional poverty measure should be decomposed into its constituting dimension to be able to estimate the contribution of each dimension. This property is mandatory for developing effective poverty prevention policies. Seth and Alkire (2014) measure inequality in deprivation amongst subgroups of the poor population using a positive multiple of variance as a decomposable measure of inequality and deprivation. Using datasets derived from a demographic health survey in 23 developing countries, they illustrate how this decomposable measure is more insightful compared to the conventional poverty headcount ratio measure used to assess levels of well-being.

Because of the ordinal nature of the poverty dimension, it is not simple to depict inequality amongst subgroups of poor population using cardinal data. Levels of simultaneous deprivations that subgroups of the poor population experience could capture levels of within-group levels of inequality. Seth and Alkire (2014) use a counting approach a decomposable inequality measure that depicts the multidimensional nature of poverty. They start their framework by expressing each person's level of deprivation in a cardinal scale of scores. In order to assess inequality levels, the weighted sums of individual deprivation are estimated. Absolute distances rather than relative distances between deprivation scores should be considered when measuring inequality using the positive multiple of variance. When relative terms are used, inequality levels are not altered when deprivation scores are all multiplied by the same factor.

An inequality-sensitive measure of multidimensional poverty should incorporate poverty incidence, poverty intensity, and inequality among the poor population. For the purpose of developing effective poverty prevention policies, delineating subgroups of the poor population is crucial. For instance, if the policy target is to decrease the incidence of poverty, then the focus should be on the marginally poor people who should be made to exit poverty and not the poorest groups of the poor population. If both the incidence of poverty and the intensity of poverty are to be targeted by the policy, then neither the poorest group of the poor population nor the marginally poor are to be the focus group. Meanwhile, when inequality eradication is the target, the poorest groups of the poor population are supposed to be the targeted subgroup of the population. A poverty measure that accounts for inequality should be sensitive to distributional changes amongst the poor subgroups of the population.

The inequality measure Seth and Alkire (2014) provide depicts both the inequality amongst the poor population and the disparities across the subgroups of the poor population. A positive multiple of variance should satisfy a set of crucial properties. It is decomposable in so that it could be measured as a sum of the total of between-group levels of inequality and within-group levels of inequality. Thus, it depicts levels of inequality among the multidimensionally poor subgroups of the population (Seth and Alkire, 2014).

Literature on the economic inequality in the MENA region provided monetary indicators for inequality. Meanwhile, others have attempted to investigate whether such objective indicators that did not incorporate perception data have reflected the reality of inequality status in the MENA. The following review of the literature on prospects of development in the MENA region highlights the contribution of the empirical approach used in this chapter. The importance of using categorical data in assessing levels of subjective well-being is emphasized in the following review.

Hassine (2015) provides a comparative analysis of the inequality of expenditure in 11 countries of the MENA region. Using a combination of aggregates of expenditure and micro-data derived from household-level surveys, the analysis shows low levels of inequality of expenditure. However, the items included in household expenditure, whether only food or non-food expenditure or were extended to expenditure on housing and durables, matter in the calculation of the Gini coefficient. The pattern of inequality varies among countries, declining in some and increasing in others, but in general, it recorded moderate to low rates on average in the MENA region. The analysis confirms that there exists no relationship between average per capita expenditures and inequality of expenditure. They both showed either a mutual increasing pattern or decreasing pattern, depending on the countries in which they were measured. Declining rates of expenditure inequality were not necessarily associated with improving per capita expenditure or any well-being improvements.

When depending on expenditure data to measure inequality of expenditure, the top tail of the distribution tends to be underrepresented. This probably underestimates measures of inequality. Thus, Ven der Weide et al (2015) follows a different technique to overcome the problem of underrepresented data. Data on house prices do not show the same pattern of income data that could be underestimated for tax issues. Since data on market house prices are easily accessible and available in public, the same tendency for underestimating the values of houses does not exist. Following an approach of multiple imputations, they use data from Egypt on market house prices to estimate the upper tail of the distribution. The imputed distribution of consumption of the upper tail is then combined with a lower tail expenditure distribution reported by the household survey. The result does not show a significant change in the Gini coefficient. The reported expenditure inequality is still considered moderate.

Measures of wealth inequality depend on approaches that use data on bank deposits in tax havens as measures of wealth. Using data on cross-border bank deposits from the Bank of International Settlements, Johannesen (2015) analyzes cross-country tax haven bank deposits and their distribution over time. The data show that the MENA region has a considerably larger portion of hidden wealth compared to other parts of the world. The analysis reported that there is no correlation exists between the GDP share of tax haven deposits and levels of inequality of expenditure in the MENA region. Data on expenditure inequality reported by survey measures. Meanwhile, measures of wealth inequality derived from data on haven deposits reflect a different dimension of inequality represented in the hidden and unreported wealth. They totally differ from measures of expenditure inequality whose data is reported by survey means. Indicators on wealth inequality provide insights into other development indicators like tax evasion and corruption.

Arampatzi et al. (2015) provide an empirical analysis of the factors that contributed to people's dissatisfaction with their standards of living immediately before the Arab uprisings. They have incorporated perception data that express subjective well-being into the objective indicators used to measure dissatisfaction with living conditions. They examine the importance of the factors that contributed to the declining dissatisfaction in the MENA. They conclude that the subjective perceptions are significantly related to the motivations of uprisings and are associated with the incurred upheavals

Ianchovichina et al. (2015) mention the importance of accounting for the individual perception of the concept of economic inequality when measuring inequality in the MENA region. They state that monetary measures that are used to gauge inequality in the MENA are biased and imprecise. Even when attempting to adjust for the biases, these measures understate inequality rates that prevailed in the MENA region before the Arab uprisings. Monetary

measures have failed to capture the fundamental elements of subjective well-being, so they underestimate the impact of inequality as a trigger of social rage behind Arab uprisings.

2.3 Data and Methodology

2.3.1 Data

The data used in estimating the income inequality index in the sample of Arab countries are derived from the World Values Survey (WVS). WVS is a global research initiative that has been launched in 1981 with the purpose of providing an over-time and cross-nation comparative of subjective perspectives on people's social norms, beliefs, and values. It was first derived from the European Value Study which is a cross-nation large-scale longitudinal opinion survey for people's values and attitudes. Besides economics, political science, sociology, public health, and international relations, both projects covered different topics in social sciences like social psychology, anthropology, and demography. It is among the first initiatives of social studies that covered international variations in main cultural zones with a wide range of extremes from the poorest to the wealthiest societies. Coordinated by the World Values Survey Association located in Stockholm, the WVS's main research instrument is a globally conducted comparative social survey. It is a common opinion questionnaire survey built on face-to-face interviews with a representative sample of the adult population in over 90 countries. The variables included reflecting people's subjective perspective on social norms and societal values and beliefs over topics like democratization, economic development, gender equality, religious beliefs, and subjective well-being. It provides a time-series database conducted on waves, each of a five-year time span. Conducted so far on seven waves, the collected database allows for analyzing people's attitudes and the nature of societies and establishing a theoretical framework for similarities and variations among different societies.

The response distribution represents subjective responses of the population on the following question regarding the subjective level of satisfaction with their own financial status on a scale of 1 to 10: How satisfied are you with the financial situation of your household? If '1' means you are completely dissatisfied on this scale, and '10' means you are completely satisfied, where would you put your satisfaction with your household's financial situation?

The data are taken from the last three waves of the World Values Survey conducted in 2009, 2014, and 2017. In all of Egypt, Jordan, and Iraq, three rounds of WVS have been conducted. But in Tunisia, Algeria, and Lebanon, only two rounds of WVS are conducted. Both the upward-looking and the downward-looking versions of the income inequality index are estimated each year. The maximum value is used as a reference point and the value of 0 is used for the sensitivity parameter.

2.3.2 Methodology

2.3.2.1 Measuring Ordinal Inequality of Income Distribution – Theoretical Framework

Inequality of income distribution is cited as a fundamental reason for social unrest and political upheavals. Justice and income equality were the main demands of Arab people on the eve of Arab uprisings. However, Arab countries have reported satisfactory measures of income inequality during the decade that preceded Arab uprisings, not alone sustaining high levels of social and economic development. Arab population's dissatisfaction with their standards of living was not perceived by economic aggregates used to measure economic growth in the region. (Ansani and Danielle, 2012; Arampatzi et al, 2015; Ghanem, 2016). The World Banks Gini index of inequality reported moderate to low levels of inequality of expenditure in the Arab region between the years 1988 to 2008 (Ianchovichina et al., 2015; Arampatzi et al, 2015). Nevertheless, this section assesses levels of inequality of income distribution using categorical

data derived from opinion surveys that depict self-reported perceptions of own financial well-being.

Interest in non-monetary measures of welfare has been rising lately. Particularly for variables that are hard to be cardinally estimated and are ordinal in nature. For example, individual health status could be ordinally measured in a group of statuses like either good health, or poor health, fair health, and very poor health. Levels of education are the same. Individuals are classified into groups according to their educational achievement like no education, primary education, secondary education, ... etc. Ordinal, or categorical data allows for expressing the status of an individual in the population in terms of its location in the distribution. The status of each individual is defined as a function for a given distribution in such that status will be independent of the cardinalization of the variable being measured. The status of each individual in the population is specified by the standard definition of the individual position in the distribution, or by the proportion of the population that is not in any better-off position.

When labeling categories as k , where the number of categories is K ($k = 1, 2, \dots, K$) and the number of people in each category is n_k , it is presumed that individuals in the same categories are of the same status. It is also presumed that the status of each individual i is measured according to the status of other individuals in the population who are either better-off or worse-off.

Measurements of economic development using ordinal data were first introduced to the economic literature by Amartya Sen (1976). Sen provided a class of poverty indexes using an axiomatic approach to measure poverty by categorical data. The introduction of such a class of ordinal measures for economic phenomena presented a breakthrough in the literature of development economics. Cowell and Flachaire (2011) followed Sen's lead when they first

provided an ordinal approach to measure mobility in income distribution. Followed by two other studies, Cowell and Chen (2015) and Cowell and Flachaire (2018), provided insights on measuring demographical and socio-economic changes brought by economic growth in China and their ramifications on development by a class of mobility indicators using ordinal data.

Cowell and Flachaire (2017) provide an axiomatic approach for measuring inequality of income distribution. Depending on the individual's location in the distribution of categorical data, the individual status is measured by the distance between the individual's location and a specific reference point of equality in income distribution. In a population of n , inequality of income distribution is captured by the status of individual i , denoted as s_i . A vector of s_i of all populations is defined by a specific distance function $d: S$, where $d(s,e)$ means the distance that a person with status s is from e , *the reference point*, that could be either given exogenously or as a function of the individual status s_i .

Thus, the first step of Cowell and Flachaire (2017) approach is to define individual status.

The endowment of utility for each individual i is u_i , for n size population, the utility distribution function is given by F . The status of each individual in the distribution is:

$$s_i \in S \subseteq R$$

$$s_i = \psi (u_i, F(.), n)$$

Where the function ψ is independent of the utility cardinalization.

The standard definition of individual position in society is used to specify individual status. The individual position is specified in terms of the proportion of the population who are

not in a better-off position. Thus, the status measure is specified by the utility distribution cumulative function:

$$s_i = F(u_i)$$

So, in a given category $k_{(i)}$ to which individual i belongs, every individual has the same status in utility distribution:

$$s_i = f\left(\sum_{l=1}^{k_{(i)}-1} n_l, n_{k_{(i)}}, \sum_{l=k_{(i)}+1}^K n_l\right)$$

When the individual position is determined by the proportion of the population who are either in a worse-off position or who are equally well-off, then a downward-looking measure of individual position is given as:

$$s_i = \frac{1}{n} \sum_{l=1}^{k_{(i)}} n_l$$

When the individual position is determined by the proportion of the population who are either better-off or who are equally well-off, then an upward-looking measure of individual position is given as:

$$s'_i = \frac{1}{n} \sum_{l=k_{(i)}}^K n_l$$

The second step of Cowell and Flachaire (2017) approach is to specify a concept of inequality. This step is mandatory to aggregate information on the distribution of individual status, and to characterize the departure of individual status from an equality point.

Unlike conventional income inequality cases where inequality is assumed when everyone receives a mean income, the equality reference point $e \in R$ is either given exogenously or as a function of the individual status.

$$e = \eta s$$

Where η represents the function by which the reference point varies according to change in individual status.

Income inequality is captured by a specific distance function $d: S$, where $d(s,e)$ means the distance that a person with status s is from inequality reference point e .

This approach of inequality measurement is developed to deal with ordinal data. Inequality is considered a weak ordering function characterized by a group of axioms. Axiom 1 of continuity entails that the function of inequality relation is continuous on individual status S_{n+1} . Axiom 2 of monotonicity defines the inequality relation as when there exist distributions that differ from one another only with respect to the status of person i , then the distribution that records higher inequality is located at a farther distance from the reference point of equality. Axiom 3 of independence means that if there is some person i who has the same status in s and in s' , then the same change in the status of person i in both distributions leaves s and s' as equivalent in terms of inequality. Anonymity axiom 4 means that if the status measure embodies all relevant information, inequality is invariant to the permutation of individuals' labels. Axiom 5 of scale invariance is considered a version of homotheticity axiom. It is also related to the choice of the reference point whether it is independent or dependent on the population size.

Individual i status is measured from two perspectives, one is downward-looking, the other is upward-looking, decided by the proportion of the population who are either relatively

better-off or worse-off. Both the downward-looking status s_i and the upward-looking status s'_i of person i are given by the following equations:

$$s_i = \frac{1}{n} \sum_{l=1}^{k_i} n_l$$

$$s'_i = \frac{1}{n} \sum_{l=k_i}^K n_l$$

Given Axioms 1–5, inequality relation ordering is represented by the following equation:

$$I(s; e) = \varphi \left(\sum_{i=1}^n d(s_i, e) e \right)$$

The reference point $e = \eta(s)^\alpha$, could be either given exogenously or could be taking forms proposed like the maximum value, minimum value, mean, or median value.

$$I_\alpha(s, \eta(s)) = \frac{1}{\alpha(\alpha - 1)} \left[\frac{1}{n} \sum_{i=1}^n s_i^\alpha - \eta(s)^\alpha \right]$$

α is the parameter that captures the sensitivity of measured inequality to different parts of the distribution, for any reference point e .

The behavior of the inequality index varies according to the choice of reference point. Assuming the monotonicity axiom guarantees that any change in the distribution that brings an individual closer to a specific reference point, if the reference point is endogenously specified $e = \eta(s)$, a change in the distribution might change the position of the reference point and

shifts it to a position that reversely affect the value of the inequality index. Otherwise, an inequality reference point could be given exogenously or could be taking forms proposed like the maximum value, minimum value, mean, or median value.

When the reference point takes its maximum value, then the situation of perfect equality exists. This happens when the distance from the reference point of each individual in the distribution is zero. For this to happen, status should be equal to the reference point $s_i = e$ ($i = 1, \dots, n$), then the maximum possible value of s is when $e = 1$. In this case, there is a possibility for the inequality index to take negative values.

When the reference point takes the minimum value, for this to happen, status should be equal to the reference point $s_i = e$ ($i = 1, \dots, n$), then the minimum possible value of s is when $e = 0$.

When the reference point takes the mean status, $e = \eta(s) = \mu(s)$, the means status is defined as:

$$\mu(s) = \mu(s') = \frac{1}{n} \sum_{i=1}^n s_i = \frac{1}{n} \sum_{i=1}^n s'_i$$

When $s_i = \mu(s)$, then $I_\alpha(s, \mu(s)) = 0$

The median status could also qualify as a reference point. The median point $e = \eta(s) = Med(s)$ in such that $\#(s_i \leq e) \geq n/2$ and $\#(s_i \geq e) \geq n/2$. The median is not easily defined for categorical data, thus using the median reference point concept involves difficulties and may result in problematic outcomes.

The outcomes resulted from using each of the above-mentioned choices as a reference point in order to select the most reasonable choice. The use of the mean and the median status as reference points has resulted in unreasonable results. The mean status significantly changes with the changes in individuals' positions. The choice of maximum value status as a reference point turned out to be the most appropriate candidate to make ordinal data analysis.

For any selected reference point, the sensitivity parameter α depicts the sensitivity of inequality measure to the distribution of data. Higher values of sensitivity parameter reflect high sensitivity of inequality index towards higher-status inequality. The opposite is true for lower and negative values of the sensitivity parameter. This is the case for cardinal data. The use of the mean status as a reference point is the most appropriate in the case of cardinal data. But it is not the case for categorical data. As the mean status is not the most appropriate reference point for ordinal data, the best option for the reference point is to be exogenously given in order to avoid getting negative values of the inequality index. The associated most appropriate sensitivity parameter should not take any negative values. The best behavior of the inequality index is captured with the parameter restriction $\alpha < 1$.

When the reference point is taken as the maximum value, that is when the situation of perfect equality exists where the distance from the reference point must be zero for everyone. The reference point takes the maximum possible value of s . So, $e = 1$. When also considering the limiting case in which the sensitivity parameter takes the value of 0. So $\alpha = 0$, then, the inequality indicator takes the form of:

$$I_{\alpha}(s, 1) = \left[-\frac{1}{n} \sum_{i=1}^n \log s_i \right]$$

This inequality index is defined according to the individual ranks and is invariant to any cardinal interpretation of the variable measured. The individual ranks in ordinal or categorical data are classified according to scales. For example, when the variable subject to study is the level of satisfaction with the financial status, then categories are classified with the range of (Completely dissatisfied – 1, 2, ..., 10 - Completely satisfied). When responses are more skewed to categories that are more desirable, or categories that are in a better-off position, then inequality should be reduced. In such a case, the upward-looking version of the inequality indicator is more suitable. The downward-looking version is more suitable for the opposite case. So, when the distribution is skewed towards higher (better-off) categories, the upward-looking version gives smaller values of the inequality measure than the downward-looking version. When the upward-looking version gives greater values, then the distribution is skewed towards smaller (worse-off) categories. Meanwhile, when both the upward-looking and downward-looking versions of the indicator give the same values, then the distribution is symmetric.

The above-used approach to developing a set of inequality measurements is applicable in both cases of ordinal data. It is also applicable in the case of conventional cardinal data but with an appropriate interpretation of status that goes well with the content of the information reported in the data. In cases of cardinal data, the values that are to be equalized are clear, for example income, and individual status are accordingly easily defined with the values given. The mean value of income works as the best candidate for the reference point that corresponds to the case of perfect equality and the inequality index is given when $\eta(s) = \mu(s)$

$$\mu(s) = \mu(s') = \frac{1}{n} \sum_{i=1}^n s_i = \frac{1}{n} \sum_{i=1}^n s'_i$$

$$I_{\alpha}(s, e) = \frac{1}{\alpha(\alpha - 1)} \left[\frac{1}{n} \sum_{i=1}^n s_i^{\alpha} - e^{\alpha} \right]$$

$I_{\alpha}(s, e)$ is convex and increasing for s_i . Thus, unlike the case with ordinal data, with cardinal data the transfer principle is satisfied with $I_{\alpha}(s, e)$.

2.4 Discussion and Findings

2.4.1 Ordinal Income Inequality Index

This section assesses how levels of inequality of income distribution have evolved in a sample of Arab countries before and after Arab uprisings. It provides a subjective measure of income inequality using perception data derived from an opinion survey. The data are presented in a categorial order depicting levels of individual satisfaction with their own financial status. People's responses are demonstrated in response distributions. The approach used for data analysis will attempt to examine the following statements. First, it is intended to examine whether the population of higher-income countries are more satisfied with their financial status. It is also intended to examine the shape that distribution across categories takes. And most importantly, the way by which the shape of the distribution affects levels of ordinal inequality.

The ordinal inequality index is derived on the basis of individual rank rather than the Likert-scale or any other ordering transformation used in the literature. The individual ranking is not sensitive to any numerical interpretation of the response. If the distribution of the responses were to be skewed towards categories who are better-off, or in a better status of well-being, an upward-looking version of the inequality index makes a better inequality indicator

and vice versa for distributions that are to be skewed towards categories who are in a worse-off status of well-being. In this case, a downward-looking version of the inequality index makes a better inequality indicator. Table 15 shows ordinal inequality indices estimated in both upward-looking and downward-looking versions for a sample of Arab countries before and after Arab uprisings. It is followed by a detailed discussion on the results of each country upon observing the behavior of the associated distribution in each year.

Table 15 - Inequality Index with Upward-looking and Downward-looking Status – 2009, 2014, 2017

Country/Year	2009		2014		2017	
	<i>I up</i>	<i>I down</i>	<i>I up</i>	<i>I down</i>	<i>I up</i>	<i>I down</i>
Egypt	0.754	0.808	0.734	0.800	0.751	0.810
Iraq	0.774	0.798	0.803	0.777	0.720	0.738
Jordan	0.807	0.707	0.770	0.786	0.770	0.786
Algeria	0.811	0.768	0.773	0.769	-	-
Tunisia	-	-	0.744	0.778	0.760	0.815
Lebanon	-	-	0.796	0.777	0.785	0.792

Source: Own calculations using World Values Survey data

Levels of income inequality are observed in the sample of Arab countries before and after Arab uprisings. The shape of the distribution of subjective responses is identified by the comparison of the upward-looking and down-looking versions of the inequality index. These comparisons provide insights into individual behavior in the self-reported level of financial satisfaction. In general, self-reported level of satisfaction with own financial status in high-income countries is expected to be higher, and vice versa for poor countries. In our sample of Arab countries, lower-middle-income countries reported lower levels of satisfaction with own financial status.

The nature of the responses' distribution tells a lot about levels of inequality measures by comparing the values of the downward-looking versions of inequality indicators to the

values of upward-looking versions of the indicators. When the distribution of the responses is skewed towards more-desirable categories while using the upward-looking version of the inequality indicator, levels of inequality fall. When the downward-looking version and the upward-looking version of the inequality indicator give similar values, then the distribution is symmetric. When the upward-looking version of the inequality indicator gives remarkably lower values than the downward-looking version, the distribution is skewed toward larger categories of the population. When the upward-looking version of the inequality indicator gives remarkably higher values than the downward-looking version, the distribution is skewed towards smaller categories of the population.

2.4.1.1 Egypt

Egypt is classified by the World Bank as a lower-middle-income country. In 2009, the discrepancy between the upward-looking version of the inequality index $I_{up} = 0.75$ and the downward-looking version of it $I_{down} = 0.81$ is significant. Between the years 2009 and 2017, the upward-looking version of the inequality index witnessed a slight decline in 2014, but it was raised again to 0.75 in 2017, meanwhile, the downward-looking version of the inequality index has almost remained the same.

Among other Arab countries in the sample, Egypt reported lower values of the upward-looking version of the inequality index. In 2009, the upward-looking version of the inequality index was the lowest of all other Arab countries in the sample even the countries that are classified as upper-middle-income countries.

If the distribution of the responses were to be skewed towards categories who are better-off, or in a better status of well-being, an upward-looking version of the inequality index makes a better inequality indicator and vice versa for distributions that are to be skewed towards

categories who are in a worse-off status of well-being. In Egypt 2009, Figure 13 shows the distribution of the responses to the survey question on evaluating individual financial status on a 1 to 10 scale. The distribution is skewed towards categories who are in a worse-off status of well-being. In this case, the downward-looking version of the inequality index makes a better inequality indicator.

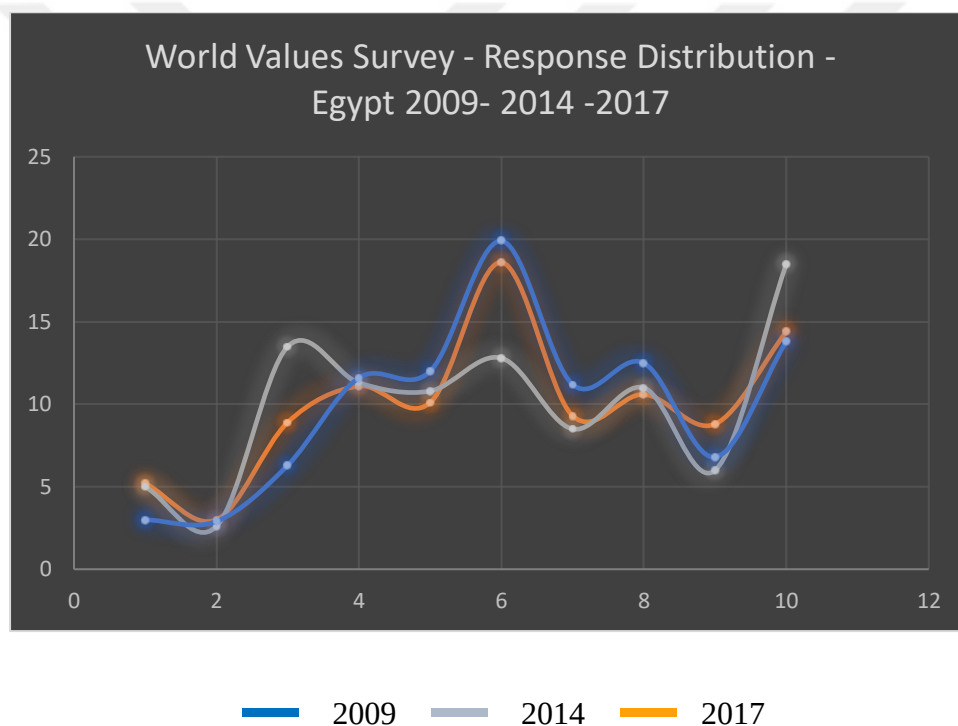
When the upward-looking version of the inequality indicator gives remarkably lower values than the downward-looking version, the distribution is skewed toward larger categories of the population. It is the case in Egypt in 2009 where the distribution is condensed around larger categories that reported a lower level of satisfaction with own financial status.

In 2014, the discrepancy between the upward-looking version of the inequality index $I_{up} = 0.73$ and the downward-looking version of it $I_{down} = 0.80$ is also significant, it is even larger than the one recorded in 2009. Among other Arab countries in the sample, Egypt reported lower values of the upward-looking version of the inequality index. In 2014, the upward-looking version of the inequality index was the lowest of all other Arab countries in the sample even the countries that are classified as upper-middle-income countries. It is also the lowest value of the inequality index for Egypt between the years 2009, 2014, and 2017.

If the distribution of the responses were to be skewed towards categories who are better-off, or in a better status of well-being, an upward-looking version of the inequality index makes a better inequality indicator and vice versa for distributions that are to be skewed towards categories who are in a worse-off status of well-being. In Egypt 2014, Figure 13 shows that the distribution of the responses is skewed towards categories who are in a worse-off status of well-being. In this case, the downward-looking version of the inequality index makes a better inequality indicator.

When the upward-looking version of the inequality indicator gives remarkably lower values than the downward-looking version, the distribution is skewed toward larger categories of the population. It is the case in Egypt in 2014 where the distribution is condensed around larger categories that reported a lower level of satisfaction with own financial status.

Figure 13 - WVS – Response Distribution – Egypt



Source: Own calculations using World Values Survey data

In 2017, the discrepancy between the upward-looking version of the inequality index $I_{up} = 0.75$ and the downward-looking version of it $I_{down} = 0.81$ is also significant.

If the distribution of the responses were to be skewed towards categories who are better-off, or in a better status of well-being, an upward-looking version of the inequality index makes

a better inequality indicator and vice versa for distributions that are to be skewed towards categories who are in a worse-off status of well-being. In Egypt 2017, Figure 13 shows that the distribution of the responses to the survey question on financial status is skewed towards categories who are in a worse-off status of well-being. In this case, the downward-looking version of the inequality index makes a better inequality indicator.

When the upward-looking version of the inequality indicator gives remarkably lower values than the downward-looking version, the distribution is skewed toward larger categories of the population. It is the case in Egypt in 2017 where the distribution is condensed around larger categories that reported a lower level of satisfaction with own financial status.

In summary, Egypt is classified as a lower-middle-income country. During the years before and after the Arab uprisings, the distribution of responses was always skewed towards categories that reported lower satisfaction with own financial status. Before the Arab uprisings, the estimated value of the income inequality index in Egypt was significantly high. The index remained amongst the highest during the years after the Arab uprisings. The value of the index has almost remained the same reporting no progress in levels of subjective income inequality.

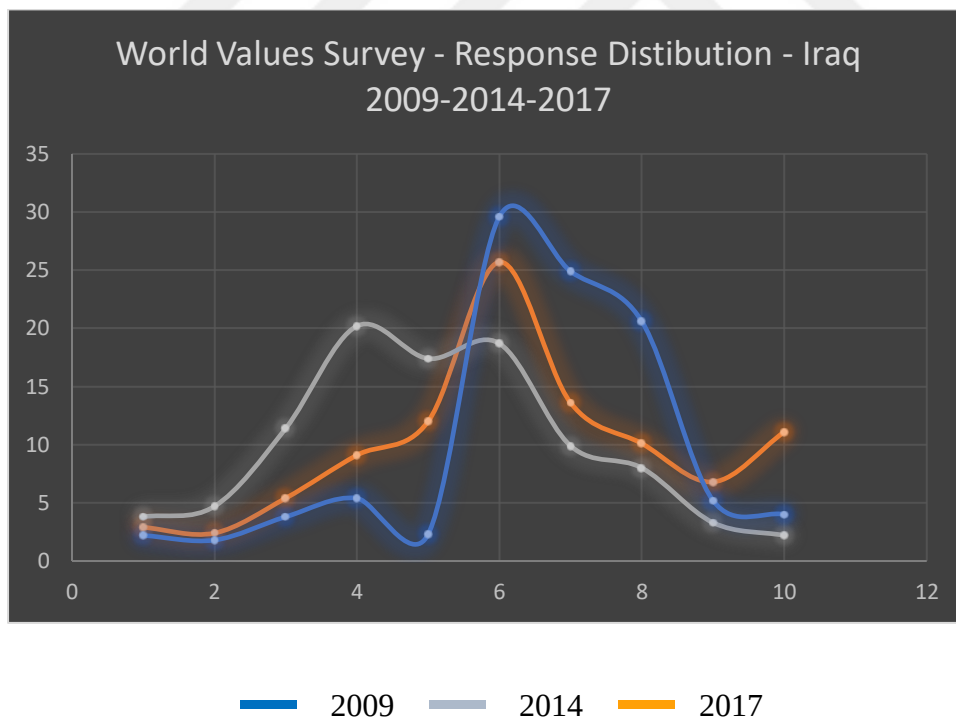
2.4.1.2 Iraq

Iraq is classified by the World Bank as an upper-middle-income country. In 2009, the discrepancy between the upward-looking version of the inequality index $I_{up} = 0.77$ and the downward-looking version of it $I_{down} = 0.798 \approx 0.80$ is not as significant. Between the years 2009 and 2017, the upward-looking version of the inequality index was increased to 0.80. However, it has significantly declined to 0.72 in 2017. Meanwhile, the downward-looking version of the inequality index has witnessed a reduction in both 2014 and 2017 up to 0.74. It is noticed that in 2014, contrary to other years Iraq reported a lower value for the upward-looking version of the inequality index than the downward-looking version.

In 2017, Iraq reported the lowest values of both the upward-looking version and the downward-looking version of the inequality index of all Arab countries in the sample.

If the distribution of the responses were to be skewed towards categories who are better-off, or in a better status of well-being, an upward-looking version of the inequality index makes a better inequality indicator and vice versa for distributions that are to be skewed towards categories who are in a worse-off status of well-being. In Iraq 2009, Figure 14 shows that the distribution of the responses is skewed towards categories who are in a worse-off status of well-being. In this case, the downward-looking version of the inequality index makes a better inequality indicator. The discrepancy between the values of the upward-looking and the downward-looking version of the inequality index is not significant in 2009.

Figure 14 – WVS – Response Distribution – Iraq



Source: Own calculations using World Values Survey data

If the distribution of the responses were to be skewed towards categories who are better-off, or in a better status of well-being, an upward-looking version of the inequality index makes a better inequality indicator and vice versa for distributions that are to be skewed towards categories who are in a worse-off status of well-being. In Iraq 2014, Figure 14 shows that the distribution of the responses is skewed towards categories who are in a worse-off status of well-being. In this case, the downward-looking version of the inequality index makes a better inequality indicator. The discrepancy between the values of the upward-looking and the downward-looking version of the inequality index is not significant in 2014. However, what is remarkable in 2014 is that contrary to the cases in 2009 and 2017, the value of the upward-looking version exceeds the value of the downward-looking version of the inequality index.

If the distribution of the responses were to be skewed towards categories who are better-off, or in a better status of well-being, an upward-looking version of the inequality index makes a better inequality indicator and vice versa for distributions that are to be skewed towards categories who are in a worse-off status of well-being. In Iraq 2017, Figure 4 shows that the distribution of the responses is skewed towards categories who are in a worse-off status of well-being. In this case, the downward-looking version of the inequality index makes a better inequality indicator. The discrepancy between the values of the upward-looking and the downward-looking version of the inequality index is not significant in 2017.

In summary, the case in Iraq is almost similar to the case in Egypt except that Iraq is classified by the World Bank as an upper-middle-income country. During the years before and after the Arab uprisings, the distribution of responses was always skewed towards categories that reported lower satisfaction with their own financial status. Like the case in Egypt, before the Arab uprisings, Iraq reported the second highest value of the inequality index amongst all other Arab countries in the sample. Nevertheless, the values of the index were gradually

declining during the years after the Arab uprisings. The value of the index has declined reflecting an improvement in levels of subjective income inequality in Iraq after the Arab uprisings.

2.4.1.3 Jordan

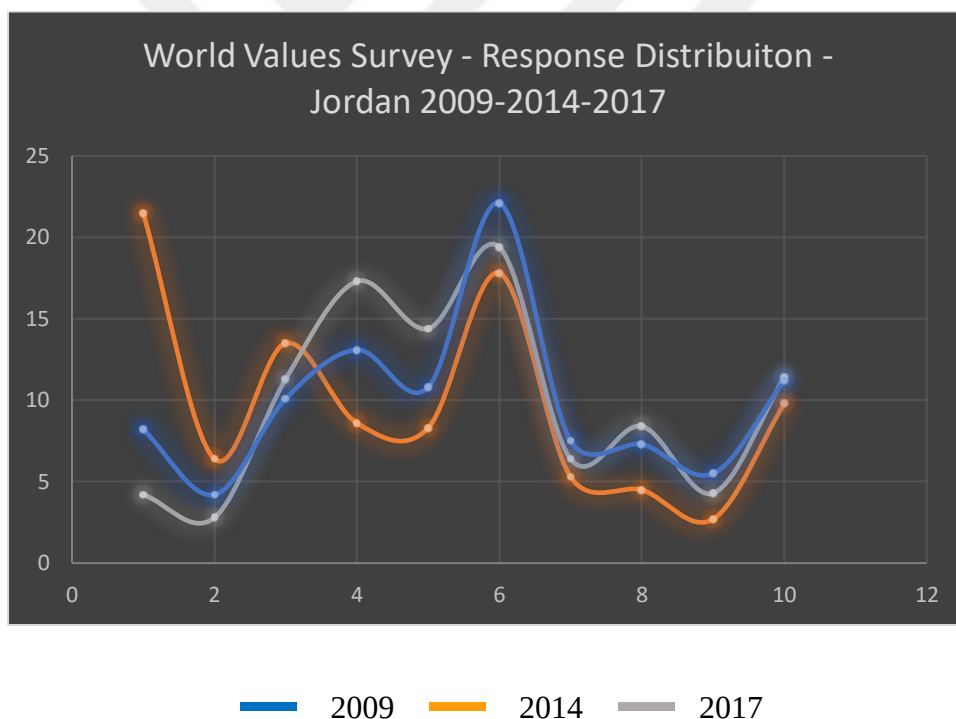
Jordan is classified by the World Bank as a lower-middle-income country. In 2009, the discrepancy between the upward-looking version of the inequality index $I_{up} = 0.80$ and the downward-looking version of it $I_{down} = 0.70$ is remarkably significant. It is also observed that contrary to other Arab countries where the value of the downward-looking version of the inequality index exceeds the value of the upward-looking version, the case in Jordan is vice versa. In 2009, Jordan has recorded the lowest value of the downward-looking version of the inequality index among all other Arab countries in the sample.

Between the years 2009, 2014, and 2017, the upward-looking version of the inequality index decreased from 0.80 in 2009 to 0.77 in both of 2014 and 2017. Meanwhile, the downward-looking version of the inequality index increased from 0.71 in 2009 to 0.79 in both 2014 and 2017.

If the distribution of the responses were to be skewed towards categories who are better-off, or in a better status of well-being, an upward-looking version of the inequality index makes a better inequality indicator and vice versa for distributions that are to be skewed towards categories who are in a worse-off status of well-being. In Jordan 2009, Figure 15 shows that the distribution of the responses is skewed towards categories who are in a better-off status of well-being. In this case, the upward-looking version of the inequality index makes a better inequality indicator.

When the upward-looking version of the inequality indicator gives remarkably lower values than the downward-looking version, the distribution is skewed toward larger categories of the population. In Jordan 2009, the case is the opposite as the upward-looking version of the inequality indicator gives remarkably higher values than the downward-looking version. This is reflected in the distribution which is skewed towards smaller categories in which the population reported high satisfaction with their own financial status.

Figure 15 – WVS – Response Distribution – Jordan



Source: Own calculations using World Values Survey data

Contrary to the case in 2009 in Jordan, in 2014 the discrepancy between the upward-looking version of the inequality index $I_{up} = 0.77$ and the downward-looking version of it $I_{down} = 0.79$ is not as significant. If the distribution of the responses were to be skewed towards

categories who are better-off, or in a better status of well-being, an upward-looking version of the inequality index makes a better inequality indicator and vice versa for distributions that are to be skewed towards categories who are in a worse-off status of well-being. In Jordan 2014, Figure 15 shows that the distribution of the responses is skewed towards categories who are in a better-off status of well-being. In this case, the upward-looking version of the inequality index makes a better inequality indicator.

Similar to the case in 2014, in 2017 the discrepancy between the upward-looking version of the inequality index $I_{up} = 0.77$ and the downward-looking version of it $I_{down} = 0.79$ is not as significant. If the distribution of the responses were to be skewed towards categories who are better-off, or in a better status of well-being, an upward-looking version of the inequality index makes a better inequality indicator and vice versa for distributions that are to be skewed towards categories who are in a worse-off status of well-being. In Jordan 2017, contrary to the cases in both 2009 and 2014, Figure 15 shows that the distribution of the responses is skewed towards categories who are in a worse-off status of well-being. In this case, the downward-looking version of the inequality index makes a better inequality indicator.

In summary, Jordan is classified as a lower-middle-income country. Before the Arab uprisings, the distribution of responses was skewed towards categories that reported higher satisfaction with their own financial status. The case was different after the Arab uprisings where the distribution was skewed towards categories that reported lower satisfaction with their own financial status. The inequality index was amongst the highest in the sample before the Arab uprisings, but it decreased during the years after the Arab uprisings.

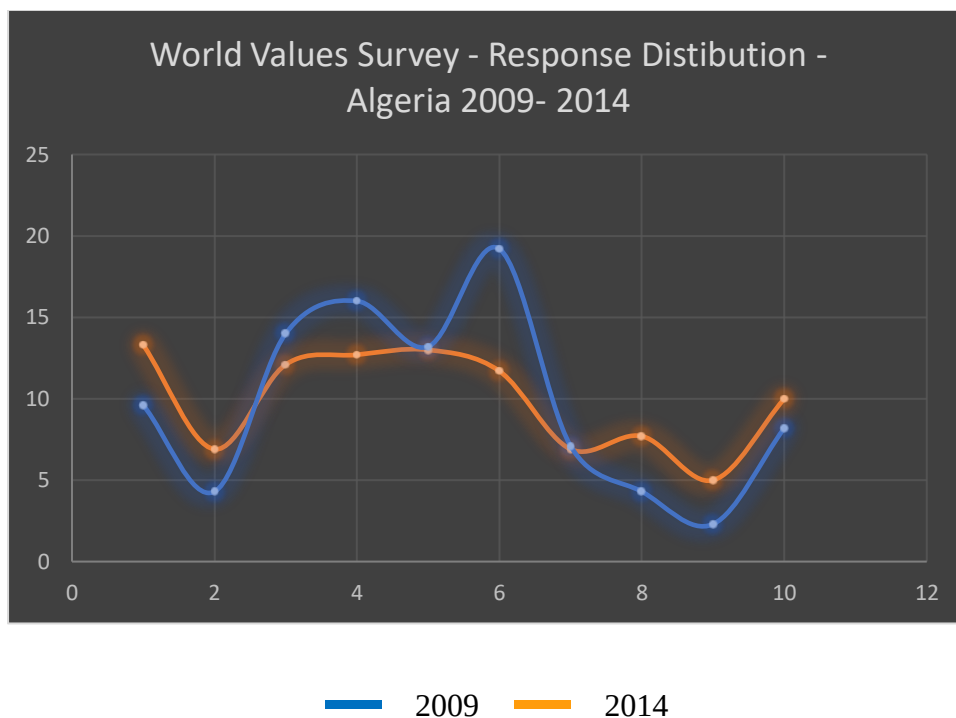
2.4.1.4 Algeria

Algeria is classified by the World Bank as an upper-middle-income country. In Algeria, only two rounds of the World Values Survey are conducted in 2009 and 2014. Thus, the estimate of the inequality index is missing for the year 2017.

In both 2009 and 2014, the discrepancy between the upward-looking version of the inequality and the downward-looking version is not significant. In 2009, Algeria has recorded the highest value of the upward-looking version of the inequality index among all other Arab countries in the sample.

Between the years 2009 and 2014, the upward-looking version of the inequality index decreased from 0.81 in 2009 to 0.77. Meanwhile, the downward-looking version of the inequality index has remained the same at 0.77. In 2014, the values of the upward-looking version and the downward-looking version of the inequality index were almost the same at 0.77.

Figure 16 – WVS – Response Distribution – Algeria



Source: Own calculations using World Values Survey data

In 2009, the upward-looking version of the inequality index was $I_{up} = 0.81$ and the downward-looking version of it was $I_{down} = 0.79$. In Algeria 2009, Figure 16 shows that the distribution of the responses is skewed towards categories who are in a better-off status of well-being. In this case, the upward-looking version of the inequality index makes a better inequality indicator.

In 2014, the upward-looking version of the inequality index $I_{up} = 0.773 \approx 0.77$ was almost the same as the downward-looking version that was $I_{down} = 0.769 \approx 0.77$. This case should be reflected in a symmetric distribution of responses. However, in Algeria 2014, Figure 16 shows that the distribution of the responses is remarkably skewed towards categories who are in a better-off status of well-being. In this case, the upward-looking version of the inequality index makes a better inequality indicator. Thus, though the inequality index declined from 0.81 in 2009 to 0.77 in 2014, the distribution is still skewed towards categories that reported higher satisfaction with their own financial status.

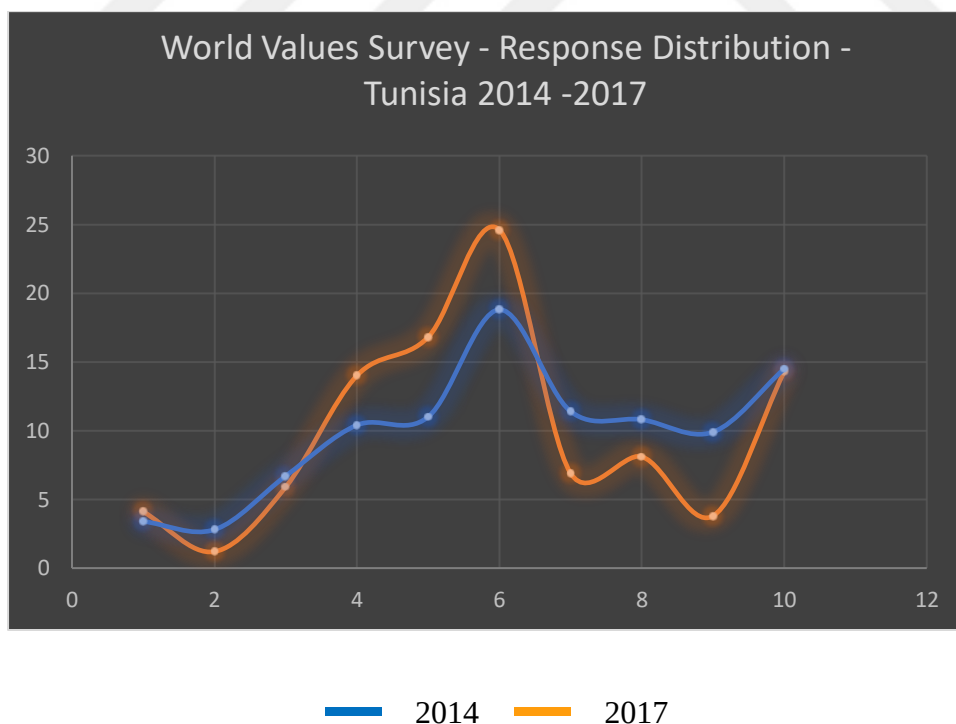
In summary, Algeria is classified as an upper-middle-income country. During the years before and after the Arab uprisings, the distribution of responses was always skewed towards categories that reported higher satisfaction with their own financial status. Before the Arab uprisings, Algeria reported the highest value of income inequality index amongst all other Arab countries in the sample, but it significantly decreased during the years after the Arab uprisings.

2.4.1.5 Tunisia

Tunisia is classified by the World Bank as a lower-middle-income country. In Tunisia, only two rounds of the World Values Survey are conducted in 2014 and 2017. Thus, the estimate of the inequality index is missing for the year 2009. In both 2014 and 2017, the

discrepancy between the upward-looking version of the inequality and the downward-looking version is significant. Both versions of the inequality index increased in 2017. In 2017, Tunisia has recorded the highest value of the downward-looking version of the inequality index amongst all other Arab countries in the sample.

Figure 17 – WVS – Response Distribution – Tunisia



Source: Own calculations using World Values Survey data

In 2014, the upward-looking version of the inequality index was $I_{up} = 0.74$ and the downward-looking version of it was $I_{down} = 0.79$. Figure 17 shows that the distribution of the responses is skewed towards categories who are in a worse-off status of well-being. In this case, the downward-looking version of the inequality index makes a better inequality indicator.

In 2017, the values of both of the upward-looking version and the downward-looking version of the inequality index were increased. The upward-looking version of the inequality index was $I_{up} = 0.76$ and the downward-looking version of it was $I_{down} = 0.82$. Figure 17 shows that the distribution of the responses is still skewed towards categories who are in a worse-off status of well-being. In this case, the downward-looking version of the inequality index makes a better inequality indicator.

In summary, Tunisia is classified as a lower-middle-income country. During the years after the Arab uprisings, the distribution of responses was always skewed towards categories that reported lower satisfaction with their own financial status. The value of the inequality index significantly increased between the years 2014 and 2017. In 2017, Tunisia reported the highest value of the income inequality index amongst all other Arab countries in the sample.

2.4.1.6 Lebanon

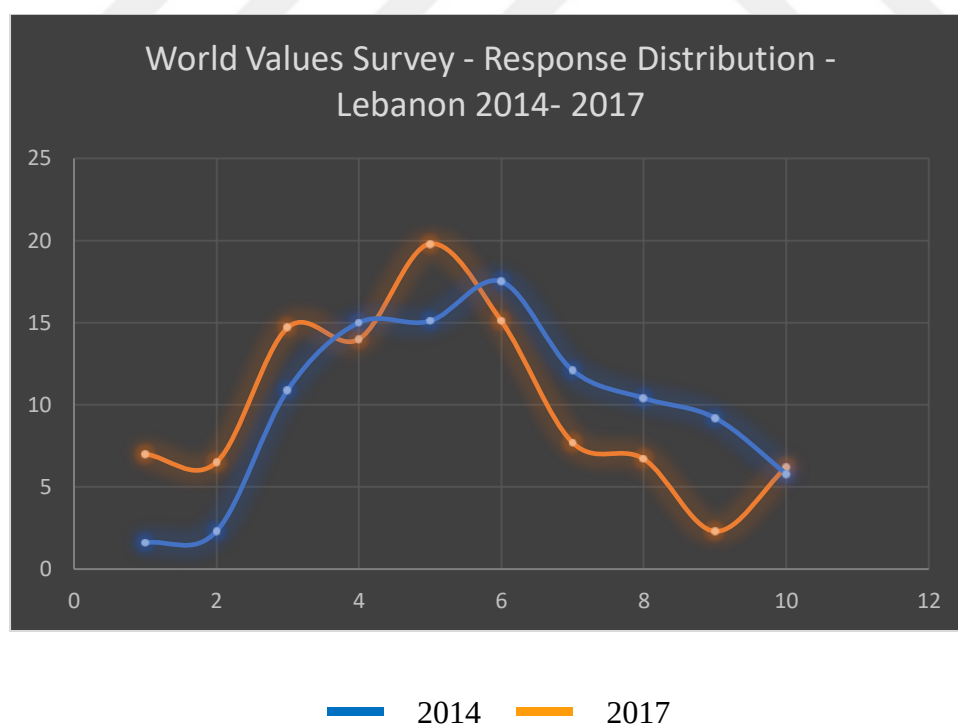
Lebanon is classified by the World Bank as an upper-middle-income country. In Lebanon, only two rounds of the World Values Survey are conducted in 2014 and 2017. Thus, the estimate of the inequality index is missing for the year 2009.

In 2014, the discrepancy between the upward-looking version and the downward-looking version of the inequality index is not significant. The upward-looking version was $I_{up} = 0.796 \approx 0.80$ and the downward-looking version of it was $I_{down} = 0.777 \approx 0.78$. The upward-looking version was reportedly higher than the downward-looking version. Figure 18

shows that the distribution of the responses is skewed towards categories who are in a better-off status of well-being. In this case, the upward-looking version of the inequality index makes a better inequality indicator.

In 2017, the upward-looking version of the inequality index $I_{up} = 0.785 \approx 0.79$ was almost the same as the downward-looking version of it was $I_{down} = 0.792 \approx 0.79$. This case should be reflected in a symmetric distribution of responses. However, Figure 18 shows that the distribution of the responses is remarkably skewed towards categories who are in a worse-off status of well-being. In this case, the downward-looking version of the inequality index makes a better inequality indicator. Thus, though the inequality index slightly declined from 0.80 in 2009 to 0.79 in 2017, the distribution was albeit skewed towards categories that reported lower satisfaction with their own financial status.

Figure 18– WVS – Response Distribution – Lebanon



Source: Own calculations using World Values Survey data

In summary, Lebanon is classified as an upper-middle-income country. In 2014 the distribution of responses was skewed towards categories that reported higher satisfaction with their own financial status. The case was different in 2017 where the distribution was skewed towards categories that reported lower satisfaction with their own financial status. The value of the inequality index remained the same during the years after the Arab uprisings reflecting no progress in subjective income inequality levels.

2.4.2 Link Between Subjective and Aggregate Measures of Inequality

One of the contributions that this chapter makes to the literature on changes in levels of well-being after the Arab uprisings is represented by providing subjective measures of income inequality and deprivation using ordinal data. This section endorses the link between income inequality as a measure of well-being and other subjective measures of well-being like rates of deprivation. In the empirical sections of this chapter, data from World Values Survey (WVS) are used to measure inequality of income distribution in a sample of Arab countries using Cowell and Flachaire (2017) axiomatic approach to measuring income inequality. The following discussion reviews the link between the different concepts used to measure inequality of income distribution using cardinal data and ordinal data.

Concepts of inequality and social exclusion were extensively researched for many different reasons. First, because income inequality and material deprivation are recognized among the basic triggers of social conflicts and political instability. Second, social exclusion is perceived as a violation of the optimum case of social justice and social welfare (Pedersen, 2004). Reduced poverty rates are used as indicators of the declining levels of material deprivation and social exclusion. Policy impact and progress achieved by policy intervention are assessed by measures of income-based inequality and poverty. Nevertheless, comprehensive measures of income inequality and income poverty based on levels of material

deprivation, individual levels of consumption, and wealth, are also currently used in the literature. Having enough money to pay utility bills, mortgages, rent payments, and to consume more food items, though is considered an indicator of low material deprivation rates, but the way by which it is subjectively perceived is still debated (Pedersen, 2004).

There is an extensive debate over the choice of alternative conceptions and empirical measures of inequality in both economic literature and literature on sociology since the 1970s (Sen 1983, 1985; Townsend ,1979, 1985). Rates of material deprivation were perceived to be empirically linked to subjective measures of inequality (D'Ambrosio and Frick, 2004). Income inequality and deprivation are both cited as triggers of social discontent. For sociologists, it is crucial to distinguish whether the concept of relative deprivation is researched as a determinant of social and political conflicts or as a tool for evaluating social welfare (Pedersen, 2004). Runciman (1966) perceives relative deprivation as a determinant of social conflict. Developing on the concept of relative deprivation that was first introduced by Stouffer et al. (1949), British sociologist W. G. Runciman (1966) uses the same concept in order to explain the popular values and beliefs of the British community that form the basis of social stratification. Runciman sought to research the reasons that objective indicators of inequality, social well-being, and deprivation did not reflect popular discontent targeted toward the status of members of particular social strata.

Differentials in living conditions among different strata of the population is undesirable and a source of social discontent. Thus, governments tend to be averse to dispersions in levels of individual well-being and people's suffering and misery. The level of social discontent is determined by the subjective perception to own social status relative to the social status of a reference group. The difference between an individual's subjectively perceived social position and the status of a social group perceived to be in a better-off position is the key determining

factor of social discontent. When a well-off individual compares her own social position to the position of other richer strata, she is more discontent with her own social position than a disadvantaged, more deprived, and poorer strata. Poor strata's choice of reference groups is more modest. Runciman concludes that individuals are selective in their choice of the reference group to whom they compare themselves (Runciman, 1966). Thus, groups of the population that do not have access to items are supposed to be distinguished from groups that cannot afford them and the ones that do not want them. Groups of the population that cannot afford the consumption of particular items are the ones to be classified as deprived and socially excluded. Alongside measures of income poverty, measuring deprivation also matters when assessing individual well-being (Smeeding, 2009).

Measures of inequality should include other aspects of well-being rather than income inequality. Measures of inequality of well-being should reflect subjective perceptions of happiness and self-reported level of satisfaction with living conditions (Quick and Delvin, 2018). The level of income is considered an index of the individual's ability to consume commodities. Thus, income is the object of relative deprivation. Subjective well-being is driven by a relative level of satisfaction with living conditions rather than by actual financial status. D'Ambrosio and Frick (2004) confirm the empirical link that exists between subjective well-being and relative satisfaction with living conditions. They examine the link between two concepts used for measuring individual well-being: relative deprivation on the one hand, and the concept of happiness on the other. Relative deprivation which is denoted also as relative satisfaction is measured by the gap between the level of individual income compared to the incomes of other members of the population whether in a better-off financial or worse-off financial status. The concept of happiness is measured by the self-reported level of satisfaction with living conditions and with own financial status. Subjective level of well-being is altered according to changes in relative satisfaction with own social status and position in the social

strata rather than changes in own level of financial status. Thus, individual satisfaction with own living conditions is driven by own perception of the observed positions of other members of society. Both concepts of happiness and satisfaction with own status are relative terms. An individual's perception of well-being is driven by seeking to be richer rather than being rich.

Well-being inequality measures depend to a large extent on the standard deviation of self-reported level of individual well-being. Nevertheless, the extent by which standard deviation is considered an acceptable measure of well-being is debated in the literature. Quick and Delvin (2018) state that well-being measures are to be judged according to their ability to satisfy a group of criteria. For example, a well-being measure should be easily computable and easily comprehensible by non-specialists. It should also account for the prioritization of the most-deprived strata of the population. This requires identifying the most disadvantaged groups of society to be targeted by public policies. Measures of well-being should enable assessing the improvements in the individual level of well-being. More weight should be given to the most deprived and most disadvantaged strata. This is denoted as weighted universalism. More weight should be given to the bottom 40% of the population and the percentage of the population that are below thresholds of well-being. A well-being measure should have a predictive character, it should enable the evaluation of changes incurred by policy reforms. It should also be more informative than the mean well-being measure (Quick and Delvin, 2018). The class of measurements provided in this chapter for economic inequality using Cowell and Flachaire (2017) axiomatic approaches of measuring inequality of well-being fulfill to a large extent the criteria stated by Quick and Delvin (2018).

This chapter provides classes of measures of social well-being that are based on perceptual ordinal data derived from opinion surveys. Ordinal measures of well-being, whether inequality, poverty, or deprivation measures, that are developed using ordinal data are

all inspired by Sen's ordinal approach to measurements (Sen, 1976). Sen's poverty measure provides an ordinal-ordering weight for the cardinally measured level of income of each poor individual. The level of individual well-being is not cardinally observable, but ordinally measurable in ordered categories. There exist some distances among the values of numerical variables that are calculated using cardinal data. These distances provide insights into the behavior of the variable. But in the case of ordinal data, the distances among values of cardinal variables hold different denotations. To overcome the measurements' problem related to cardinally measured poverty headcount ratio, Sen (1976) used weights assigned for ordinal ranks of the poor population's levels of income. In this chapter, an ordinal measure of income inequality is developed using Cowell and Flachaire (2017) approach. These groups of measures are all inspired by Amartya Sen's measure of poverty depending on ordinal data (Sen, 1976). In both approaches, Cowell and Flachaire (2017) provide an axiomatic approach for a class of ordinal measures of well-being. The axioms assumed in that approach are about the properties that an ordinal measure should fulfill. The empirical approach follows a relativistic perspective as individual social status is measured relative to a reference group. But either for social groups who are in a better-off or in a worse-off social position.

For Cowell and Flachaire (2017), inequality of income distribution in a population is captured by individual status in the social ranking. The standard definition of individual position in society is used to specify individual status. The individual position is specified in terms of the proportion of the population who are not in a better-off position. Inequality is measured by the distance between the location of the individual in the income distribution and a specific reference point of equality in the same distribution. The equality reference point is either given exogenously or as a function of the individual status. When the reference point takes its maximum value, then the situation of perfect equality exists. This happens when the distance from the reference point of each individual in the distribution is zero. The ordinal

inequality index of a society is selected among two different versions. A downward-looking version of inequality measure is used when the individual position is determined by the proportion of the population who are in a worse-off income position. An upward-looking version of the inequality measure is used when the individual position is determined by the proportion of the population who are in a better-off income position. When the distribution of income is skewed towards categories who are in a better status of well-being, the upward-looking version of the inequality index makes a better inequality indicator and vice versa for distributions that are to be skewed towards categories who are in a worse-off status of well-being.

2.4.2.1 Subjective Measures of Economic Inequality Relative to Gini Index

In this section, the Gini index is calculated for four Arab countries using data from the consumption survey of the Economic Research Forum. The Gini index is calculated for the purpose of the comparison to the subjective inequality index developed in this chapter using Cowell and Flachaire (2017) approach.

Various policy implications are inferred by different measures of inequality. On the choice among different measures of inequality, though the Gini index is widely used as a measure of inequality, it is extensively criticized. Higher values of the Gini index indicate a higher level of inequality. However, the mere dependence on the Gini index does not indicate which part of the inequality distribution has been altered. For instance, if rich strata of the population are derived out of the middle class, this case holds different policy implications than the one that drifts the poor population far from the middle class (Smeeding, 2009).

The main feature that distinguishes the Gini index as a measure of inequality is that it implicitly includes a relativistic conception of inequality. This particular conception of economic inequality in the field of economics intersects with the same conception of inequality in the field of sociology. This conception of inequality is derived from a status of relative deprivation. The basic rationale behind the Gini index is its application to a reference stratum of the population. It implicitly assumes that from a subjective perspective, individuals compare their status with the status of other members of the population. The relativistic conception of inequality that the Gini index implies is the main attractive feature that makes the Gini index the best measure of inequality from a sociological perspective. Also, from the perspective of welfare economics, it is the reason that the Gini index is interpreted as a measure of relative deprivation (Atkinson and Bourguignon, 2000; Pedersen, 2004). From a sociological perspective, envy is a critical element in the subjective perception of well-being. The relativistic nature of the Gini index expresses the social welfare function that implicitly includes the envy phenomenon as a critical element in the subjective measure of well-being. Each individual as a member of a particular population defines her social status relative to a reference group but ignores groups who are non-members of the population (Pedersen, 2004).

Part of the Gini index's popularity as a measure of inequality is attributed to its simplicity of calculation. In order to calculate the Gini index in this section, individual social status is measured relative to the Lorenz curve as a reference. The Gini index is calculated as twice the area between the Lorenz curve and the 45-degree diagonal (Cowell, 2000). The relativistic nature of the Gini index is also endorsed by Sen (1973) and Lambert and Aronson (1993). An alternative formula for calculating the Gini index also exists in which it is equal to half the mean difference in income among all pairs of individuals in the population. In other words, for a randomly-selected pair of individuals, it is half of the expected relative difference in their income (Sen, 1973; Lambert and Aronson, 1993). The data used in the chapter to

calculate the Gini index are taken from the Economic Research Forum microdata catalog on the MENA region. The cross-sectional data used in this section are derived from a household-level survey conducted in a bundle of Arab countries for different years. The timeframe of the study is selected to represent the effect of the Arab uprisings on vulnerability to poverty. Thus, the years are selected for each country before and after the Arab uprisings. Household income, expenditure, and consumption survey (HIECS) conducted in Egypt for 3 years, 2009, 2014, and 2017 in order to capture the impact of Arab uprisings. It was conducted by the Committee of Statistics in Egypt. Household socio-economic survey (IHSES) was conducted in Iraq for 2 years 2009 and 2017. National survey on the household budget, consumption, and standards of living (EBCNV) conducted in Tunisia for the years 2009 and 2014. Household expenditure and income survey (HEIS) conducted in Jordan for the years 2009, 2014, and 2017.

Table 16 below shows the comparison between the measure of inequality calculated in this chapter using Cowell and Flachaire (2017) approach and the calculated Gini index.

Table 16 - Ordinal Measures of Inequality Versus Calculated Gini Index

Country/Year	2009		2014		2017	
	<i>Gini Index</i>	<i>Ordinal Inequality Index</i>	<i>Gini Index</i>	<i>Ordinal Inequality Index</i>	<i>Gini Index</i>	<i>Ordinal Inequality Index</i>
Egypt	32.5	80.8	28.3	80.0	31.5	81.0
Iraq	29.5	79.8	28.8	77.7	-	73.8
Jordan	33.4	80.7	31.1	77.0	32.5	78.6
Tunisia	35.8	-	32.7	77.8	-	81.5

Source: Own calculation

Upon comparing the values of the Gini coefficient relative to the values of the subjective inequality indices calculated using ordinal perception data, Table 10 shows that the values of the Gini index are remarkably lower than the values of the ordinal inequality index. This observation coincides with the findings of Ven der Weide et al. (2015). Their study

provided evidence that when depending on expenditure data to measure inequality, the measure of inequality is underestimated (Ven der Weide et al., 2015). It also coincides with the findings of Ianchovichina et al. (2015) which emphasize the importance of accounting for the individual perception to the concept of economic inequality. They provided evidence that monetary measures that are used to gauge inequality in the MENA are biased and imprecise. Monetary measures have failed to capture the fundamental elements of subjective well-being. These measures understate inequality rates that prevailed in the MENA region before the Arab uprisings (Ianchovichina et al., 2015). Nevertheless, the changes in the values of the Gini index before and after the Arab uprisings were associated with the changes in the values of the ordinal inequality index in all of the MENA countries included in the sample. In Egypt, the value of the ordinal inequality index in Egypt was significantly high in 2009. It witnessed a slight reduction in 2014, but it increased again in 2017. The movement of the Gini index coincided with the movement of the ordinal inequality index despite the remarkable discrepancy in the values between the two. The same observation was also witnessed in Iraq, Jordan, and Tunisia where the movements of both of the indices were associated.

2.5 Results

The wave of protests denoted as the Arab uprisings was a popular outcry against economic hardship and deteriorating living conditions in the Arab countries that witnessed protests of the Arab revolution. Inequality of income distribution was among the main demands of the Arab people expressing their dissatisfaction with their standards of living. Nevertheless, conventional objective measures of inequality reported moderate to low levels of inequality of expenditure in the Arab region during the decade before the Arab uprisings. It was also reported that Arab countries that witnessed protests were achieving high rates of economic growth and that the bottom 40 percent of the population were experiencing high rates of income growth.

The misleading trends of economic growth built upon objective aggregates of growth in the Arab countries failed to predict people's levels of dissatisfaction with their standards of living. Objective measures of income inequality failed to capture the realities beyond people's dissatisfaction rates before the Arab uprisings, not alone levels of income inequality and deprivation in the aftermath of the Arab uprisings. Conventional monetary measures have failed to capture the fundamental elements of subjective well-being, so they underestimate the impact of income inequality as a trigger of social rage behind the Arab uprisings.

Increasing critique of per capita GDP as an ultimate measure of welfare stems the interest in subjective measures of well-being, particularly for variables that are hard to be cardinally estimated and are ordinal in nature. Deprivation is an ordinally measurable variable that cannot be easily captured through a cardinal variable. Empirical frameworks used for measuring social deprivation built upon the concept of individual status in society are extended to measurements of income inequality. This chapter provides classes of subjective measures of well-being used to assess levels of well-being after the Arab uprisings. The theoretical framework used to develop these classes of measures is empirically applied to ordinal data analysis. It provides a subjective measure of income inequality using perception data derived from an opinion survey. The data is presented in a categorial order depicting levels of individual satisfaction with own financial status.

The theoretical framework used to assess income inequality is an axiomatic approach built on the concept of individual status within the distribution. The choice of the reference point is another controversial pillar in this approach. Unlike inequality indicators that are built on cardinal data where the reference point is the mean value, the reference point for the ordinal inequality indicator is either the minimum value or the maximum value in the distribution of individual status.

Levels of income inequality are observed in the sample of Arab countries before and after the Arab uprisings. In general, self-reported level of satisfaction with own financial status in high-income countries is expected to be higher, and vice versa for poor countries. However, in Cowell and Flachaire (2017) sample of 23 developing countries, self-reported levels of life satisfaction were high in two low-income countries like Colombia and Mexico. In our sample of Arab countries, the population of lower-middle-income countries reported lower levels of satisfaction with their financial status. Amongst the countries investigated by Cowell and Flachaire (2017), the controversy lies in that both Mexico and Colombia reported low values of per capita GDP, yet with the lowest values of income inequality and life satisfaction indices.

The estimated ordinal inequality index of income distribution in Egypt is significantly high. The estimated value of the income inequality index in Egypt before the Arab uprisings was significantly high. The index remained among the highest during the years after the Arab uprisings. The value of the index has almost remained the same with no improvements in levels of subjective income inequality. Before the Arab uprisings, Algeria recorded the highest values of the inequality index amongst all other Arab countries in the sample. Nevertheless, the value of the income inequality index has significantly declined in Algeria after the Arab uprisings.

Before the Arab uprisings Iraq recorded the second-highest value of the estimated inequality index amongst all other Arab countries in the sample. However, the values of the index were gradually declining during the years after the Arab uprisings. The case was almost similar in Jordan. The inequality index was also significantly high in the sample before the Arab uprisings, but it was declining during the years after the Arab uprisings.

The data in both Tunisia and Lebanon exists only for the years after the Arab uprisings. Lebanon has recorded significantly high values of the income inequality index. In Tunisia, there was a significant increase in the estimated value of the income inequality index between

the years 2014 and 2017. Tunisia recorded the highest values of the inequality index amongst all other Arab countries in the sample in 2017.

In conclusion, contrary to the alleged moderate to low levels of income inequality reported by objective measures of well-being in the Arab countries before the Arab uprisings, the ordinal income inequality measures estimated in this chapter based on self-reported level of satisfaction with own financial status reported significantly high values in our sample of Arab countries. Countries that have never witnessed Arab uprisings' protests were in a better position in terms of the level of income inequality after the Arab uprisings. Though significantly high values of income inequality indices were recorded in all of Iraq, Jordan, and Algeria before the Arab uprisings, slight declines in the values of the income inequality index were achieved after the Arab uprisings. In both of the countries that have witnessed protests of Arab uprisings, the estimated values of the income inequality index were significantly high after the Arab uprisings. Meanwhile Egypt has sustained similar values of the index and was amongst the highest after the Arab uprisings, Tunisia recorded the highest values of the income inequality index of all.

The ordinal income inequality index developed in this chapter reported higher levels of income inequality in the Arab countries than the moderate to low levels reported by conventional objective measures. When income inequality was measured using categorical data derived from opinion surveys, the depicted self-reported perception of own financial well-being reflected lower levels of satisfaction with own position in the distribution of income. Subjective measures of income inequality reported high levels of income inequality during the years before the Arab uprisings. Post-Arab uprisings' levels of inequality were not improved and they were even worse in some Arab countries.

CHAPTER 3

AN EX-POST MEASURES OF INEQUALITY OF OPPORTUNITY – EVALUATING REFORMS IN PUBLIC EXPENDITURE POLICY AFTER ARAB UPRISINGS

3.1 Introduction

Arab uprisings shed a light on issues of inequality and non-inclusive growth in the MENA region. The problem did not lie in rates of economic growth per se, but the rapid rates of economic growth were not associated with improving standards of living. The paradox in the MENA region was caused by the gap between the economic opportunities available in the labor market that mismatch levels of educational attainment of the youth population. Improved educational attainment has raised people's aspirations and reduced their tolerance to inequality of wealth distribution (Ansani and Danielle, 2012; Arampatzi et al., 2015; Ghanem, 2016). Expectations of the youth population who have acquired better education lowered youth satisfaction with their lives and amplified the perception of inequality of opportunity (Campante and Chor, 2012).

Cited among the main reasons behind the Arab uprisings, equality of opportunity has been a prominent demand of the protestors in the Arab world. Recently the concept of equal opportunity became among the most globally supported conceptions of social justice. It revolves around the idea of providing a similar set of choices for all groups of society, thus mandating equalizing policies that particularly target disadvantaged individuals. The root of the debate over the concept of equalizing opportunities emerged with the publications of Rawls (1971) and Dworkin (1981). Rawls (1971) advocated the idea that social outcomes should be equalized among individuals according to the extent by which they responsibly behaved. The provision of equal opportunities requires equalizing outcomes among individuals in society conditional on the extent they are responsibly behaving (Rawls, 1971). Individuals are held

accountable for particular responsibility attributes like their preferences, endowments, and actions. Meanwhile, individuals are not held responsible for other arbitrary attributes like circumstances (Dworkin, 1981). Equality of opportunity is achieved through implementing policies that compensate individuals who are subject to misfortunate circumstances so that the economic outcomes become a function of only the factors that an individual is held accountable for. A social planner seeking an equal opportunity policy will aim to equalize the final outcomes, represented by an indicator of individual welfare, among individuals according to these responsibility factors. Differentials in the final outcomes should be limited to differences in responsibility factors rather than the set of arbitrary non-responsibility factors. Opportunity equalizing policies are intended to equalize levels of welfare across individuals, and/or equally sustain a high level of welfare for individuals with misfortunate circumstances. Thus, the individual level of income should be a function of the efforts an individual exerts.

Implementing opportunity-equalizing policies in the sector of education is an essential means for achieving economic progress. According to the conventional view, the distribution of equal educational resources is an opportunity-equalizing policy in the sector of education. This view is challenged in the economic literature (Roemer, 1998), (Roemer, 2002), (Betts and Roemer, 2001), (Carpantier and Sapata, 2012), (Roemer and Trannoy, 2016). Despite the nominal and real increases in per capita public expenditure on education during the last decade, these increases are not necessarily sufficient to equalize opportunities in the sector of education. A redistribution of educational resources is mandatory for achieving opportunity-equalizing policies. The impact of educational expenditure on the number of years spent in schools, consequently on wage-earning capacity, has been analyzed in the literature. But not as much has been achieved in terms of estimating the required magnitude of reforms in educational policies in order to equalize opportunity across individuals.

Though it is cited among the fundamental socio-economic reasons behind the Arab uprisings, the literature on the inequality of opportunity before and after the Arab uprisings is limited to qualitative descriptive analysis studies (Ansani and Danielle, 2012; Arampatzi et al., 2015; Ghanem, 2016). Issues of poverty and inequality of income have been discussed in the literature on the Arab uprisings (Ianchovichina, 2018; Iqbal and Kiendrebeogo, 2014a, 2014b; Hassine, 2012; Abu-Ismaïl and Al-Kiswani, 2018a, 2018b). Some studies provided comparative analyses of the inequality of access to health services, education, and basic utilities like electricity and gas resources (Salehi-Isfahani et al. 2012; Krafft and El-Kogali, 2014; Assaad et al., 2016). However, empirical analysis on the extent of inequality of opportunities in the MENA countries does not exist in the literature on the Arab uprisings, nor any policy evaluation for equalizing reforms undertaken after the Arab uprisings.

Conventional measures of well-being used in the literature on the Arab uprisings to evaluate unequal levels of welfare do not capture issues of unfair inequalities. Notwithstanding that the standard Gini index did not score high in countries of the MENA region for the last decade, inequality of opportunity was still a fundamental demand of people during protests of the Arab Spring. This contradiction is attributed to the fact that conventional measures of inequality did not capture all aspects that indicators of unfair inequality consider. Insofar as empirical analyses for the impact of factors pertained to individual circumstances like social status, effort exerted by individuals, and all similar factors that are beyond individual control are absent in the literature on the Arab uprisings. This chapter will hold three contributions. First, it attempts to provide a parametric estimate of the inequality of opportunity in the MENA region. In order to track the change in levels of inequality of opportunity, the chapter provides an indicator of inequality of opportunity that is gauged in two timeframes, before and after the Arab uprisings.

Second, the approach employed in this chapter to observe levels of inequality of opportunity will also allow for evaluating repercussions of policy reforms conducted after the Arab uprisings for the purpose of equalizing opportunities. Particularly educational policy reforms and increases in public spending on education that are intended to equalize opportunities in the educational sector. The chapter evaluates the indirect effect of policy reforms on wage-earning capacity through its direct impact on levels of individual effort. It gauges the extent by which the intended impact is achieved and whether policy reforms were equalizing and how they are supposed to be redesigned in case they were not equalizing.

Finally, the analysis is conducted at two levels for each country. Alongside the national level that allows for making cross-country comparative analysis, the empirical analysis will also be conducted across regions of each country in order to make cross-regional comparisons. The case of fair inequality appears when differentials in wage-earning capacity are merely due to differentials in levels of effort exerted by individuals. The regional level analysis allows for distinguishing the effect of the regional circumstances on the inequality of opportunity. The unfair inequality of opportunity is recognized when differentials in wage-earning capacity are due to differentials in regional circumstances.

The next section summarizes the literature on concepts of equality of opportunity and the principles of fair inequality. Section 3 is intended to describe the data used in this chapter alongside theoretical and empirical frameworks employed to measure fair inequality. Section 4 presents the results and discussion. It provides an assessment of policy interventions conducted in the educational sector in order to equalize opportunities. Section 5 summarizes the main findings and conclusions resulting from the discussion.

3.2 Literature Review

The concept of equality of opportunity differs from the concept of equality of outcomes. Where the equality of outcome principle entails that people should have equal access to the same levels of wealth regardless of the effort they exert to obtain it, principles of equal opportunity entail that people should be rewarded differently according to the level of effort they exert. Principles of equality of opportunity advise the fair way to distribute outcomes that cannot be equally distributed (Cohen, 1983). The compensation principle and the reward principle constitute the main pillar of the concept of equality of opportunity. The compensation principle states that differentials in outcomes that are caused by differentials in circumstances are unacceptable and should be compensated by society. The reward principle states that differentials in outcomes that are caused by differentials in the effort exerted are acceptable. When this kind of differential exists, then no intervention is justified because individuals who choose to exert more effort are supposed to be rewarded for the efforts they make (Aaberge et al., 2010). Because equal treatment could be unfair, particularly in cases of scarce resources. The equal treatment provides a preference for some people to achieve at the expense of others. A certain level of effort is mandatory to achieve better outcomes and also to sustain a desirable level of competition (Cohen, 1983).

Recent literature on egalitarianism has been impacted by these conceptions of inequality, particularly the provision of equal sets of available choices to different groups of society. However, other conceptions of how individuals are to be held accountable for the choices they make are also advised. Rawls (1971) advocated the idea that social outcomes should be equalized among individuals according to the extent by which they responsibly behaved. Dworkin (1981) separated a person's preference from her resources. Individual resources are the endowments that an individual has an access to but has no choice on. Things

that are available for an individual but he/she plays no role in choosing them. Thus, individuals are to be held responsible for the choices they make but not the resources available for them. Dworkin's conception of equality revolves around the idea that resources are to be equalized among individuals, but only by allowing for final outcomes to vary according to the differences that emerged by differences in individual preferences.

Within the realm of social choice theory, egalitarianism is interpreted as equality of utility or equality of welfare. The kind of equality that is considered desirable has been debated in the economic literature. The conventional concept of equality of outcomes does not hold individuals accountable for the choices they make. Concepts of personal responsibility have been invoked into ideas of egalitarianism as an indicator of the extent to which equality is considered ethically legitimate. Inducting this concept into the literature on egalitarianism has been an attempt to provide a replacement for the concept of equality of outcomes. Equality of opportunity became the focal point instead. Conflicted theories regarding this concept have been also introduced to the economic literature on inequality. Some economists argued that inequality due to wage differentials are caused by differentials in individual intelligence quota (IQ). Thus, equalizing policies that compensate for the differentials in individual endowments cannot be implemented (Jensen, 1969) (Herrnstein, 1971). On the contrary, other economists attributed inequality of income to inequality of opportunity rather than differentials in human endowments (Bowles, 1973) (Conlisk, 1974). So, Rawls and Dworkin philosophical contribution to the concept of inequality has reoriented the trajectory of the economic debate in the literature of egalitarianism for the next 40 years (Rawls, 1971) (Dworkin, 1981). The focus became on kinds of inequality that are ethically acceptable and kinds that are ethically objectionable. It became essential to distinguish the extent to which an individual is held responsible for the outcomes she achieves. It is mandatory to examine whether these outcomes are shaped by social factors that are beyond her control, or shaped by other factors that an

individual is held accountable for. This part cannot be distinguished by simply checking the distribution of income or welfare as a final outcome. When differentials in final outcomes are a function of individual effort, then it is a case of fair inequality that should not be compensated by society. Meanwhile, when differentials in final outcomes are due to social factors other than individual effort, then it is a case of unfair inequality that should be removed by implementing equalizing policies (Rawls, 1971).

The conception of inequality of opportunity provided in the literature is perceived to be abstract by Roemer (1998). In response, Roemer attempted to advise means for equalizing opportunities through redesigning policies of social welfare. Roemer's (2002) view emphasizes equalizing policies in the sector of public spending on education. Wage-earning capacity is determined by individual effort represented by the number of years of education. The effort exerted by an individual, or the responsibility factor, is represented by the number of years of schooling.

As for other non-responsibility factors, besides social background and social status, per-student public spending on education is the main non-responsibility factor to be considered. Levels of public spending on education vary according to geographical location and other socio-economic factors. This view coincides with the views that attribute income inequality to inequality of opportunity. Whether located in rural areas, urban areas, disadvantaged areas, or ghettos, the level of per-capita public expenditure on education varies accordingly.

Distributing educational budgets among schools is to be developed into an equalizing policy. The distribution of the educational budget is equalized when the wage-earning capacity of individuals who exert the same level of effort, here it is the number of years of schooling, is equal on average among the same type of individuals who belong to the same social group. So, equal opportunity policies of public spending on education are no longer about allocating the

same per-student budget equally, but policies of educational expenditure should compensate the students who are subject to misfortunate circumstances. There is supposed to be higher public spending on educational budget for students who belong to groups of lower socioeconomic status or students who reside in disadvantaged geographical locations. In so that, wages of individuals who belong to the same social group, and exert the same level of effort, with a similar number of years of schooling, should be equal.

Betts and Roemer (2001) examine the possibility of equalizing opportunity through reforms in educational finance policies. Building on Roemer theory of equal opportunity (1998), Betts and Roemer analyze the required reallocation of public spending on education in order to equalize opportunities. They conclude that implementing an equalizing educational finance policy across individuals from different racial backgrounds requires six to ten times more per capita public expenditure on black students. Therefore, it is not sufficient to implement equalizing policies across individuals without considering racial differences. Another effective equalizing policy is achieved by raising the age of school leaving by one year. It is a relatively less expensive policy that slightly reduces inequality across individuals from different racial backgrounds.

Betts and Roemer estimate the required reallocations of educational finance to equalize opportunities in terms of wage-earning capacity across individuals. The effect of public expenditure on the effort exerted by individuals is represented by years of school attendance. Individuals hold moral responsibility represented by the effort they exert. Society is held accountable and should compensate individuals who achieve low economic outcomes despite the sufficient high effort that they have exerted. Policies should compensate for misfortunate circumstances that are beyond individual control. When individual effort is increased, this effort should be reflected in individual wage-earning capacity. Only when this target is

achieved, then policies are considered fair and opportunity equalizing (Betts and Roemer, 2001).

Theoretical framework employed in this chapter builds upon theories and axioms of Roemer's (Roemer, 1998), (Betts and Roemer, 2001), and Roemer's (2002). The empirical approach used to measure levels of inequality of opportunity in Arab states before and after the Arab uprisings is the ex-post measure introduced by Carpentier and Sapata (2012). The ex-post approach for evaluating inequality of opportunity has been also applied in a study conducted by the society for the study of economic inequality. However, the results provide a counter argument for the case of Arab states. Norway is an example of Scandinavian welfare state in which developed systems of Nordic social welfare policies are applied. A large proportion of inequality of outcomes is perceived to be due to effort. According to the principles of equality of opportunity, this kind of inequality is acceptable and no policy intervention is justified.

Aaberge et al. (2010) evaluate inequality of income distribution using a general framework in a long-term timeframe. The study timeframe allowed for making an ex-ante and ex-post analysis using panel data on individual income during the working lifespan in Norway. A permanent income measure used in the ex-post approach defines the minimum level of the annual expenditure an individual needs in order to smooth consumption, or else to stabilize intertemporal levels of consumption through income transfers. Meanwhile, the expected permanent income is used in the ex-ante approach for individuals who endure the same circumstances. Ex-ante inequalities in expected permanent income are measured for individuals classified into different types.

Aaberge et al. (2010) delineate the difference between the principles that form the concept of equality of opportunity from the one that forms the concept of equality of outcomes. The compensation principle states that differentials in outcomes that are caused by differentials

in circumstances are unacceptable and should be compensated by society. The reward principle states that differentials in outcomes that are caused by differentials in the effort exerted are acceptable. When this kind of differential exists, then no intervention is justified because individuals who choose to exert more effort are supposed to be rewarded for the efforts they make. Differentials in permanent income among individuals who exert the same levels of effort indicate the existence of long-term ex-post inequality of opportunities. Two aggregation steps are needed to develop the ex-ante and ex-post measures of inequality of opportunity. The first is needed to construct an interpersonal measure of permanent income used for the comparison of aggregates on individual income streams. Constraints on intertemporal income transfers that an individual may conduct in order to smooth consumption are incorporated using the intertemporal choice theory framework. The second is needed in order to aggregate individual permanent income into a measure of inequality of opportunity.

The long-term timeframe used in Aaberge et al. (2010) study showed that inequality of opportunity accumulates over time. Disadvantaged groups of individuals remain in the same position of income ranking over time. Due to their income ranking, they are deprived of advantages given to other groups that are in better income ranking like access to credits and other financial derivatives.

The empirical results provide insights that lead to two conclusions. First, if the measure of inequality of opportunity counted for less than a third of the corresponding measures of inequality of outcome, then inequality of opportunity exists. Second, measures of equality of outcomes based on conventional income measures overstate inequality relative to measures of inequality of opportunity based on expected permanent income. Thus, a substantial level of income mobility exists. Levels of inequality of income in the early stages of the working lifespan do not approximate levels of inequality in permanent income. Measures based on

levels of income for individuals between 35 and 50 report a level of inequality corresponds to measures of inequality of outcomes. When considering the late stages of labor market participation, similarities between ex-ante and ex-post measures of inequality of opportunity exist (Aaberge et al., 2010).

3.3 Data and Methodology

3.3.1 Data

The above empirical approach is used to trace the track of inequality of opportunity in a sample of Arab countries. The data used in the section are taken from the Economic Research Forum microdata catalog on the MENA region. The cross-sectional data used in this section are derived from the Labor Force Survey and the National Survey of Population and Employment conducted in a bundle of Arab countries for different years. The timeframe of the study is selected to represent the effect of the Arab uprisings on vulnerability to poverty. Thus, the years are selected for each country before and after the Arab uprising.

Labor Force Survey raw data harmonized by the data team of the Economic Research Forum was first provided by the Statistical Agency in Egypt. The type of data is sample survey data on both individual and household levels. The data is collected on the size of manpower, employed and unemployed labor force according to their geographical locations and individual characteristics. The survey aimed to cover a group of topics. It was intended to measure the size of the civilian labor force in Egypt's governorates and their identifying characteristics. It is also intended to measure the national-level and regional-level employment rates. It also reports national-level and regional-level unemployment rates. It examines the distribution of the employed and unemployed populations according to their identifying characteristics like age, gender, level of education, economic activity, occupation, sector of employment, levels of wages, and disposable income. It provides information on the housing conditions of individuals

and households. It provides insights into inter-regional immigration of the labor force. Labor Force Survey covers samples of rural and urban areas of all Egyptian governorates.

Raw data from the National Survey on Population and Employment harmonized by the data team of the Economic Research Forum was first provided by the National Institute of Statistics in Tunisia. It was intended to examine the educational and demographic characteristics of the Tunisian population. It provides demographic and economic aggregates such as fractions of the active labor force, supply of labor force, demand in the job market, fractions of the employed population and their identifying characteristics, annually created job opportunities in the labor market, national-level and regional-level employment rate, and unemployment rate. It is conducted on both individual and household levels. Individual characteristics reported in the survey include geographical location, level of education, status of employment, reasons for unemployment, sector of employment, type of employment, level of wages and disposable income, nationality, and migration status. Household characteristics reported in the survey include geographical location, household size, number of household members, household composition, housing characteristics, dwelling conditions, head's and spouse's individual characteristics like age, employment status, level of education, ownership of durables, and housing conditions.

Raw data from the Employment and Unemployment Survey harmonized by the data team of the Economic Research Forum was first provided by the Department of Statistics in Jordan. It was intended to examine the educational and demographic characteristics of the population in the Kingdom of Jordan. It provides demographic and economic aggregates such as fractions of the active labor force, supply of labor force, demand in the job market, fractions of the employed population and their identifying characteristics, annually created job opportunities in the labor market, national-level and regional-level employment rate, and

unemployment rate. It is conducted on both individual and household levels. Individual characteristics reported in the survey include geographical location, level of education, status of employment, reasons for unemployment, sector of employment, type of employment, level of wages and disposable income, nationality, and migration status. Household characteristics reported in the survey include geographical location, household size, number of household members, household composition, housing characteristics, dwelling conditions, head's and spouse's individual characteristics like age, employment status, level of education, ownership of durables, and housing conditions.

Raw data from the Labor Force Survey in the Palestinian territory harmonized by the data team of the Economic Research Forum was first provided by the Palestinian Central Bureau of Statistics. The type of data is sample survey data on both individual and household levels. The data is collected on the size of manpower, employed and unemployed labor force according to their geographical locations and individual characteristics. The survey aimed to cover a group of topics. It was intended to measure the size of the civilian labor force in the Palestinian territory and their identifying characteristics. It is also intended to measure the national-level and regional-level employment rates. It also reports national-level and regional-level unemployment rates. It examines the distribution of the employed and unemployed populations according to their identifying characteristics like age, gender, level of education, economic activity, occupation, sector of employment, levels of wages, and disposable income. It provides information on the housing conditions of individuals and households.

3.3.2 Methodology

3.3.2.1 Theoretical Framework

In this section, theoretical framework employed in this chapter in order to estimate inequality of opportunity in a sample of Arab countries is explained. The section provides an ex-post measure of inequality of opportunity using theoretical framework developed by Carpentier and Sapata (2012), who in their turn is built on Roemer's (Roemer, 1998), (Betts and Roemer, 2001) and Roemer's (2002) theoretical approach used to measure inequality opportunity of distributing policy allocations. Thus, this section reviews the points in Roemer's (2002) on which Carpentier and Sapata (2012) built their empirical model.

Measuring fair inequality of opportunity is the core concept that the ex-post approach is all about. When the variation in individual income is determined only by the variation in the effort, we reach fair inequality of opportunity. The population is divided into groups. Individuals who are experiencing the same circumstances, in other words, the same non-responsibility factors, are grouped into one group, denoted as type. In each type, the effort level is conditional upon x , the per capita expenditure. Within each of the types of effort distribution, the person's ranking in terms of the log earning capacity is measured after demeaning by mean log wages for workers of the same type. Following Roemer's axioms (Roemer, 1989), income is an increasing, monotonous function of the level of effort exerted by individuals. It assumed that people who are exerting the same level of effort in each type are on the same percentile of the income distribution. Factors that are not considered as effort are included in the circumstances. When the correlation between effort and circumstances is ruled out, the net effort is measured. When income is predicted by circumstances as non-responsibility factors, the residual can no longer proxy responsibility factors like effort, unless the correlation is ruled out.

Roemer's (2002) model estimates opportunity "equalisandum" or the condition for which the social planner seeks to equalize opportunities is expressed by the function: $u(C, e, \varphi)$, where C denotes the individual's circumstances, e his effort, and φ the policy of the intervening agency or planner. A measure of welfare could be income, life expectancy, or wage-earning capacity. Individuals are divided into types $1; 2; \dots; t$, expressed by the value of circumstances C . There will be a distribution of effort in each type, which is a probability measure on the set of non-negative real numbers. Effort can be captured by one variable. For example, if u was wage-earning capacity, a person's type is her parents' socio-economic status, like dwellers of a particular neighborhood, and the policy is the per capita governmental educational expenditure which may vary according to the school's location. When effort is denoted by the number of years of school a person attends, so he/she is held responsible for the number of schooling years but is not held responsible for the socio-economic status of his/her parents.

The equal opportunity concept entails that the average potential wage an individual may earn should be equal for all who attended a similar number of school years. Achieving such a goal requires implementing an equal opportunity policy for the government educational budget that compensates disadvantaged individuals. The budget is to be distributed among schools where more per capita expenditure is required in low socioeconomic status neighborhoods. Individuals are not held responsible for their circumstances nor their types but they are held responsible for the efforts they make. Efforts are expressed in distributions that characterize the type, not the individual. Therefore, the individual's effort is not measured by the absolute level of the effort she makes, but by her rank in her type's effort distribution.

According to the mapping of effort distribution, F , the indirect outcome function can be derived. It is the level of v for individuals of type t at the π th quantile of the effort distribution for type t when the policy is φ . If two individuals in two different types lie at the same rank of

the distributions of their types, these two individuals are rendered to have tried equally hard. The objective is to equalize the final outcomes among individuals despite their different types and circumstances. This is formalized in the model as maximizing the minimum value of the final outcomes.

Roemer (2001) provided an empirical study on the use of educational expenditure in order to equalize wage-earning capacity among individuals. An individual's type is defined by the educational level of her most educated parent. The population is divided into 4 types. The most disadvantaged type contains individuals with a parent who has less than 6 years of schooling.

The model estimates the reallocation of the resources, here it is the per capita expenditure on education, that equalizes the opportunities for wage-earning capacity. The objective variable that is to be equalized among individuals is the wage-earning capacity. The expected value of the objective is a function of the resource x , here it is the per capita public expenditure on education, and the effort an individual exerts. The purpose of this analysis is to estimate the value of the policy that makes the objective, here the wage-earning capacity, equal for all individuals that lie at the same type of income distribution. Since it is implausible to make it equal, the minimum value of x , which is the per capita public expenditure on education, is to be maximized instead.

$$\text{Max}_{x_1, x_2, \dots, x_T} \text{Min}_t v^t(\pi, x^t)$$

The purpose is to maximize the minimum individual policy allocation. Thus, the opportunity-equalizing policy is the one that provides a solution for the following maximizing equation.

$$\text{Max}_{x_1, x_2, \dots, x_T} \int_0^1 \text{Min}_t v^t(\pi, x^t) d\pi$$

Where v^t is the indirect outcome function, π is the quantile of the effort distribution for an individual who belongs to type t , and x is the per capita public expenditure on education.

Following Roemer's (2002) approach, the method followed in this chapter in order to trace the unfair inequality of opportunity starts with the classical wage equation, in which the log of income is predicted by both responsibility and non-responsibility factors.

$$\log(y_i) = \beta_0 + \beta^E X_i^E + \beta^C X_i^C + \varepsilon_i$$

Where E denotes effort, X_i^E is the effort variable, and β^E is the coefficient of effort variable. C denotes circumstances, X_i^C is the circumstances variable, and β^C is the coefficient of circumstances variable.

In this equation, the responsibility factor is gross effort. The error term or the residual in this equation includes the omitted variables that are not considered in the group of circumstances variables. Thus, the residual does not represent the responsibility factor of effort. It is challenging to delineate responsibility factors, which are related to individual effort, and non-responsibility factors, which are circumstances, due to their potential correlation. It is hard to delineate the direct effect that circumstances hold on income from their indirect effect through their correlation with the effort variable. Therefore, Carpentier and Sapata (2012) suggest an ex-post approach to measure inequality of opportunity from two perspectives. The first is when the effort is included despite its correlation with circumstances and is denoted as the gross effort. The second is through including the net effort upon ruling out the correlation between effort and circumstances.

3.3.2.2 Empirical Approach

The empirical framework used in this section to observe levels of inequality of opportunity allows for assessing the repercussions of policy reforms conducted after the Arab uprisings for the purpose of equalizing opportunities. Particularly educational policy reforms and increases in public spending on education that are intended to equalize opportunities in the educational sector.

Roemer's theory (1998) assumes that circumstances are exogenously determined meanwhile individual effort over which the individual has control is endogenously determined. When individual earning capacity is a function of circumstances and effort, the effort is also a function of circumstances.

$$y = f(C, E(c))$$

Achieving inequality of opportunity mandates that circumstances variables hold no causal effect on earning capacity. These conditions are expressed as follows.

$$F(y/C) = f(y)$$

$$\left(\frac{\partial f(C, E)}{\partial C} \right) = 0$$

Accordingly, inequality of opportunity exists when

$$F(y/C) \neq f(y)$$

The correlation between the effort variable and the circumstances variables is to be cleaned. This is achieved by regressing each of the responsibility variables, here the gross

effort, on the set of circumstances variable. The residual of this regression equation represents the net effort.

$$X_i^E = bX_i^C + \tilde{X}_i^E$$

Here, $\tilde{X}_i^E$ is the net effort which is obtained by estimating the fitted values of the residual. The gross effort in the above wage equation is replaced by the net effort. The logarithm of wage is regressed on variables that represent circumstances alongside the net effort:

$$\log(y_i) = \beta'_0 + \beta'_E \tilde{X}_i^E + \beta'_C X_i^C + \varepsilon_i$$

Ex-post equality of opportunity is achieved when each of the individuals in the population receives a fair income, which is the income predicted by the responsibility factors only. When income is a function of net effort only, then the situation of ex-post equality of opportunity exists (Almas et al., 2011) (Carpantier and Sapata, 2012). Fair income estimated by gross effort is:

$$\log(y_i^F) = f(X_i^E)$$

$$y_i^F = \exp(\beta_0 + \beta^E X_i^E)$$

As actual income has the same average of individual fair income, the fair income y_i^F is standardized as follows by replacing gross income by fair income variable in the following average equation:

$$y_i^F = \frac{\exp(\beta_0 + \beta^E X_i^E)}{\sum_j \exp(\beta_0 + \beta^E X_j^E)} \sum_j y_j$$

Standardized fair income is proportional to individual effort. Yet, it is a function of the circumstances of the entire population and the effort exerted by oneself, in other words, the individual responsibility factor (Almas et al., 2011).

In order to trace the unfair inequality of opportunity, a modified version of the Gini coefficient is developed depending on fair income rather than average income (Almas et al., 2011) (Carpantier and Sapata, 2012). Meanwhile the Gini index measures the difference between average income and actual income, this modified version takes fair income as a reference point. Nevertheless, differences in individual effort explain the variation in income, so inequality of income due to variation in effort exerted by individuals is a fair inequality. The unfair distribution of individual income is represented by the distance between fair income and actual income. The unfair Gini index is developed as follows:

$$G^u(A) = \frac{2}{n(n-1)\mu(A)} \sum_i i(y_i - y_i^F)$$

$$\mu(A) = n^{-1} \sum_i y_i$$

$$A = [(y_i, y_i^F), \dots, (y_n, y_n^F)]$$

Unlike the standard Gini index where individuals are ordered in ascending order according to their own individual income, the unfair Gini index orders individuals according to the distance between the individual own fair income and actual income where negative values are at the bottom.

In order to explain whether the differences in mean income are caused by responsibility or non-responsibility factors, a cross-regional Oaxaca decomposition is suggested. The Oaxaca decomposition provides a better understanding of the unfair Gini index results and the roles

that circumstances and effort variables play in the cross-regional differences of income (Oaxaca, 1937) (Carpantier and Sapata, 2012). The differences are decomposed between the two kinds of variables; differences that are caused by the distribution of non-responsibility variables, and the ones that are caused by the responsibility variables. For each of these two groups of variables, the differences then are decomposed between the ones that are caused by the distribution of variables, and the ones that are caused by the impact of those variables on income in one region relative to the other regions.

The Oaxaca decomposition allows for making cross-regional comparisons for the mean income in one region, $\log(y_j)$, relative to the mean income in other regions $\log(y_{-j})$. The regional differences in the mean income are explained by the contribution of each of the non-responsibility factors, here the circumstances, and the responsibility factors, here the effort. This decomposition explains the cross-regional differentials in mean income and the magnitude of the contribution of each variable in determining these differentials. It explains whether these differentials are caused by differentials in individual effort, which is fair inequality, or whether they are determined by differentials in circumstances, which is unfair inequality. The following equation is used to calculate the magnitude, the effect, and the interaction between the responsibility factor and other factors.

$$\log(y_j) - \log(y_{-j}) = \Delta X^E \beta_{-j}^E + \Delta X^C \beta_{-j}^C + \Delta \beta^E X_{-j}^E + \Delta \beta^C X_{-j}^C + \Delta X^E \Delta \beta^E + \Delta X^C \Delta \beta^C$$

The left-hand side shows the difference between the log income in one region j relative to log income in other regions $-j$.

k is used to denote the number of effort variables and the variables that represent circumstances.

$$k = E, C$$

ΔX^k , $\Delta \beta^k$, they show the difference between the parameters and variables of each region j relative to other regions $-j$.

$$\Delta X^k = X_j^k - X_{-j}^k$$

$$\Delta \beta^k = \beta_j^k - \beta_{-j}^k$$

The Oaxaca decomposition is used in this chapter to make comparisons of the differences in the region of each Arab country in the sample. It is used to explain the regional variations in the effect of circumstances variables and the effort variable on the differences in the levels of income in each country. It differentiates the impact on levels of income that is caused by the differences in magnitudes $\Delta X \beta_{-j}$, and the one caused by differences in variable effects $\Delta \beta X_{-j}$ for region j and relative to the other regions $-j$.

3.4 Discussion and Findings

3.4.1 Egypt

In order to elevate youth employment after the Arab uprisings protests in Egypt, reforms in the public education sector became a governmental priority. Policy reforms that are required to improve public education were interpreted in a larger share of public spending allocated for education. The new constitution mandated an allocation of 4% of GDP for public education. However, the allocations did not meet the sectoral requirements. Targeted ratios of enrollment in pre-university levels are not met. Almost 54% of the youth population has no regular access to education. Economic obstacles to regular school attendance are cited as the main reasons for low school enrolment ratios. The public education sector in Egypt is the largest in the MENA region. The public education system in Egypt is characterized by high capacity in terms of embracing a huge population of students. Public expenditure on education witnessed a slight increase during the decade after the Arab uprisings. According to UNESCO

Institute of Statistics, in 2008, the share of public spending on education relative to the total government expenditure was 10.94%. This share was lower than the one of 2003 when it reached its highest level of 15.35% of government expenditure. The share of public spending on education as a percentage of GDP was 3.76 in 2008. In 2011, this share decreased to 3.5%, almost \$9.5 billion, i.e. \$300 annual average per student. In 2014, the share was 3.9% of GDP, which is almost \$11.1 billion. This nominal slight increase in public spending on education contradicts the agenda of free education that was placed in action since the founding of the republic of Egypt in 1953. This gap between the huge enrolment capacity of the public education sector and the required public fund for education negatively affected the quality of the public education sector. To compensate, household expenditure on private tutoring services and private school courses was increased.

First, in order to evaluate the effect of the policy reform conducted in the educational sector after the Arab uprisings, this section is intended to estimate the inequality of opportunity in Egypt for the years 2009, 2012, and 2015. The expansion of public spending on education upon the Egyptian revolution in 2011 was not reflected in significant sectoral progress. The purpose of this chapter is to evaluate whether this policy reform undertaken after the Arab uprisings was an opportunity-equalizing policy or not. Therefore, following Carpentier and Sapata (2012) approach, the unfair Gini index is estimated for the years 2009, 2012, and 2015 successively. Moreover, the estimated model also analyzes the effect of non-responsibility factors, represented by both circumstances and policy variables, and the responsibility factor represented by the level of effort on individual wage-earning capacity.

The sample is divided into main 4 regions in Egypt. The dependent variable is the log total disposable income. Non-responsibility factors are represented by circumstance variables: geographical region, tenure of dwelling whether owned or rented, level of expenditure on

education, computer ownership status, access to an internet connection, literacy status of parents, access to proper water resources, access to shared sanitation services, access to proper electricity supply, and a variable representing the policy of public expenditure on education. A policy variable is also included representing policies of public spending on education in each region calculated on a per-capita basis. As for the responsibility factor, it is the individual effort measured by the number of years spent on education. In Egypt, the individual educational attainment variable is closely related to the father's educational attainment variable. This correlation between the two variables is ruled out by taking the net measure of individual effort.

3.4.1.1 National Level Analysis

The first step conducted to proceed with the analysis is to predict net effort. In other words, to clean gross effort from its correlation with the circumstances' variables. This is achieved through regressing the effort variable, here it is the years of schooling, on circumstances variables. Table 17 shows the estimation results. The selected circumstances' variables are all statically significant in predicting individual effort represented by the number of years of school attendance. In all of the years 2009, 2012, and 2015, circumstances variables included in the regression were all statistically significant in explaining levels of effort. All the parameters of circumstances variables showed the hypothetically expected signs for the magnitude effect. Being a dweller of an urban region and a dweller of an owned rather than a rented type of housing has a positive effect on levels of effort. The ownership of a computer, access to an internet connection, access to proper water resources, access to proper electricity supply, and a variable representing the policy of public expenditure on education, all have a positive magnitude impact on levels of effort. Access to a shared sanitation facility has a negative magnitude impact on levels of effort.

Table 17 - Net Effort Equation - National Level – Egypt 2009, 2012, 2015

Variable	2009		2012		2015	
	Coefficient	t*	Coefficient	t*	Coefficient	t*
Region	.044	8.48	.039	4.4	.055	7.93
Dwelling	.22	3.06	.21	1.64	.36	3.48
Tenure						
Education	.00012	8.1	.0001	4.65	.0007	8.14
Expenditure						
Computer	1.83	15.45	1.36	7.36	1.6	11.3
Internet	1.28	6.6	1.27	5.33	1.12	6.91
Literacy Status	6.26	6.32	7.39	9.84	7.1	4.25
-Father						
Literacy Status	4.32	4.62	3.45	19.93	3.24	22.71
-Mother						
Water	1.38	13.36	.74	4.11	1.1	7.85
Sanitation	-.35	3.66	-.46	2.5	-.1	.76
Electricity	1.1	2.78	1.3	1.02	.5	.78
Policy	.026	2.74	.044	2.64	.019	1.4
Constant	3.38	1.47	10.39	2.39	.51	.15
Observations	12,033		3,755		6,383	
R-squared	0.60		0.59		0.49	

*t-value at 5% significance level

Source: Own calculation

The regression results reported in Table 17 show that in 2009, a year before the Arab uprisings, parents' literacy status has a significant positive effect on the offspring's' effort variable. Among all other circumstances' variables, the father's literacy status has the largest magnitude effect on the offspring's' years of schooling. In terms of magnitude, it is subsequently followed by the mother's literacy status, the ownership of a computer, access to proper water supply, access to an internet connection, and access to electricity. The policy variable is also statistically significant, but it has a small effect on the effort variable in terms of magnitude. 60% of the variation in the effort variable is explained by individual circumstances and policy variables. The residual 40% unexplained by the circumstances represents the net effort.

In 2012, the policy variable turned out to be statistically significant in predicting effort. However, the magnitude of its effect on effort is very small. 59% of the variation in the effort variable is explained by individual circumstances and policy variables. The parents' literacy status still had the largest magnitude effect on levels of effort. Followed by computer ownership status and access to an internet connection. However, access to electricity and shared sanitation facilities turned out to be statistically insignificant. In 2015, the policy

variable which is the per capita expenditure on education turned out to be statistically insignificant in predicting effort. 49% of the variation in the effort variable is explained by individual circumstances and policy variables. The parents' literacy status still had the largest magnitude effect on levels of effort. Followed by computer ownership status and access to an internet connection. Access to electricity and shared sanitation facility turned out to be statistically insignificant.

The second step is to predict wage the function in order to be used in the calculations of the unfair Gini index. The unfair Gini index is measured in two versions. The first version is calculated using the wage function formula that includes levels of gross effort. The second version is calculated using the wage function formula that includes levels of net effort. Therefore, individual wage-earning capacity represented by log income is regressed twice. First log income is regressed on circumstances variables alongside the gross effort variable. Then the regression is repeated using net effort instead of gross effort. The wage equation with the net effort variable is used in order to predict fair income. The predicted values of fair income are used later in order to calculate the unfair Gini index in its net effort version. The results vary when using the different versions of the effort variable. The national-level analysis confirms the persistence of inequality of opportunity in Egypt during the years 2012 and 2015. Inequality of opportunity is essentially due to differential in the geographical location particularly whether the individual is a dweller of a rural or an urban area. It is also related to a large extent to the number of wage earners in each household. Particularly, whether only one of the parents or both parents are wage earners. It is related to a lower extent to the own source of income or sector of employment. Other circumstances' variables that turned out to be statistically significant in predicting fair income are the ownership of a personal computer, access to an internet connection, and access to proper water supply resources. The policy variable turned out to be statistically insignificant in predicting wage-earning capacity in both

versions of the regressions, the one with the gross effort and the one with the net effort as an independent variable. At the national level, parents' literacy status positively impacts offspring's income levels despite the limited magnitude effect parents' literacy status holds on levels of effort. This result confirms the hypothesis that the more educated the parents, the more educated the offspring, and the higher the impact on wage-earning capacity. The effect of individual social backgrounds on wage differentials is large at the national level.

3.4.1.2 The Unfair Gini Index Versus the Standard Gini Index

The results reported in table 18 show that values of the standard Gini index were significantly lower than the values of the unfair Gini index for the years 2009, 2012, and 2015 successively. At the national level, the value of the unfair Gini index was increasing and it always recorded a higher value than the standard Gini index. The unfair Gini index is estimated in both formulas, the gross effort and the net effort formula successively. In both versions, the unfair Gini index reports inequality levels that are higher than the ones estimated by the standard Gini index. Though the standard Gini index has decreased from 0.31 in 2008 to 0.28 in 2012, but it has increased again to 0.31 on 2015. Nevertheless, the unfair Gini index shows that un-matching levels of inequality of opportunity has coincided with these changes in the standard Gini values. Table 2 shows the national-level values of the unfair Gini index in Egypt were 0.81, 0.92, 0.84 successively for the years 2009, 2012, and 2015. Inequality of opportunity, particularly in terms of the impact that reforms of educational sector has on wage-earning capacity, has been increasing rather than decreasing during the years after The Arab uprisings despite the undertaken policy reforms. The increases in the unfair Gini index indicate that income distribution is far from the distribution of fair income. So wage-earning capacity differentials are not determined by differentials in individual effort.

Table 18 - The Unfair Gini Index – Egypt 2009, 2012, and 2015

Year	2009			2012			2015		
Region	Standard Gini	The unfair Gini (Gross)	The unfair Gini (Net)	Standard Gini	The unfair Gini (Gross)	The unfair Gini (Net)	Standard Gini	The unfair Gini (Gross)	The unfair Gini (Net)
National Level	0.31*	0.73	0.81	0.28*	0.74	0.92	0.32*	0.77	0.84
Cairo		0.62	0.73		0.72	0.79		0.66	0.75
Alexandria		0.57	0.71		0.61	0.72		0.63	0.79
Port Said		0.74	0.82		0.68	0.79		0.76	0.86
Suez		0.65	0.81		0.71	0.89		0.69	0.89

Source: Own calculations

*World Bank Gini Index

At the national-level in Egypt, in all of the years 2009, 2012, and 2015 the value of the unfair Gini index is larger than the value of the standard Gini index. It indicates that in all of years, whether before or after Arab uprising, the distribution of actual income is far from the distribution of fair income, but it is close to the egalitarian distribution of income.

It is also noted that in all of the years, the value of the gross effort version of the unfair Gini index is remarkably smaller than the value of the net effort version. It indicates that the indirect effect of circumstances' variables is relatively large compared to their direct effect on income. Thus, though the effect of the circumstances' variables is relatively small on the effort variables, the contribution of their correlation with the inequality of opportunity is remarkably large.

3.4.1.3 Regional Level Analysis and Oaxaca Decomposition

This section is intended to provide a regional comparative analysis of the ex-post measure of inequality of opportunity. It measures inequality of opportunity in each region of the country among individuals that are exerting the same level of effort. At the regional level, the wage equation is again estimated twice using the gross effort version and the net effort version successively but separately for each region. The point behind conducting the regional analysis is to compare the peculiarities of circumstances variables in each region. The

heterogeneities of the effects that circumstances' variables cast on wage-earning capacity is examined, particularly the impact of policy variable in each of the main regions in the country.

Results at the regional level show a variant impact of circumstances variables on income inequality among regions. For instance, in coastal urban regions where parents' literacy status is improved compared to rural areas, the magnitude of the impact of parent's literacy status is higher. Nevertheless, the extent of significance and the effect's magnitude vary across regions. It is also noticed that regions differently reward efforts exerted by individuals. Cross-regional sources of the unfair inequality are similar to some extent. Nevertheless, the magnitude of the impact that each source of inequality cast on variation in earning capacity varies across regions. These regional variations in ex-post the unfair inequality of opportunity should be taken into consideration when designating re-distributional policies. Particularly equalizing policy of public finance of education in each region. Cross-regional comparisons of the unfair Gini index provides a helpful tool to differently target regions with customized equalizing policies.

It is noticed from Table 18 that in all of the regions of Egypt, the values of the unfair Gini are remarkably higher than the value of the standard Gini index. Thus, the distribution of income in all of the regions is very far from fair distribution but is closer to egalitarian distribution. This also indicates that the correlation between income and effort variable is significant. This conclusion is also confirmed by the remarkable discrepancy between the values of the two versions of the unfair Gini index. In all regions the value of the gross effort version of the unfair Gini index is smaller than the value of the net effort version.

The Oaxaca decomposition is conducted in order to analyze the differences in mean wage-earning capacity across regions. This decomposition is used to explore whether the cross-regional differentials are due to different circumstances or differences in effort. It also explores

what is caused by difference in the magnitudes and what is caused by differences in the effect of each variable for region j relative to the other regions $-j$.

$$\log(y_j) - \log(y_{-j}) = \Delta X^E \beta_{-j}^E + \Delta X^C \beta_{-j}^C + \Delta \beta^E X_{-j}^E + \Delta \beta^C X_{-j}^C + \Delta X^E \Delta \beta^E + \Delta X^C \Delta \beta^C$$

$$\Delta X^k = X_j^k - X_{-j}^k$$

$$\Delta \beta^k = \beta_j^k - \beta_{-j}^k$$

$$k = E, C$$

Table 19 - Oaxaca Decomposition for Income Differences into Effort and Circumstances Factors – Egypt 2015

Region j	Wage j	Wage -j	Demean Log y	Total		Magnitude		Effect		Interaction	
				Circu	Effort	Circu	Effort	Circu	Effort	Circu	Effort
Cairo	62,445	52,138	-0.18	10.85	0.082	10.52	0.027	0.326	0.055	3.42952	0.001485
Alexandria	47,860	57,000	0.17	10.43	0.13	10.01	0.076	0.42	0.054	4.2042	0.004104
Port Said	59,396	53,155	0.11	10.37	0.07	10.08	0.021	0.285	0.049	2.8728	0.001029
Suez	49,159	56,567	-0.14	10.75	0.069	10.45	0.012	0.295	0.057	3.08275	0.000684

Source: Own calculations

The results shown in Table 19 demonstrates that the contribution of circumstances variables to wage differentials appears through the two channels, i.e. through the magnitude and through the effect, in the regional wage differential equation. The results show that the contribution of the variation in the circumstances factors and effort factors into the variation of wage is heterogenous across regions. In the capital region, Cairo, effort differentials have a lower contribution in terms of impact on wage differential, but with higher magnitude of the effect. Only when inequality was to be fair, then the impact of effort on wage differentials could have been significant, i.e. if policy reforms were to have a direct positive effect on years of education, then this effect could have been positively transmitted to wage-earning capacity. The region with the largest discrepancy between the values of the gross effort version and the net effort version of the unfair Gini index is the Suez region. Thus, it is the region with the

largest indirect effect of circumstances variables on income. The Suez is also the region with the largest discrepancy between the values of the unfair Gini and the standard Gini index. When the value of the unfair Gini is remarkably larger than the standard Gini index, the effort and income are closely related.

Only if the policy reforms were to be equalizing, fair inequality would have had been the pattern in Suez region where the magnitude by which policy reforms impact wage-earning capacity is high enough. The interaction variables also show differentials in terms of dwellers of rural areas and urban areas in each of the regions. A reallocation of per capita expenditure is mandatory to vary accordingly. The positive impact of policy reforms is witnessed to a larger extent in rural areas where majority of students attend public schools rather than private school. Meanwhile in urban areas where private schooling is more common, the impact of increases in public expenditure on education on rates of school attendance was lower. The cross-regional differences in the impact of policy reforms in educational expenditure on wage-earning capacity provides a framework for future policy reforms to be more equalizing.

In summary, it is noticed that at the national level in Egypt, parents' literacy status positively impacts offspring's income levels. Thus, the effect of individual social background on wage differentials is large. It is also noticed that during all the years before and after Arab uprisings, the value of the unfair Gini index is larger than the value of the standard Gini index. Thus, the distribution of actual income is far from the distribution of fair income, but it is close to the egalitarian distribution of income. It is also noted that in all of the years, the value of the gross effort version of the unfair Gini index is remarkably smaller than the value of the net effort version. It indicates that the indirect effect of circumstances' variables is relatively large compared to their direct effect on income. Thus, though the effect of the circumstances'

variables is relatively small on the effort variables, the contribution of their correlation with the inequality of opportunity is remarkably large.

The regional level analysis shows that the correlation between income and circumstances variables is significant in all of the regions. It also shows that in all regions the value of the gross effort version of the unfair Gini index is smaller than the value of the net effort version. The largest modicum of discrepancy between the two versions is noticed in Suez region. Thus, it is the region with the largest indirect effect of circumstances variables on income. If policy reforms were to have a direct positive effect on years of education, then this effect could have been positively transmitted to wage-earning capacity. Thus, the Suez region, where the magnitude by which policy reforms impact wage-earning capacity is high enough, it is the most qualified region for receiving larger shares of public fund on education that could positively affect levels of inequality of opportunity in wage differentials.

3.4.2 Tunisia

Since its independence in 1956, Tunisia was known for its high quality and selectivity of the educational systems. The populist reforms taken during president Ben Ali's regime changed the course of the educational system ever since. After the independence of Tunisia, president Bourguiba educational system set an exam for entrants of secondary school. The student who do not pass it are assigned to vocational schools rather than high schools. They received a diploma training on professions related to the needs of labor market. Ben Ali's reforms of 1991 cancelled the secondary-school entrance exam and made it easier for students to receive secondary education. The average years of schooling in Tunisia became 7.1 (Yerkes, 2020). Again in 2002, some reforms for university-entrance exams lowered the standards for university entrance. This made it easier for students to receive university education with full

tuitions scholarships. Universities became exporters of excessive number of university graduate with degrees that do not match the needs of labor market (Masri, 2019).

Reforms to the educational system after The Arab uprisings are represented by a number of initiatives. Alongside the increasing the annual budget assigned for the educational sector, some initiatives like the national dialogue on educational reform in 2015, education's white paper in 2016, the strategic plan of 2018-2022, all aimed to improve the educational system through upgrading educational curricula, and the provision of proper infrastructure and efficient programs for teacher's training (Canavan, 2016). Nevertheless, a comprehensive policy for educational reforms was not materialized in Tunisia after the Arab uprisings. The elected government was unable to prioritize challenges to the existing educational system, the thing that raised popular discontent (Ragione, 2020). On January 2017, with the support of teachers' trade union, primary and secondary school teachers took the street on a nation-wide protest against the deteriorating quality of educational systems. In response, the minister of education was dismissed but no serious reforms have been taken. There were no improvements achieved in the quality of school management nor any upgrading to school infrastructure were realized.

The agenda of the new government that was formed on September 2020 included policies for combating economic challenges in health sector. But no priorities were given for any further policy reforms in the educational sector (Sarraf, 2020).

This section is intended to monitor inequality of opportunity in Tunisia for the years 2009 and 2012. The purpose of this section is to evaluate whether this policy reform undertaken after The Arab uprisings was an opportunity-equalizing policy or not. Following Carpentier and Sapata (2012), the unfair Gini index, estimated for gross effort and net effort, is calculated for the years 2009 and 2012 successively. The estimated model also analyzes the effect of non-

responsibility factors, represented by both circumstances and policy variables, and the responsibility factor represented by level of effort on individual wage-earning capacity.

The sample is divided into 4 regions in Tunisia. The dependent variable is the log total disposable income. Non-responsibility factors are represented by circumstance variables: geographical region, tenure of dwelling whether owned or rented, level of expenditure on education, computer ownership status, access to an internet connection, literacy status of parents, access to proper water supply, access to shared sanitation services, access to proper electricity supply, and a variable representing the policy of public expenditure on education. The responsibility factor is the individual effort measured by number of years spent on education.

3.4.2.1 National Level Analysis

The first step is to clean gross effort from its correlation with the circumstances' variables. This is achieved through regressing the effort variable, here it is the year of schooling on circumstances variables. Except for access to electricity supply and sanitation service, the majority of the selected circumstances' variables are all statically significant in predicting individual effort represented by the number of years of school attendance.

Table 20 - Net Effort Equation - National Level – Tunisia 2009, 2012

Variable	2009		2012	
	Coefficient	t*	Coefficient	t*
Region	.1	3.12	.18	1.98
Dwelling Tenure	.58	3.31	1.67	3.19
Education Expenditure	.00097	6.32	.0008	3.87
Computer	4.1	18.7	.9	7.46
Internet	3.8	8.44	1.02	2.81
Literacy Status -Father	1.5	7.86	3.67	3.5
Literacy Status -Mother	1.89	11.3	4.68	6.84
Water	.07	1.08	.23	.4
Sanitation	-.62	3.5	-.26	.46
Electricity	.26	.35	.05	.36
Policy	.019	.98	.053	.66
Constant	3.25	0.7	12.01	.59
Observations	5,701		1,473	
R-squared	0.54		0.52	

*t-value at 5% significance level

Source: Own calculations

The regression results reported in Table 20 shows that in 2009, a year before Arab uprisings, parents' literacy status has a significant positive effect on offspring's effort variable. Among all other circumstances' variables, computer ownership status and access to an internet connection have the largest magnitude effect on years of schooling. In terms of magnitude, they are subsequently followed by parents' literacy status that is less significant in predicting individual effort compared to the same parameter in Egypt. The policy variable is not statistically insignificant in predicting effort. 54% of the variation in effort variable is explained by individual circumstances and policy variables. The residual unexplained by the circumstances represents the net effort. In 2012, the policy variable turned out to be statistically insignificant in predicting effort. 52% of the variation in the effort variable is explained by individual circumstances and policy variables. The parents' literacy status still had the largest magnitude effect on levels of effort. Followed by computer ownership status and access to an internet connection. However, access to electricity, and shared sanitation facility turned out to be statistically insignificant.

Wage function is predicted in both formulas. The first is with the use of level of gross effort. Levels of fair income are calculated using the wage function formula that includes net effort. The presence of inequality of opportunity in Tunisia is confirmed at the national level. Circumstances variables that turned out to be statistically significant in predicting income are the ownership of personal computer, access to an internet connection, and access to proper water supply resources. The policy variable turned out to be statistically insignificant in predicting wage-earning capacity in both versions of the regressions, the one with the gross effort and the one with the net effort as an independent variable. All the parameters of circumstances variables showed the hypothetically expected signs for the magnitude effect. Being a dweller of an urban region and a dweller of an owned rather than a rented a type of housing have a positive effect on levels of log income. The ownership of a computer, access

to an internet connection, access to proper water resources, access to proper electricity supply, and a variable representing the policy of public expenditure on education, all have positive magnitude impact on log income. The access to a shared sanitation facility has a negative magnitude impact on levels of log income.

3.4.2.2 The Unfair Gini Index Versus the Standard Gini Index

The results reported in Table 21 show that the values of the standard Gini index were lower than the values of the unfair Gini index for the years 2009 and 2012. At the national level, the value of the unfair Gini index was increasing and it always recorded a higher value than the standard Gini index. The unfair Gini index is estimated in both formulas, the gross effort, and the net effort formula successively. In both versions, the unfair Gini index reports inequality levels that are higher than the ones estimated by the standard Gini index. Though the standard Gini index has decreased from 0.36 in 2009 to 0.33 in 2012, the unfair Gini index shows that un-matching levels of inequality of opportunity coincided with these changes in the standard Gini values. Table 5 shows that the national-level values of the unfair Gini index increased from 0.73 in 2009 to 0.78 in 2012. Inequality of opportunity, particularly in terms of the impact that reforms of the educational sector have on wage-earning capacity, has been increasing rather than decreasing during the years after The Arab uprisings despite the undertaken policy reforms. The increases in the unfair Gini index indicate that income distribution is far from the distribution of fair income. So wage-earning capacity differentials are not determined by differentials in individual effort.

Table 21 - The unfair Gini Index – Tunisia 2009 and 2012

Year	2009			2012		
Region	Standard Gini	The unfair Gini (Gross)	The unfair Gini (Net)	Standard Gini	The unfair Gini (Gross)	The unfair Gini (Net)
National Level	0.36*	0.68	0.73	0.33*	0.71	0.78
Grand Tunis		0.62	0.69		0.72	0.79
Northern Region		0.59	0.78		0.61	0.78
Central Region		0.52	0.65		0.57	0.62
Southern Region		0.61	0.74		0.67	0.73

Source: Own calculations

*World Bank Gini Index

At the national level in Tunisia in both the years 2009 and 2012, the value of the unfair Gini index is larger than the value of the standard Gini index. It indicates that, whether before or after Arab uprisings, the distribution of actual income is far from the distribution of fair income, but it is close to the egalitarian distribution of income. It is also noted that at the national level in both years, the value of the gross effort version of the unfair Gini index is smaller than the value of the net effort version. It indicates that the indirect effect of circumstances' variables is relatively large compared to their direct effect on income. Thus, though the effect of the circumstances' variables is relatively small on the effort variables, the contribution of their correlation with the inequality of opportunity is large.

3.4.2.3 Regional Level Analysis and Oaxaca Decomposition

At the regional level, the wage equation is again estimated twice using the gross effort version and the net effort version successively but separately for each region. The heterogeneities of the effects that circumstances' variables cast on wage-earning capacity are examined, particularly the impact of policy variable in each of the main regions in the country.

Results at the regional level show a variant impact of circumstances variables on income inequality among regions. For instance, in the region of Grand Tunis, the magnitude effect of computer ownership status and access to the internet is higher relative to other regions.

In terms of significance, in the region of Grand Tunis the variables of dwelling conditions are more statistically significant in predicting log income than the variables of computer ownership status and access to the internet. Parents' literacy rate turned out to be statistically insignificant in predicting log income. In the Northern region, parents' literacy rate turned out to be statistically significant in predicting log income, it also has the largest magnitude effect in predicting log income relative to other regions. However, amongst all other regions, the Northern region reported the lowest level of average income. It confirms that regions differently reward efforts exerted by individuals according to their living circumstances. Cross-regional sources of unfair inequality are similar to some extent. Nevertheless, the magnitude of the impact that each source of inequality cast on variation in earning capacity varies across regions. Cross-regional comparisons of the unfair Gini index provide a helpful tool to differently target regions with customized equalizing policies.

It is noticed from Table 21 that in all of the regions of Tunisia, the values of the unfair Gini are higher than the value of the standard Gini index. Thus, the distribution of income in all of the regions is very far from fair distribution but is closer to egalitarian distribution. This also indicates that the correlation between income and the effort variable is significant. This conclusion is also confirmed by the discrepancy between the values of the two versions of the unfair Gini index. The Northern region is the region with the largest discrepancy between the two versions. In all other regions, the value of the gross effort version of the unfair Gini index is smaller than the value of the net effort version.

The Oaxaca decomposition is calculated to analyze the differences in mean wage-earning capacity across regions. This decomposition is used to explore whether the cross-regional differentials are due to different circumstances or effort differentials.

Table 22 - Oaxaca Decomposition for Income Differences into Effort and Circumstances Factors – Tunisia 2012

Region j	Wage j	Wage -j	Demean Log y	Total		Magnitude		Effect		Interaction	
				Circu	Effort	Circu	Effort	Circu	Effort	Circu	Effort
Grand Tunis	12,464	11,298	-0.10	9.277	0.046	8.89	0.015	0.387	0.031	3.44043	0.000465
Northern Region	8,926	12,477	0.33	9.009	0.052	8.72	0.013	0.289	0.039	2.52008	0.000507
Central Region	13,344	11,004	0.19	12.519	0.051	12.19	0.016	0.329	0.035	4.01051	0.00056
Southern Region	11,623	11,578	0.14	10.412	0.066	10.09	0.012	0.322	0.054	3.24898	0.000648

Source: Own calculations

The results shown in Table 22 demonstrate that the contribution of circumstances variables to wage differentials appears through the two channels, i.e. through the magnitude and through the effect, in the regional wage differential equation. The results show that the contribution of the variation in the circumstances factors and effort factors into the variation of wage is heterogeneous across regions. In the Central region, effort differentials have a high contribution in terms of impact on wage differential with a higher magnitude of the effect. Only when inequality was to be fair, then the impact of effort on wage differentials could have been significant, i.e. if policy reforms were to have a direct positive effect on years of education, then this effect could have been positively transmitted to wage-earning capacity. The region with the largest discrepancy between the values of the gross effort version and the net effort version of the unfair Gini index is the Northern region. Thus, it is the region with the largest indirect effect of circumstances variables on income. The Northern region is also the region with the largest discrepancy between the values of the unfair Gini and the standard Gini index. When the value of the unfair Gini is larger than the standard Gini index, effort and income are correlated. Only if the policy reforms were to be equalizing, fair inequality would have been the pattern in the Northern region where the magnitude by which policy reforms impact wage-earning capacity is high enough. A reallocation of per capita expenditure is mandatory to vary according to regions. The positive impact of policy reforms is witnessed to a larger extent in the coastal northern region. The cross-regional differences in the impact of policy reforms in

educational expenditure on wage-earning capacity provide a framework for future policy reforms to be more equalizing.

In summary, it is noticed that at the national level in Tunisia, computer ownership status and access to an internet connection are the variables that affect income levels. Amongst other dwelling conditions, the effect of these two variables on wage differentials is large. It is also noticed that during all the years before and after the Arab uprisings, the value of the unfair Gini index is larger than the value of the standard Gini index. Thus, the distribution of actual income is far from the distribution of fair income, but it is close to the egalitarian distribution of income. It is noticed that the indirect effect of circumstances' variables is relatively large compared to their direct effect on income. This is confirmed by the discrepancy between the values of the gross effort version and the net effort version of the unfair Gini index. It has been observed that whether before or after the Arab uprisings, the values of the gross effort version are smaller than the value of the net effort version. Thus, though the effect of the circumstances' variables is relatively small on the effort variables, the contribution of their correlation with the inequality of opportunity is remarkably large. The same discrepancy has been observed in all of the regions in Tunisia. The regional level analysis shows that the correlation between income and circumstances variables is significant in all of the regions. It also shows that in all regions the value of the gross effort version of the unfair Gini index is smaller than the value of the net effort version. The largest modicum of the discrepancy between the two versions is noticed in the Northern region. Thus, it is the region with the largest indirect effect of circumstances variables on income. The Northern region, where the magnitude by which policy reforms impact wage-earning capacity is high enough, is the most qualified region for receiving larger shares of the public fund on education that could positively affect levels of inequality of opportunity in wage differentials.

3.4.3 Jordan

In Jordan, a country with limited financial resources and modest levels of national income, the performance of the educational system is beyond expectations when compared to other MENA countries (Gallaher, 2012). However, this same level of performance is not considered as developed when compared to international standards of evaluating national educational systems. The educational system in Jordan is characterized by the mass employment of teachers. The costs of salaries and wages of a large number of employed teachers in the public educational system exceed 93% of the budget allocated for the sector of education. However, the teacher-per-student ratio is still considered low (Akkari, 2015).

The public education system in Jordan provides a large number of small, but less efficient, schools accessible in many districts. Thus, economies of scale in the educational system are not achieved as the per-student cost of such a system of small, but multiple public schools, is triple the cost of large more, cost-effective, public schools.

Since 2011, the share of direct support to the educational institutions in national budget was decreased. The share of public expenditure on education in GDP decreased from 4.9% in 2011 to 2.9% in 2019 (World Bank). Meanwhile, governmental financial assistants to students in disadvantaged areas increased (Gallaher, 2012). This section is intended to monitor the inequality of opportunity in Jordan for the years 2009 and 2012. Though no particular policy reforms have been undertaken after the Arab uprisings, there was a gradual decline in the share of per-student government expenditure on education as a percentage of GDP during the years after the Arab uprisings. Following Carpentier and Sapata (2012), the unfair Gini index, estimated for gross effort and net effort, is calculated for the years 2009 and 2012 successively. The estimated model also analyzes the effect of non-responsibility factors, represented by both circumstances and policy variables, and the responsibility factor represented by the level of

effort on individual wage-earning capacity. The sample is divided into 4 regions in Jordan. The dependent variable is the log total disposable income. Non-responsibility factors are represented by circumstance variables: geographical region, tenure of dwelling whether owned or rented, level of expenditure on education, computer ownership status, access to an internet connection, literacy status of parents, access to proper water supply, access to shared sanitation services, access to proper electricity supply, and a variable representing the policy of public expenditure on education. The responsibility factor is the individual effort measured by the number of years spent on education.

3.4.3.1 National Level Analysis

The net effort is predicted by circumstances variables. The regression results reported in Table 23 show that in 2009, a year before the Arab uprisings, parents' literacy status has a significant positive effect on the offspring's effort variable.

Table 23 - Net Effort Equation - National Level – Jordan 2009, 2012

Variable	2009		2012	
	Coefficient	t*	Coefficient	t*
Region	.011	0.62	-.007	-0.67
Dwelling Tenure	.25	1.28	.21	1.16
Education Expenditure	.00054	6.34	.00058	8.5
Computer	2.8	12.7	12.8	5.97
Internet	1.7	4.17	1.5	7.8
Literacy Status -Father	4.89	9.43	6.05	15.5
Literacy Status -Mother	3.7	10.5	2.4	8.10
Water	.25	2.95	.25	3.36
Sanitation	-.69	-2.58	-.9	-4.7
Electricity	1.8	.44	.001	3.1
Policy	.12	.41	.046	-.8
Constant	-5.7	-0.7	-.08	-0.04
Observations	1,702		2,839	
R-squared	0.56		0.58	

*t-value at 5% significance level

Source: Own calculations

Among all other circumstances' variables, parents' literacy status has the largest magnitude effect on years of schooling. The parents' literacy status variables are highly significant in predicting individual effort. In terms of magnitude, both the parent's literacy status variables are subsequently followed by computer ownership status and access to an internet connection. These two variables are also highly significant in predicting levels of

individual effort. The policy variable is not statistically insignificant in predicting effort. 56% of the variation in the effort variable is explained by individual circumstances and policy variables. The residual that is not explained by the circumstances represents the net effort. The results reported in 2012 were almost the same. In 2012, the policy variable was not statistically insignificant in predicting effort. The parents' literacy status also has the largest magnitude of the effect on years of schooling. The parents' literacy status variables are also highly significant in predicting individual effort. In terms of magnitude, these two variables were subsequently followed by computer ownership status and access to an internet connection that are also predicting levels of individual effort. 58% of the variation in the effort variable is explained by individual circumstances and policy variables. The parents' literacy status still had the largest magnitude effect on levels of effort. In both the years 2009 and 2012, access to electricity was not statistically significant in predicting levels of individual effort. But the access to a shared sanitation facility was statistically insignificant and has a negative impact on levels of individual effort.

The wage function is predicted in both formulas. The first is with the use of the level of gross effort. Levels of fair income are calculated using the wage function formula that includes net effort. The presence of inequality of opportunity in Jordan is confirmed at the national level. Circumstances variables that turned out to be statistically significant in predicting income are the dwellers' tenure status, parents' literacy rate, ownership of a personal computer, and access to an internet connection. The policy variable turned out to be statistically insignificant in predicting wage-earning capacity in both versions of the regressions, the one with the gross effort and the one with the net effort as an independent variable. All the parameters of circumstances variables showed the hypothetically expected signs for the magnitude effect. The ownership of a computer and access to an internet connection have a

positive magnitude impact on log income. Access to a shared sanitation facility has a negative magnitude impact on levels of log income.

3.4.3.2 The Unfair Gini Index Versus the Standard Gini Index

The results reported in Table 24 show that the values of the standard Gini index were lower than the values of the unfair Gini index for the years 2009 and 2012. At the national level, the value of the unfair Gini index was increasing and it always recorded a higher value than the standard Gini index. The unfair Gini index is estimated in both formulas, the gross effort, and the net effort formula successively. In both versions, the unfair Gini index reports inequality levels that are higher than the ones estimated by the standard Gini index. The value of the standard Gini index increased from 0.33 in 2009 to 0.34 in 2012. The values of gross and net unfair Gini index increased from 2009 to 2012. Inequality of opportunity has been increasing rather than decreasing during the years after the Arab uprising. The increases in the unfair Gini index indicate that income distribution is far from the distribution of fair income. So wage-earning capacity differentials are not determined by differentials in individual effort.

Table 24 - The unfair Gini Index – Jordan 2009 and 2012

Year	2009			2012		
Region	Standard Gini	The unfair Gini (Gross)	The unfair Gini (Net)	Standard Gini	The unfair Gini (Gross)	The unfair Gini (Net)
National Level	0.33*	0.58	0.64	0.34*	0.62	0.69
Amman		0.67	0.71		0.72	0.77
Irbid		0.57	0.63		0.58	0.61
Madaba		0.63	0.72		0.65	0.69
Azzarqa		0.54	0.65		0.62	0.74

Source: Own calculations

*World Bank Gini Index

At the national level in Jordan in both the years 2009 and 2012, the value of the unfair Gini index is larger than the value of the standard Gini index. It indicates that, whether before or after Arab uprisings, the distribution of actual income is far from the distribution of fair

income, but it is close to the egalitarian distribution of income. It is also noted that at the national level in both years, the value of the gross effort version of the unfair Gini index is smaller than the value of the net effort version. It indicates that the indirect effect of circumstances' variables is relatively large compared to their direct effect on income. Thus, though the effect of the circumstances' variables is relatively small on the effort variables, the contribution of their correlation with the inequality of opportunity is large.

3.4.3.3 Regional Level Analysis and Oaxaca Decomposition

At the regional level, the wage equation is again estimated twice using the gross effort version and the net effort version successively but separately for each region. The heterogeneities of the effects that circumstances' variables cast on wage-earning capacity are examined, particularly the impact of policy variable in each of the main regions in the country. It is noticed from Table 24 that in all of the regions of Jordan, the values of the unfair Gini are higher than the value of the standard Gini index. Thus, the distribution of income in all of the regions is very far from fair distribution but is closer to egalitarian distribution. This also indicates that the correlation between income and the effort variable is significant. This conclusion is also confirmed by the discrepancy between the values of the two versions of the unfair Gini index. Azzarqa region is the region with the largest discrepancy between the two versions. In all other regions, the value of the gross effort version of the unfair Gini index is smaller than the value of the net effort version.

The Oaxaca decomposition is calculated to analyze the differences in mean wage-earning capacity across regions. This decomposition is used to explore whether the cross-regional differentials are due to different circumstances or effort differentials.

Table 25 - Oaxaca Decomposition for Income Differences into Effort and Circumstances Factors – Jordan 2012

Region j	Wage j	Wage -j	Demean Log y	Total	Magnitude		Effect		Interaction	
					Circu	Effort	Circu	Effort	Circu	Effort
Amman	9,140	7,856	-0.15	7.06	0.054	6.98	0.04	0.08	0.014	0.00056
Irbid	8,863	7,948	-0.11	5.939	0.083	5.76	0.001	0.179	0.082	0.000082
Madaba	8,011	8,232	-0.03	2.723	0.567	2.43	0.197	0.293	0.37	0.07289
Azzarqa	6,694	8,671	-0.08	9.122	0.054	9.08	0.02	0.042	0.034	0.00068

Source: Own calculations

The results shown in Table 25 demonstrate the cross-regional heterogeneity of the contribution that the variation in the circumstances' factors holds on the variation in the wage. Only in one region of Jordan, variation in levels of individual effort has a large contribution to the variation in wage-earning capacity. Variations in circumstances variables contribute to wage differentials through the two channels of magnitude and effect in other regions. In Amman region, policy reforms have no direct positive effect on years of education. The effect that policy reforms hold on levels of effort was not transmitted to differentials in wage-earning capacity. The region with the largest discrepancy between the values of the gross effort version and the net effort version of the unfair Gini index is the Alzarraq region. Thus, it is the region with the largest indirect effect of circumstances variables on income. Levels of individual effort and levels of income are correlated as the value of the unfair Gini is larger than the standard Gini index. In all regions of Jordan, the magnitude by which policy reforms impact levels of individual effort is not high enough to allow for transmitting the effect to levels of income. A reallocation of per capita expenditure is mandatory to vary according to regions. The cross-regional differences in the impact of policy reforms in educational expenditure on wage-earning capacity provide a framework for future policy reforms to be more equalizing. The region of Madaba would have demonstrate a positive effect of policy reforms on levels of wage-earning capacity. An increase of per-student public fund on education would have

positively affected wage-earning capacity in this particular region where the contribution of the variation in levels of individual effort on levels of income is the largest.

In summary, at the national level in Jordan parents' literacy rate, computer ownership status, and access to an internet connection are the variables that affect income levels. Amongst other dwelling conditions, the effect of parents' literacy rate on wage differentials is large. It is also noticed that during all the years before and after the Arab uprisings, the value of the unfair Gini index is larger than the value of the standard Gini index. Thus, the distribution of actual income is far from the distribution of fair income, but it is close to the egalitarian distribution of income. It is noticed that the indirect effect of circumstances' variables is relatively large compared to their direct effect on income. This is confirmed by the discrepancy between the values of the gross effort version and the net effort version of the unfair Gini index. Before and after the Arab uprisings, the values of the gross effort version are smaller than the value of the net effort version. Thus, though the effect of the circumstances' variables is relatively small on the effort variables, the contribution of their correlation with the inequality of opportunity is remarkably large. The regional level analysis shows that the correlation between income and circumstances variables is significant in all of the regions except for the region of Madaba which demonstrated a correlation between income and individual effort. In all regions of Jordan, the value of the gross effort version of the unfair Gini index is smaller than the value of the net effort version. The largest modicum of the discrepancy between the two versions is noticed in the Azzarqa. Thus, it is the region with the largest indirect effect of circumstances variables on income. Contrary to the region of Madaba where the magnitude by which policy reforms impact wage-earning capacity is high enough, it is the most qualified region for receiving larger shares of the public fund on education that could positively affect levels of inequality of opportunity in wage differentials.

3.4.4 Palestine

The political instability in both West Bank and Gaza Strip regions casts repercussions on the education system in the Palestinian territories. The Ministry of Education and Higher Education was established in 1993 when the responsibility of the Palestinian Authority was assumed on the education system in Palestinian territories. Reforms in the educational sector were started in 2003. The reforms were presented in the Education Sector Development Plans for the years 2008-2012. The second Education Development Strategic Plan was supposed to cover the year between 2014-2019. The main purpose of the two sets of policy reforms was to prompt equity and accessible educational systems with sustainable quality management. Nevertheless, per-student public expenditure declined by 10.3% in 2012 compared to 2005. Public expenditure on education as a share of GDP in 2005 was 15.7%. In 2012, it declined to 13.1% (Claussen et al., 2013). This section is intended to monitor the inequality of opportunity in Palestine for the years 2009 and 2012. It is intended to evaluate policy reforms that caused the decline in the share of per-student government expenditure on education as a percentage of GDP during the years after the Arab uprisings. Following Carpantier and Sapata (2012), the unfair Gini index, estimated for gross effort and net effort, is calculated for the years 2009 and 2012 successively. The estimated model also analyzes the effect of non-responsibility factors, represented by both circumstances and policy variables, and the responsibility factor represented by the level of effort on individual wage-earning capacity. The sample is divided into 2 regions of West Bank and Gaza Strip. The dependent variable is the log total disposable income. Non-responsibility factors are represented by circumstance variables: geographical region, tenure of dwelling whether owned or rented, level of expenditure on education, computer ownership status, access to an internet connection, literacy status of parents, access to proper water supply, access to shared sanitation services, access to proper electricity supply,

and a variable representing the policy of public expenditure on education. The responsibility factor is the individual effort measured by the number of years spent on education.

3.4.4.1 National Level Analysis

The net effort is predicted by circumstances variables. The regression results reported in Table 26 show that in both the years 2009 and 2012, parents' literacy status has a significant positive effect on the offspring's effort variable. Among all other circumstances' variables, parents' literacy status has the largest magnitude effect on years of schooling.

Table 26 - Net Effort Equation - National Level – Palestine 2009, 2012

Variable	2009		2012	
	Coefficient	t*	Coefficient	t*
Region	.06	5.7	-.077	9.39
Dwelling Tenure	.05	0.31	-.27	-2.6
Education Expenditure	.0003	2.40	.00052	8.43
Computer	2.4	10.03	2.47	17.01
Internet	1.01	2.58	.54	4.29
Literacy Status -Father	5.7	25.13	5.39	30.7
Literacy Status -Mother	2.98	16.51	2.75	19.8
Water	.011	.15	.13	-2.12
Sanitation	-.37	2.03	-.77	-5.5
Electricity	2.48	1.11	.0001	3.22
Policy	.005	4.55	.0006	1.42
Constant	-10.6	-4.6	-1.55	-2.14
Observations	3,430		5,638	
R-squared	0.49		0.48	

*t-value at 5% significance level

Source: Own calculations

The parents' literacy status variables are highly significant in predicting individual effort. In terms of magnitude, both the parent's literacy status variables are subsequently followed by computer ownership status and access to electricity supply. These two variables are also highly significant in predicting levels of individual effort. The policy variable is statistically insignificant in predicting effort only in 2009. 46% of the variation in the effort variable is explained by individual circumstances and policy variables. The residual that is not explained by the circumstances represents the net effort. The results reported in 2012 were almost the same. Except for the policy variable that was not statistically insignificant in predicting effort. The parents' literacy status also has the largest magnitude of the effect on

years of schooling. The parents' literacy status variables are also highly significant in predicting individual effort. In terms of magnitude, these two variables were subsequently followed by computer ownership status. 48% of the variation in the effort variable is explained by individual circumstances and policy variables. The parents' literacy status still had the largest magnitude effect on levels of effort.

The wage function is predicted in both formulas. The first is with the use of the level of gross effort. Levels of fair income are calculated using the wage function formula that includes net effort. The presence of inequality of opportunity in Palestine is confirmed at the national level. The policy variable turned out to be statistically insignificant in predicting wage-earning capacity in both versions of the regressions, the one with the gross effort and the one with the net effort as an independent variable. All the parameters of circumstances variables showed the hypothetically expected signs for the magnitude effect. The ownership of a computer has a positive magnitude of the effect on log income. Access to a shared sanitation facility has a negative magnitude impact on levels of log income.

3.4.4.2 The Unfair Gini Index Versus the Standard Gini Index

The results reported in Table 27 show that the values of the standard Gini index were lower than the values of the unfair Gini index for the years 2009 and 2012. At the national level, the value of the unfair Gini index was decreasing and it always recorded a higher value than the standard Gini index. The unfair Gini index is estimated in both formulas, the gross effort, and the net effort formula successively. In both versions, the unfair Gini index reports inequality levels that are higher than the ones estimated by the standard Gini index. The value of the standard Gini index has decreased from 0.36 in 2009 to 0.35 in 2012. The values of the unfair Gini index in both the gross and the net versions decreased from 2009 to 2012. Though

inequality of opportunity at both the national level and the regional level existed in Palestine, it slightly decreased after the Arab uprisings.

Table 27 - The unfair Gini Index – Palestine 2009 and 2012

Year	2009			2012		
Region	Standard Gini	The unfair Gini (Gross)	The unfair Gini (Net)	Standard Gini	The unfair Gini (Gross)	The unfair Gini (Net)
National Level	0.36*	0.66	0.72	0.35*	0.63	0.69
West Bank		0.62	0.76		0.59	0.73
Gaza Strip		0.65	0.69		0.62	0.65

Source: Own calculations

*World Bank Gini Index

Before and after the Arab uprisings, at the national level, the value of the unfair Gini index is larger than the value of the standard Gini index. It indicates that, whether before or after the Arab uprisings, the distribution of actual income is far from the distribution of fair income, but it is close to the egalitarian distribution of income. It is also noted that at the national level in both years, the value of the gross effort version of the unfair Gini index is smaller than the value of the net effort version. It indicates that the indirect effect of circumstances' variables is relatively large compared to their direct effect on income. Thus, though the effect of the circumstances' variables is relatively small on the effort variables, the contribution of their correlation with the inequality of opportunity is large.

3.4.4.3 Regional Level Analysis and Oaxaca Decomposition

At the regional level, the wage equation is again estimated twice using the gross effort version and the net effort version successively but separately for each region. The heterogeneities of the effects that circumstances' variables cast on wage-earning capacity are examined, particularly the impact of policy variable in each of the main regions in the country. In both the West Bank and Gaza Strip regions, the values of the unfair Gini are higher than the value of the standard Gini index. Thus, the distribution of income in all of the regions is very

far from fair distribution but is closer to egalitarian distribution. This also indicates that the correlation between income and the effort variable is significant. This conclusion is also confirmed by the discrepancy between the values of the two versions of the unfair Gini index. The West Bank region is the region with the largest discrepancy between the two versions.

The Oaxaca decomposition is calculated to analyze the differences in mean wage-earning capacity across regions. This decomposition is used to explore whether the cross-regional differentials are due to different circumstances or effort differentials.

Table 28 - Oaxaca Decomposition for Income Differences into Effort and Circumstances Factors – Palestine 2012

Region j	Wage j	Wage -j	Demean Log y	Total		Magnitude		Effect		Interaction	
				Circu	Effort	Circu	Effort	Circu	Effort	Circu	Effort
West Bank	2,100	646	-1.18	12.72	0.34	12.4	0.08	0.32	0.26	3.968	0.0208
Gaza Strip	1,938	700	-1.02	15.05	0.29	14.6	0.06	0.45	0.23	6.57	0.0138

Source: Own calculations

The results shown in Table 28 demonstrate the cross-regional heterogeneity is not as large in terms of the contribution that the variation in the circumstances' factors holds on the variation in the wage. The results of the Oaxaca decomposition are not significantly different between the two regions of the West Bank and Gaza Strip. Variations in circumstances variables contribute to wage differentials through the two channels of magnitude and effect in other regions. In both regions, any policy reforms will have no direct positive effect on years of education. The effect of the policy reforms on levels of effort was not transmitted to differentials in wage-earning capacity. The region with the largest discrepancy between the values of the gross effort version and the net effort version of the unfair Gini index is the West Bank region. Thus, it is the region with the largest indirect effect of circumstances variables on income. Levels of individual effort and levels of income are correlated as the value of the unfair Gini is larger than the standard Gini index. In both regions, the magnitude by which

policy reforms impact levels of individual effort is not high enough to allow for transmitting the effect to levels of income. Any reallocation of per capita expenditure will have no repercussions neither on levels of individual efforts nor on levels of wage-earning capacity. It is obvious that the case in Palestine does not require increasing the per-student expenditure in order to equalize wage-earning capacity. A different set of policy reforms are recommended such as improving school administration systems and applying further monitoring and controlling procedures on schooling practices.

In summary, at the national level in Palestine parents' literacy rate is the variable that affect income levels the most. Amongst other dwelling conditions, the effect of parents' literacy rate on wage differentials is large. During all the years before and after the Arab uprisings, the value of the unfair Gini index is larger than the value of the standard Gini index. Thus, the distribution of actual income is far from the distribution of fair income, but it is close to the egalitarian distribution of income. It is noticed that the indirect effect of circumstances' variables is relatively large compared to their direct effect on income. This is confirmed by the discrepancy between the values of the gross effort version and the net effort version of the unfair Gini index. Before the Arab uprisings, the values of the gross effort version are smaller than the value of the net effort version. Thus, though the effect of the circumstances' variables is relatively small on the effort variables, the contribution of their correlation with the inequality of opportunity is remarkably large. The regional level analysis shows that the correlation between income and circumstances variables is significant in both the regions of the West Bank and Gaza Strip. The region with the larger indirect effect of circumstances variables on income is the West Bank region where the discrepancy between the two versions of the unfair Gini index is higher.

3.5 Results

Notwithstanding the moderate to low rates of inequality reported in the Arab countries during the decade before the Arab uprising, social injustice was a focal point behind the upheavals that inflicted the Arab world. Observed levels of inequality reported by conventional measures miss a large portion of inequality denoted as inequality of opportunity. The concept of equality of opportunity has received great attention in the economic literature on redistributive justice. It revolves around the idea that the unfair inequality among individuals who exert the same level of effort has to be removed. Individuals that exert higher levels of effort should be compensated by policy interventions. Unfair inequality is the form of inequality associated with belonging to a particular social class or being subject to some unfortunate circumstances beyond one's control, particularly the kind of inequality generated by factors that individuals are not held responsible for. Meanwhile, fair inequality generated by differentials in levels of effort exerted by individuals or factors that the individual is held responsible for has to be preserved. Individuals who exert a higher level of effort are allowed to receive higher income as a reward for the extra effort that they exert. The rationales behind studies on the inequality of opportunity are justified by the harmful impact that the unfair inequality of opportunity casts on levels of economic growth. It hinders the accumulation of human capital and weakens the support for the market economy and democratic practices. It also negatively impacts levels of investment in human capital because it affects people's aspirations.

Issues of unfair inequality are not addressed in the literature on the Arab uprising. Conventional measures of well-being used in the literature on the Arab uprisings in order to evaluate unequal levels of welfare do not reflect levels of inequality of opportunity. Empirical analysis of the extent of inequality of opportunity in the MENA region and the evaluation of

equalizing policies undertaken after the Arab uprisings are absent in the literature. In order to observe the changes in levels of inequality of opportunity in a sample of Arab countries before and after the Arab uprisings, this chapter is intended to provide a parametric estimate of the unfair inequality using data on responsibility and non-responsibility factors needed to explain inequalities of opportunity.

Theoretical and empirical approaches employed in this chapter allow for evaluating the repercussions of policy reforms conducted after the Arab uprisings for the purpose of equalizing opportunities. Particularly educational policy interventions represented by increases in public expenditure on education. In general, massive schooling was among the policies adopted by governments in Arab states to combat high rates of illiteracy. In this chapter, the indirect effect of policy reforms on wage-earning capacity is evaluated through its direct impact on levels of individual effort. It is proven that policies of massive schooling in the Arab states and the increases in state funding of education did not contribute to the reduction of inequalities among regions of Arab countries. The intended equalizing policy effect was not achieved in any of the Arab counties included in the sample. Dwellers of disadvantaged regions do not have the same access to resources that contribute to improving individual wage-earning capacity. Equalizing policies should be redesigned in order to address deficiencies in the education systems in rural areas where the quality of schooling is lower compared to urban regions. In all of the countries, the indirect impact of the increased fund of public education on levels of wage-earning capacity was heterogeneous among regions, but in general, it was lower in rural regions. Comparisons of policy effect were conducted on both levels. Alongside the national-level comparative analysis, the cross-regional comparisons showed that differentials in wage-earning capacity are not merely due to differentials in levels of effort exerted by individuals. The unfair inequality of opportunity is detected across regions of each country as differentials in wage-earning capacity are due to differentials in regional circumstances.

Fair income was estimated in order to calculate the unfair Gini index as a measure of the unfair inequality of opportunity. In which the magnitude of ex-post the unfair inequality of opportunity is measured by the distance between actual income and fair income. Sources of regional wage differentials and cross-regional heterogeneity in levels of the unfair inequality of opportunity are examined by using Oaxaca decomposition. The main findings resulting from the national-level analysis of the unfair Gini index revealed that levels of the unfair Gini index are higher than the standard Gini index. These results indicate that the actual income distribution in our sample of Arab countries is far from fair income distribution compared to the distribution of the average income. Whether before or after the Arab uprisings, actual income is far from fair income in all regions of Egypt and Tunisia. Thus, according to theory and principles of inequality of opportunity redistribution of resources using equalizing policies are mandatory to be reflected on levels of individual effort.

Alongside the national-level analysis, the regional-level Oaxaca decomposition analyses in both Egypt and Tunisia emphasize the small contribution of the effort variable relative to circumstances variables in explaining wage differences. A fair income equation that included the net effort variable also confirmed the insignificant, and sometimes the absent, contribution of the policy variable on levels of individual effort.

The large heterogeneity in the effect of educational policy reforms on levels of effort exerted emphasizes the differential in reward schemes for individual effort across regions. Differentials in the magnitudes of the contribution of the effort variable to the wage equation indicate the cross-regional differentials in the level of the unfairness in reward schemes. According to the principles of inequality of opportunity, advising equalizing redistributive policies should be conducted at a decentralized pattern according to the contextual specificities of each region including reforms of the educational sector. Merely increasing public spending

on education did not contribute to reducing wage differentials entailed by circumstances. Nor did it contribute to altering levels of individual effort exerted. Reforms were insufficient in reducing the unfair inequality of opportunity nor did they motivate citizens to exert more effort due to the insufficient reward schemes. Policies that upgrade the quality of education could be more effective, particularly for dwellers of disadvantaged regions with less access to educational facilities like internet connection and ownership of technologies required for a better quality of education.



CONCLUSION

This study is intended to trace development prospects in the Arab world in the aftermath of the Arab uprising. The study provided dynamic measures of well-being that fits in with the transitional context of Arab uprisings. The innovative empirical approaches used in this study accommodate for the lack of panel data required for making transitional analyses. A measure of vulnerability to poverty using cross-sectional household-level data in a sample of Arab countries was provided. The study demonstrated how misleading trends of economic growth built upon objective aggregates of growth in Arab countries failed to predict people's levels of dissatisfaction with their standards of living. Subjective measures of income inequality using ordinal data were provided. Ordinal income inequality index was estimated for a sample of Arab countries before and after Arab uprising.

A parametric estimate of inequality of opportunity in MENA region was provided. In order to track the change in levels of inequality of opportunity, the parametric indicator of inequality of opportunity that is gauged in two timeframes, before and after Arab uprisings. The approach employed to estimate the parametric index of inequality of opportunity allowed for evaluating repercussions of policy reforms conducted after Arab uprisings on the purpose of equalizing opportunities. The analysis was conducted at two levels for each country. Alongside the national level that allowed for making cross-country comparative analysis, the empirical analysis was also conducted across regions of each country in order to make cross-regional comparisons.

Due to the transitional context of the changes brought to the Arab region by Arab uprisings, assessing development prospects mandates observing the dynamics of changes in the main indicators of well-being. Chapter 1 provides a dynamic measure of well-being that fits in with the transitional context of Arab uprisings. It observes trends of vulnerability to

poverty rather than observing changes in poverty rates per se. Literature on the repercussions of Arab uprising included a wide range of studies on changes in levels of poverty rates. Chapter 1 introduces the concept of vulnerability to poverty to the literature on economic development after Arab uprising. It is also intended to incorporate innovative empirical approaches that accommodate for the lack of panel data required for making transitional analysis.

In the absence of panel data, vulnerability to poverty analyses using cross-sectional-level data are suggested in order to monitor levels of vulnerability to poverty. Repercussions of Arab uprisings on levels of household's welfare before and after Arab uprisings were inferred by changes in rates of vulnerability to poverty and by poverty transition maps that demonstrate movement into and out of poverty. The cross-sectional data used in chapter 1 are derived from the Economic Research Form microdata portal that provides household-level survey conducted in a bundle of Arab countries. The timeframe of the study is selected to represent the effect of Arab uprisings on rates of vulnerability to poverty. The years of survey rounds are selected for each country before and after the Arab uprising.

Vulnerability is measured in terms of the variation of household's expected expenditure relative to an expenditure threshold measured at poverty line. The expected expenditure is predicted by the household's characteristics that determine the household's current level of expenditure. The proportion of vulnerable population and vulnerability rates are estimated accordingly for each year of the survey. Another measure that functions better for comparative analysis is the vulnerability to poverty ratio. This ratio is used to measure dispersion in vulnerability of the population. Validating the outcomes resulted by vulnerability analyses requires the establishment of poverty transition matrices that allow for monitoring movement into and out of poverty in multiple periods of time. In this chapter, a synthetic panel data is generated for each country in each year the cross-sectional welfare survey has been conducted.

The generated synthetic panel data sets are used to provide poverty transition matrices that show movement into and out of poverty during the years before and after Arab uprisings.

Within the transitional context of the change brought to the Arab region by the wave of Arab uprisings, the estimated measures of vulnerability to poverty and poverty transitional estimates in the aftermath of Arab uprising reflected deteriorating levels of well-being. In both of Egypt and Tunisia, the political transition brought by Arab uprising put larger proportions of the population under the risk of vulnerability to poverty. Egypt's post-revolution experience was unique in so that the country has undergone two rounds of political transitions during a very short of time. The prolonged process of initial regime transition in 2011, then the consequent counter-revolution in 2013, have slowed down measures of economic growth. Poverty eradication and welfare development policies were not prioritized the thing that negatively impacted levels of well-being. Other countries that have never witnessed neither protests of Arab uprisings nor any subsequent political transition were still inflected with political turmoil. In Iraq, particularly after the political turmoil brought by Arab uprising in 2014, many large-scale industrial, infra-structure, constructions, and housing projects were halted. Levels of well-being were not improved. Though levels of vulnerability to poverty witnessed a slight reduction, a large proportion of vulnerable households became highly vulnerable to poverty with higher likelihood of falling into poverty at some point in the future.

The wave of protests denoted as Arab uprisings was a popular outcry against economic hardship and deteriorating life conditions in Arab countries that witnessed protests of Arab revolution. Inequality of income distribution was among the main demands of the Arab people expressing their dissatisfaction with their standards of living. Nevertheless, conventional objective measures of inequality reported moderate to low levels of inequality of expenditure in the Arab region during the decade before Arab uprisings.

Chapter 2 provides subjective measures of well-being used to assess levels of well-being after Arab uprisings. The theoretical framework used to develop these measures are empirically applied on ordinal data analysis. It provides a subjective measure of income inequality using perception data derived from an opinion survey. The data is presented in a categorial order depicting levels of individual satisfaction with own financial status.

The theoretical framework used to assess income inequality is an axiomatic approach built on the concept of individual status within the distribution. The choice of reference point is another controversial pillar in this approach. Unlike inequality indicators that are built on cardinal data where the reference point is the mean value, the reference point for ordinal inequality indicator is either the minimum value or the maximum value in the distribution of individual status.

Estimated ordinal inequality index of income distribution in Egypt is significantly high. Before Arab uprising Iraq recorded the second highest value of estimated inequality index amongst all other Arab countries in the sample. In Tunisia there was a significant increase in the estimated value of income inequality index between the years 2014 and 2017. In conclusion, contrary to the alleged moderate to low levels of income inequality reported by objective measures of well-being in Arab countries before Arab uprisings, the ordinal income inequality measures estimated in chapter 2 based on self-reported level of satisfaction with own financial status reported significantly high values in our sample of Arab countries. Countries that have never witnessed Arab uprisings protests were in a better position in terms of level of income inequality after Arab uprisings. Though significantly high values of income inequality indices were recorded in all of Iraq, Jordan, and Algeria before Arab uprising, slight declines in values of income inequality index were achieved after Arab uprising. In both of the countries that have witnessed protests of Arab uprisings, estimated values of income inequality index

were significantly high after Arab uprisings. Meanwhile Egypt has sustained similar values of the index and were amongst the highest after Arab uprisings, Tunisia recorded the highest values of income inequality index of all.

Ordinal income inequality index developed in chapter 2 reported higher levels of income inequality in Arab countries than the moderate to low levels reported by conventional objective measures. When income inequality was measured using categorical data derived from opinion surveys, the depicted self-reported perception of own financial well-being reflected lower levels of satisfaction with own position in the distribution of income. Subjective measures of income inequality reported high levels of income inequality during the years before Arab uprisings. Post-Arab uprising levels of inequality were not improved and it was even worse in some Arab countries.

Social justice was a focal point behind the upheaval inflicted the Arab world notwithstanding the moderate to low rates of inequality reported in the Arab countries during the decade before Arab uprising. This contradiction is explained by the assumption that observed levels of inequality reported by conventional measures miss a large portion of inequality represented by inequality of opportunity. In order to observe the changes in levels of inequality of opportunity in a sample of Arab countries before and after Arab uprisings, chapter 3 is intended to provide a parametric estimate of unfair inequality using data on responsibility and non-responsibility factors needed to explain inequalities of opportunity. The theoretical and empirical approaches employed chapter 3 allow for evaluating repercussions of policy reforms conducted after Arab uprisings in the purpose of equalizing opportunities. Particularly educational policy interventions represented by increases of public expenditure on education.

The main findings resulted by the national-level analysis of unfair Gini index revealed that levels of unfair Gini index are higher than standard Gini index. These results indicate that the actual income distribution in our sample of Arab countries are far from fair income distribution compared to the distribution of the average income. Whether before or after Arab uprisings, actual income is far from fair income in all regions of Egypt and Tunisia. Thus, according to the theory and principles of inequality of opportunity redistribution of resources using equalizing policies are mandatory to be reflected on levels of individual effort.

Alongside the national-level analysis, the regional-level Oaxaca decomposition analysis in both of Egypt and Tunisia emphasize the small contribution of effort variable relative to circumstances variables in explaining wage differences. Fair income equation that included net effort variable also confirmed the insignificant, and sometimes the absent, contribution of the policy variable on level individual effort.

The large heterogeneity in the effect of educational policy reforms on levels of effort exerted emphasizes the differential in reward schemes for individual effort across regions. Differentials in the magnitude of contribution of effort variable to wage equation indicate the cross-regional differentials in level of unfairness in reward schemes. According to the principles of inequality of opportunity, advising equalizing redistributive policies should be conducted at decentralized pattern according to contextual specificities of each region including reforms of educational sector. Merely increasing public spending on education did not contribute to reducing wage differentials entailed by circumstances. Nor did it contribute to altering levels of individual effort exerted. Reforms were insufficient in reducing unfair inequality of opportunity nor did they motivate citizens to exert more effort due to the insufficient reward schemes. Policies that upgrade the quality of education could be more effective particularly for dwellers of disadvantaged regions with less access to educational

facilities like internet connection and ownership of technologies required for better quality of education.

REFERENCES

- Aaberge, R., Mogstad, M., Peragine, V.:2010 “Measuring Long-term Inequality of Opportunity”, **Society for the Study of Economic Inequality**, Working Paper ECINNQ 158.
- Abu-Ismaïl, K., and Al-Kiswani, B. :2018a “Multidimensional Poverty in the Poorest Parts of the MENA: Agenda for action”, The Forum ERF Policy Portal, **Economic Research Forum**, Cairo.
- Abu-Ismaïl, K., and Al-Kiswani, B. :2020 ‘Poverty and Vulnerability in the MENA Region’, in Hakimian, H. (ed., 2020), **Handbook on the Middle East Economy**, London and New York: Routledge.
- Akkari, A.: 2105 “Education in the Middle East and North Africa”, **International Encyclopedia of the Social and Behavioral Sciences**, 2nd Ed.
- Almas, I., Cappelen, A.W., Lind, J.T., Sorensen, E.O., Tungodden, B. :2011 “Measuring the Unfair (In)equality”, **Journal of Public Economics**, Vol. 95, No. 7-8, pp. 488-499.
- Ansani, A., and Daniele, V.:2012 “About Revolution: The Economic Motivations of the Arab Spring”, **International Journal of Development and Conflict**, Vol.2, No. 3, pp. 20-45.
- Arampatzi, E., Burger, M., Lanchovichina, E., Rohricht, T., and Veenhoven, R.: 2018 “Unhappy Development: Dissatisfaction with Life on the Eve of the Arab Spring”, **The Review of Income and Wealth**, Vol. 64, No. 1, pp. 80-113.
- Assaad, R., Krafft, C., Roemer, J., and Salehi-Isfahani, D.:2016 “Inequality of opportunity in income and consumption: The Middle East and North Africa region in comparative perspective”, **Working Paper 1003, Economic Research Forum**, Cairo.
- Alwang, J., Siegel, P., B., and Jorgensen, S., L.:2001 “Vulnerability: A View from Different Disciplines”, **Social Protection Discussion Papers and Notes**, 23304, The World Bank. Washington DC.
- Amemiya, T.:1977 “The maximum likelihood estimator and the Non-linear Three-stage Least Squares Estimator in the General Nonlinear Simultaneous Equation Model”, **Econometrica**, Vol.45, pp. 955-968.

- Andriopoulou, E., and Tsakloglou, P.:2011 “The Determinants of Poverty Transitions in Europe and the Role of Duration Dependence”, **IZA, Discussion Paper** No. 5692.
- Al-Furaiji, M., H., O., Karim, U. F. A., Augustijn, D., C., M., Waisi, B., I., H., and Hulscher, S., J., M., H.:2016 “Evaluation of Water Demand and Supply in the South of Iraq”, **Journal of Water Reuse and Desalination**, Vol. 6, No. 1, pp. 2014-226.
- Allan, J. A.:1994 “Overall Perspectives on Countries and Regions”. **In Water in the Arab World: Perspectives and Prognoses**. Edited by P. Rogers and P. Lydon. Cambridge, MA: Harvard University Press.
- Allan, J. A.:1996 “The political Economy of Water: Reasons for Optimism but Long-term Caution’. **In Water, Peace and the Middle East: Negotiating Resources in the Jordan Basin**. Edited by J. A. Allan. London: Tauris Academic Publications.
- Allan, J. A.:2001 “**The Middle East Water Questions. Hydropolitics and the Global Economy**”. London: IB Tauris.
- Allison, R., A., and Foster, J., E.:2004 “Measuring Health Inequality Using Qualitative Data”, **Journal of Health Economics**, Vol. 23, No.3, pp. 505 – 524.
- Antonelli, M., F. Laio, and S. Tamea.:2017 “Water Resources, Food Security and the Role of Virtual Water Trade in the MENA Region.” **In Governance of Environmental Change within a Human Security Perspective**, edited by M. Behnassi. Springer.
- Atkinson, A. B. and Bourguignon, F.: 2000 “Introduction: Income Distribution and Economics”, in A. B. Atkinson and F. Bourguignon (eds) **Handbook of Income Distribution**, Vol. 1, pp. 1–58, Amsterdam: Elsevier Science.
- Bhaya A. G.: 2019 “**Egypt’s Failure to Curb Poverty**”, Central Agency for Public Mobilization and Statistics
- Bloch, K., Lopez-Calva, L., F., and Ortiz-Juarez, E.:2021 “When Life gives you Lemons: Using Cross-sectional Surveys to Identify Chronic Poverty in the Absence of Panel Data”, **Review of Income and Wealth**. <https://doi.org/10.1111/roiw.12566>.

- Berglöf, E., and S. Devarajan.:2015 “Water for Development: Fulfilling the Promise.” **In Water for Development—Charting a Water Wise Path**, edited by A. Jägerskog, T. J. Clausen, T. Holmgren, and K. Lexén.
- Betts, J. and Roemer, J., E.:2001 “Equalizing Opportunities Through Educational Finance Reform”, Discussion Paper, **Institute for Social and Policy Studies**, Yale University.
- Bowles, S.:1973 “Understanding Unequal Economic Opportunity”, Paper and Proceedings of Annual Meeting of the **American Economic Association**, pp.346-356.
- Campante, F. R., and D. Chor.:2012 “Why Was the Arab World Poised for Revolution? Schooling, economic opportunities, and the Arab Spring”, **Journal of Economic Perspectives**, Vol. 26, No.2, pp. 167–188.
- Canavan, K.:2016 “Education Reform 2016-2020: Building a Better Future for Students in Tunisia?”, **White Book Nawaat**. Tunis.
- Carpantier, J., and Sapata, C.: 2012 “An ex-post View of Inequality of Opportunity in France and its Regions”, Working Paper No. 1211, **Department of Applied Economics at Universitat Autònoma**, Barcelona.
- Claussen, J., Kiernana, M., and Gramshaug, R. :2013 “Public Expenditure Review of Education in Palestine, Final Report”, **Publications of Talal Abu-Ghazaleh & Co International**.
- Conlisk, J.: 1974 “Can Equalization of Opportunity Reduce Social Mobility?”, **American Economic Review**, Vol. 64, No.1, pp. 80-90.
- Cohen, G., A.:1983 “The Structure of Proletarian Unfreedom”, **Philosophy and Public Affairs**, Vol. 12, No. 1, pp. 3-33.
- Cowell, F., and Flachaire, E.:2011 “Measuring Mobility”, **ECIEQ Working Paper No. 199**, ECIEQ Society for the Study of Economic Inequality.
- Cowell, F., and Chen, Y.:2015 “Mobility in China”, **Review of Income and Wealth**, Vol. 63, No.2, pp.203-218.
- Cowell, F., and Flachaire, E.:2017 “Inequality with Ordinal Data”, **Economica**, Vol. 84, pp. 290-321.

- Cowell, F., and Flachaire, E.:2018 “Measuring Mobility”, **Quantitative Economics**, No. 9, pp., 865–901.
- Clark, A., E., Frijters, P., and Shields, M., A.:2008 “Relative Income, Happiness, and Utility: An Explanation for Easterlin Paradox and other Puzzles”, **Journal of Economic Literature**, Vol. 46, No. 1, pp. 95-144.
- Chaudhuri, S.:2000 “Empirical Methods for Assessing Household Vulnerability to Poverty, mimeo”, **Department of Economics**, Columbia University, New York.
- Chaudhuri, S., Jalan, J., and Suryahadi, A.:2002 “Assessing Household Vulnerability to Poverty from Cross-sectional Data. A Methodology and Estimates from Indonesia”, **Discussion Paper No. 0102-52**. New York: Columbia University.
- Chiwaula, L., Witt, R. and Waibel, H.:2011 “An Asset-based Approach to Vulnerability: The Case of Small-scale Fishing Areas in Cameroon and Nigeria”, **Journal of Development Studies**, Vol.47, No. 2, pp. 338–353.
- Christiaensen, L. and Boisvert, R.:2000 “On Measuring Household Food Vulnerability: Case Evidence from Northern Mali”, **Department of Applied Economics and Management Working Papers WP-2000-05**, Cornell University.
- Cruces, G., Lanjouw P., Lucchetti, L., Perova, E., Vakis, R., and Viollaz, M.:2015 “Estimating Poverty Transition Using Repeated Cross-sections: A three-country Validation Exercise”, **Journal of Economic Inequality**, Vol. 13, pp. 161-179.
- Dang. H., A., and P. Lanjouw.:2013 “Measuring Poverty Dynamics with Synthetic Panels Based on Cross-Sections”, **World Bank Policy Research Working Paper No. 6504**, World Bank, Washington DC.
- Dang, H., A., Lanjouw, P., Luoto, J., and McKenzie, D.:2014 “Using Repeated Cross-sections to Explore Movements into and out of Poverty”, **Journal of Development Economics**, Vol. 107, Issue C, pp. 112-128.
- Dang. H., and P. Lanjouw.:2018 “Poverty Dynamics in India between 2004- 2012: Insights from Longitudinal Analysis Using Synthetic Panel Data”, **Economic Development and Cultural Change**, Vol. 67, No. 1.

- D'Ambrosio, C., Frick, J. R.:2004 “Subjective well-being and Relative Deprivation: An Empirical Link”, **IZA Discussion Paper No. 1351**, Bonn, Germany.
- Dercon, S., J. Hoddinott, and T. Woldehanna.:2005 “Consumption and Shocks in 15 Ethiopian Villages, 1999-2004”, **Journal of African Economies**, Vol. 14, No. 4, pp. 559-585.
- Dridi, M.:2021 “Tunisia Facing Increasing Poverty and Regional Inequalities”, **Carnegie Endowment for International Peace**, <https://carnegieendowment.org/sada/85654>.
- Dworkin, R.:1981a “What is Equality? Part 1: Equality of Welfare”, **Philosophy and Public Affairs**. Vol: 10, No:3, pp.185-246.
- Dworkin, R.:1981a “What is Equality? Part 1: Equality of Resources”, **Philosophy and Public Affairs**. Vol: 10, No:4, pp.283-345.
- Elbers, C., J.O. Lanjouw, and P. Lanjouw.:2003 “Micro-level Estimation of Poverty and Inequality”, **Econometrica**, Vol. 71, No. 1, pp 355–364.
- Foster, J. E. and Shorrocks A. F.:1991 “Subgroup Consistent Poverty Indices”, **Econometrica**, No. 59, Vol. 3, pp. 687-70.
- Fuente, D., J. Gakii Gatua, M. Ikiara, J. Kabubo-Mariara, M. Mwaura, and D. Whittington. :2016 “Water and Sanitation Service Delivery, Pricing, and the Poor: An Empirical Estimate of Subsidy Incidence in Nairobi, Kenya”, **Water Resources Research** 52: 4845–62.
- Ferreira, F.H.G., J. Messina, J. Rigolini, L.-F. López-Calva and R. Vakis.:2013 “Economic Mobility and the Rise of the Latin American Middle Class”, **World Bank Latin American and Caribbean Studies**, Washington DC.
- Gallaher, M.:2012 “Jordan: Public Expenditure Perspectives”, **Development Technical System Incorporation, USAID/Jordan**, Fiscal Reform II Project.
- Ghanem, H.:2016 “Roots of the Arab Spring”. In **The Arab Spring Five Years Later: Toward Greater Inclusiveness** (pp. 39-64). Washington, D.C.: Brookings Institution Press.
- Gelvin, J. L.:2013 “Conclusion: the Arab World at the Intersection of the National and Transnational”. In Reibman, M,

- (ed.), **The Arab Spring: Change and Resistance in the Middle East**, pp. 238-255.
- Glewwe, P., and Hall, G.:1998 "Are Some Groups More Vulnerable to Macroeconomic Shocks than Others? Hypothesis Tests Based on Panel Data from Peru", **Journal of Development Economics**, Vol. 56, No. 1, pp. 181-206.
- Garcia, N., I. Harrison, N. Cox, and M. F. Tognelli.: 2015 **"The Status and Distribution of Freshwater Biodiversity in the Arabian Peninsula"**, Technical Report, IUCN
- Gelil, I. A.: 2014 "Proposal for an Arab Strategic Framework for Sustainable Development, 2015–2025", **Arab High Level Forum on Sustainable Development**, Economic and Social Commission for Western Asia (ESCWA), United Nations, Amman, April 2–4.
- Gordon, M.: 2018 "Forecasting Instability: The Case of the Arab Spring and the Limitations of Socioeconomic Data". **Wilson Center Middle East Program**.
- Graham, C. & Lora, E.:2009 "Happiness and Health Satisfaction Across Countries". In Graham, C. & Lora, E. (Eds.) **Paradox and Perception: Measuring Quality of Life in Latin America**. Washington DC: Brookings Institution Press.
- Gravel, N., Magdalou, B. and Moyes, P.:2014 "Ranking Distributions of an Ordinal Attribute", **AMSE Working Paper no. 2014-50**, Aix-Marseille School of Economics.
- Grey, D., and C. Sadoff.: 2007 "Sink or Swim? Water Security for Growth and Development", **Water Policy 9 (6)**: 545–71.
- Hammond, P. J. :1976 "Equity, Arrow's Conditions and Rawls' Difference Principle", **Econometrica**, Vol. 44, pp.793–803.
- Hassine, N.:2016 "Economic Inequality in the Arab region". **Policy Research Working Paper; No. 6911**. World Bank, Washington, DC. World Bank.
- Hoddinott, J. and Quisumbing, A.:2003 "Methods of Microeconometric Risk and Vulnerability Assessments", **Social Protection Discussion Paper Series 0324**, World Bank, Washington DC.

- Herrnstein, R.:1971 “I.Q.”, **The Atlantic Monthly**, September, pp.43–64.
- Ianchovichina, E., Mottaghi, L., and Devarajan S.:2015 “Inequality, Crisis, and Conflict in the Arab World”, **Middle East and North Africa (The MENA) Economic Monitor**. Washington, D.C.: World Bank Group.
- Iqbal, F. and Kiendrebeogo, Y. :2014a “Education Attainment in the Middle East and North Africa: Success at a Cost”, **Policy Research Working Paper; No. 7127**. World Bank Group, Washington, DC.
- Iqbal, F. and Kiendrebeogo, Y. :2014b “The Reduction of Child Mortality in the Middle East and North Africa: A Success Story”, **Policy Research Working Paper; No. 7023**. World Bank Group, Washington, DC.
- Jensen, A.:1969 “How Much Can We Boost IQ and Academic Achievement?”, **Harvard Educational Review**, No. 39, pp. 1–123.
- Johannesen, N.:2015 “Economic Inequality in the MENA Countries – Evidence from Cross-Border Deposits,” **mimeo, IMF Library**.
- Kalmijn, W., and Veenhoven, R.:2005 “Measuring Inequality of Happiness in Nations: In Search for Proper Statistics”, **Journal of Happiness Studies**, Vol. 6, pp. 357-396.
- Khoury, R.:2019 “Poverty, Inequality, and the Structural Threat to the Arab Region, Analysis and Opinions – Project on Middle East Political Science”, **Harvard Kennedy School – Belfer Center for Science and International Affairs**.
- Krafft, C., and El-Kogali, S.:2014 “Inequality in Early Childhood Development in the Middle East and North Africa”, **Working Paper 856**, Economic Research Forum, Cairo.
- Kummu, M., H. de Moel, M. Porkka, S. Siebert, O. Varis, and P. J. Ward.: 2012 “Lost Food, Wasted Resources: Global Food Supply Chain Losses and Their Impacts on Freshwater, Cropland and Fertilizer Use”, **Science of the Total Environment**, 438: 477–89.
- Lagi, M., Bertrand, K., Z., and Bar-Yam, Y.: 2011 “The Food Crises and Political Instability in North African and the Middle East”, Cambridge: New England Complex Systems Institute, **SSRN Electronic Journal**.

- Lambert, P. J. and Aronson, R. J.:1993 "Inequality Decomposition Analysis and the Gini Coefficient Revisited", **Economic Journal**, Vol. 103, No. 420, pp. 1221–1227.
- Lavieren, H., J. Burt, D. A. Feary, G. Cavalcante, E. Marquis, L. Benedetti, C. Trick, B. Kjerfve, and P. F. Sale.:2011 "Managing the Growing Impacts of Development on Fragile Coastal and Marine Ecosystems: Lessons from the Gulf", **A Policy Report. Hamilton, Ontario, Canada: UNU-INWEH** (United Nations University-Institute of Water, Environment, and Health).
- Ligon, E. and Schechter, L.:2003 "Measuring Vulnerability", **The Economic Journal**, Vol.113, No. 486, pp. 95–102.
- Lucchetti, L.:2018 "What Can We (Machine) Learn About Welfare Dynamics from Cross-sectional Data?", **Policy Research Working Paper; No. 8545**. World Bank, Washington, DC.
- Luciani, G.:2106 "**On the Economic Causes of Arab Spring and its Possible Development. In Oil States in The New Middle East: Uprising and Stability**", pp. 188-204. New York, Routledge: Taylor and Francis Group.
- Masri, S. M.: 2019 "Repairing Tunisia's Education System is Key to Tackling its Economic Woes", **An Update on Middle Eastern Development by Moshe Dayan Center**, Vol. 14, No. 8.
- McKernan S., M, and Ratcliffe, C. E. :2002 "Transition Events in the Dynamics of Poverty", **The Urban Institute**, SSRN Electronic Journal. [DOI:102139/ssrn, 2205860](https://doi.org/10.2139/ssrn.2205860)
- Ncube, M., and Anyanwn, J.: 2012 "Inequality and Arab Spring Revolution in North Africa and the Middle East", **Africa Economic Brief**, African Development Bank, Vol. 3, No. 7, pp. 1-24.
- Oaxaca, R.:1973 "Male-Female Wage Differentials in Urban Labor Markets", **International Economic Review**, Vol: 14, No. 3, pp. 693-709.
- Pedersen, A. W.:2004 "Inequality as Relative Deprivation: A Sociological Approach to Inequality Measurement", **Acta Sociologica**, Vol. 47, No. 1, pp. 31-49.
- Pritchett, L., Suryahadi, A. and Sumarto, S.: 2000 "Quantifying Vulnerability to Poverty: a Proposed Measure Applied to Indonesia", **Policy Research**

- Working Paper No. 2437**, The World Bank, Washington, DC.
- Quick, A., Delvin, S.:2018 “Measuring Well-being Inequality: Working Paper on the Selection of a Headline Indicator”, **Office of National Statistics**, New Economics Foundation, Paper No. 1055254, London, UK.
- Rawls, J.:1971 “A Theory of Justice”, Harvard University Press, Cambridge, MA.
- Ragione, T.: 2020 “Mechichi in Power: Can the New Government Deal with the Challenges”, **Arab Center for Research and Policy Studies**, Washington D. C.
- Roemer, J., E.:1998 “**Equality of Opportunity**”, Cambridge MA: Harvard University Press.
- Roemer J., E.: 2002) “To What Extent Do Fiscal Regimes Equalize Opportunities for Income Acquisition Among Citizens?”, **Journal of Public Economics**, Vol. 87, pp. 539-565.
- Roemer, J. E., and Trannoy, A.:2016 “Equality of Opportunity: Theory and Measurement”, **Journal of Economic Literature**, Vol.54, No.4, pp. 1288-1332.
- Revenge, A., Marie-Nelly, M., F., Bidani, B., and Cuesta, J.: 2016 “**Tunisia Poverty Assessment 2015**” World Bank, Washington, DC.
- Runciman, W. G.:1966 “**Relative Deprivation and Social Justice: A Study of Attitudes to Social Inequality in Twentieth-Century England**”, London: Routledge & Kegan Paul.
- Saczewska-Piotrowska. A.: 2014 “Analysis of Poverty Transitions in Poland Using Multilevel Discrete-Time Event History Models”, **Applications of Mathematics and Statistics in Economics**, International Scientific Conference, Poland.
- Sadoff, C. W., J. W. Hall, D. Grey, J. C. J. H. Aerts, M. Ait-Kadi, C. Brown, A. Cox, S. Dadson, D. Garrick, J. Kelman, P. McCornick, C. Ringler, M. Rosegrant, D. Whittington, and D. Wiberg. :2015. “Securing Water, Sustaining Growth”, **Report of the GWP/OECD Task Force on Water Security and Sustainable Growth**. Oxford, U.K.: University of Oxford.

- Salehi-Isfahani, D., Hassine, N., and Ragui, A.: 2012 "Equality of Opportunity in Educational Achievement in the Middle East and North Africa", **Working Paper 689**, Economic Research Forum, Cairo.
- Sarra, A.:2020 "Tunisia Accelerating Economic Challenges", **Carnegie Endowment for International Peace**, Washington D.C.
- Schoder, J.: 2014 "Measuring Inequality with Ordinal Data: Cross-Disciplinary Review of Methodologies and Application to Life Satisfaction in Europe", **Technical Report of Working Group Geography**, Department of Geography and Geology, University of Salzburg, Austria.
- Sen, A.:1976 "Poverty: An Ordinal Approach to Measurement", **Econometrica**, Vol. 44, No. 2, pp. 219-231.
- Sen, A. K.:1983 "Poor, Relatively Speaking", **Oxford Economic Papers**, New Series, Vol.35, No.2, pp. 153–69.
- Sen, A. K.:1985 "A Sociological Approach to the Measurement of Poverty, A Reply to Professor Peter Townsend", **Oxford Economic Papers**, Vol.37, No. 4, pp. 669-676.
- Seth, S. and Alkire, S.:2014 "Measuring and Decomposing Inequality among the Multidimensionally Poor Using Ordinal Data: A Counting Approach", **OPHI Working Papers 68**. **Oxford**: University of Oxford.
- Seth, S., and Yalonetzky, G.: 2020 "Assessing Deprivation with an Ordinal Variable: Theory and Application to Sanitation Deprivation in Bangladesh", **Policy Research Working Paper**; No. 9120. World Bank, Washington, DC.
- Smeeding, T. M.: 2009 "New Comparative Measures of Income, Material Deprivation, and Well-being", **Journal of Policy Analysis and Management**, Vol. 28, No. 4, pp. 745-752.
- Stouffer, S. A., Suchman, E. A., DeVinney, L. C., Star, S. A. and Williams, R. M.:1949 "The American Soldier: Adjustment During Army Life", **Social Force**, Vol. 1, pp. 559- 675. Princeton, NJ: Princeton University Press.
- Sungur, E, A.: 2007 "Dependence Information in Parameterized Copulas", **Communication in Statistics Simulation Computation**, Vol. 19, No. 4, pp. 1339–1360.

- Tesliuc, E. and Lindert, K.:2002 “Vulnerability: a Quantitative and Qualitative Assessment”, **Guatemala Poverty Assessment Program**, World Bank, Washington DC, pp. 1-91.
- Townsend, P.:1979 “**Poverty in the United Kingdom**”. London: Penguin.
- Tropp, H., and A. Jägerskog.: 2006 “Water Scarcity Challenges in the Middle East and North Africa”, **Occasional Paper 2006/31 for the Human Development Report 2006**. United Nations Development Programme, New York City.
- UNICEF and WHO (United Nations Children’s Fund and World Health Organization.): 2015. “Keeping Up with Population Growth.” In Progress on Sanitation and Drinking Water 2015. Update and MDG Assessment. Geneva: WHO Press.
- Van der Weide, R., Lakner, C., & Ianchovichina, E. :2015 “Is Inequality Underestimated in Egypt? Evidence from House Prices”, **Review of Income and Wealth**, Vol. 64, No. 1, pp. 55-79.
- Whittington, D., Nauges, D. Fuente, and X. Wu.: 2015. “A Diagnostic Tool for Estimating the Incidence of Subsidies Delivered by Water Utilities in Low- and Medium-Income Countries, with Illustrative Simulations”, **Utilities Policy** 34: 70–81
- World Bank. :2007 “Making the Most of Scarcity: Accountability for Better Water Management Results in the Middle East and North Africa”, **MENA Development Report**. Washington, DC: World Bank.
- World Bank.: 2018 “Beyond Scarcity: Water Security in the Middle East and North Africa”, **MENA Development Report**; Washington, DC: World Bank.
- World Economic Forum.: 2015 “**Global Risks 2015 10th ed.**”, Geneva: World Economic Forum.
- Yerkes, S.:2020 “Tunisia’s Perennial Priorities”, **Carnegie Middle East Center**, Washington D.C.
- Zekri, S., M. Ahmed, R. Chaieb, and N. Ghaffour.: 2014 “Managed Aquifer Recharge Using Quaternary-Treated Wastewater: An Economic Perspective”, **International Journal of Water Resources Development**, 30 (2): 246–61.

DATA REFERENCES

Egypt - Household Income, Expenditure, and Consumption Survey, HIECS 2015	OAMDI, 2017. Harmonized Household Income and Expenditure Surveys (HHIES), http://erf.org.eg/data-portal/ . Version 2.0 of Licensed Data Files; HIECS 2015 - Central Agency for Public Mobilization and Statistics (CAPMAS). Egypt: Economic Research Forum (ERF).
Egypt - Household Income, Expenditure, and Consumption Survey, HIECS 2012/2013	OAMDI, 2014. Harmonized Household Income and Expenditure Surveys (HHIES), http://erf.org.eg/data-portal/ . Version 2.0 of Licensed Data Files; HIECS 2012/2013 - Central Agency for Public Mobilization and Statistics (CAPMAS). Egypt: Economic Research Forum (ERF).
Egypt - Household Income, Expenditure, and Consumption Survey, HIECS 2008/2009	OAMDI, 2014. Harmonized Household Income and Expenditure Surveys (HHIES), http://erf.org.eg/data-portal/ . Version 2.0 of Licensed Data Files; HIECS 2008/2009 - Central Agency for Public Mobilization and Statistics (CAPMAS). Egypt: Economic Research Forum (ERF).
Iraq - Household Socio-Economic Survey, IHSES 2012	OAMDI, 2016. Harmonized Household Income and Expenditure Surveys (HHIES), http://erf.org.eg/data-portal/ . Version 2.0 of Licensed Data Files; IHSES 2012- Central Organization for Statistics (COS). Egypt: Economic Research Forum (ERF).
Iraq - Household Socio-Economic Survey, IHSES 2006/2007	OAMDI, 2016. Harmonized Household Income and Expenditure Surveys (HHIES), http://erf.org.eg/data-portal/ . Version 2.0 of Licensed Data Files; IHSES 2006/2007- Central Organization for Statistics and Information Technology (COSIT). Egypt: Economic Research Forum (ERF).
Jordan - Household Expenditure and Income Survey, HEIS 2013	OAMDI, 2017. Harmonized Household Income and Expenditure Surveys (HHIES), http://erf.org.eg/data-portal/ . Version 2.0 of Licensed Data Files; HEIS 2013 - Department of Statistics (DOS), The Hashemite Kingdom of Jordan. Egypt: Economic Research Forum (ERF).
Jordan - Household Expenditure and Income Survey, HEIS 2010	OAMDI, 2014. Harmonized Household Income and Expenditure Surveys (HHIES), http://erf.org.eg/data-portal/ . Version 2.0 of Licensed Data Files; HEIS 2010 - Department of Statistics (DOS), The Hashemite Kingdom of Jordan. Egypt: Economic Research Forum (ERF).
Jordan - Household Expenditure and Income Survey, HEIS 2008	OAMDI, 2014. Harmonized Household Income and Expenditure Surveys (HHIES), http://erf.org.eg/data-portal/ . Version 2.0 of Licensed Data Files; HEIS 2008 - Department of Statistics (DOS), The Hashemite Kingdom of Jordan. Egypt: Economic Research Forum (ERF).
Tunisia - National Survey on Household Budget, Consumption and Standard of Living, EBCNV 2010	OAMDI, 2014. Harmonized Household Income and Expenditure Surveys (HHIES), http://erf.org.eg/data-portal/ . Version 2.0 of Licensed Data Files; EBCNV 2010 - National Institute of Statistics (INS), Tunisia. Egypt: Economic Research Forum (ERF).
Tunisia - National Survey on Household Budget, Consumption and Standard of Living, EBCNV 2005	OAMDI, 2014. Harmonized Household Income and Expenditure Surveys (HHIES), http://erf.org.eg/data-portal/ . Version 2.0 of Licensed Data Files; EBCNV 2005 - National Institute of Statistics (INS), Tunisia. Egypt: Economic Research Forum (ERF).

Palestine - Labor Force Survey, LFS 2015	OAMDI, 2019. Harmonized Labor Force Surveys (HLFS), http://erf.org.eg/data-portal/ . Version 1.0 of Licensed Data Files; LFS 2015- Palestinian Central Bureau of Statistics (PCBS). Egypt: Economic Research Forum (ERF).
Egypt - Labor Force Survey, LFS 2015	OAMDI, 2018. Harmonized Labor Force Surveys (HLFS), http://erf.org.eg/data-portal/ . Version 1.0 of Licensed Data Files; LFS 2015- Central Agency for Public Mobilization and Statistics (CAPMAS). Egypt: Economic Research Forum (ERF).
Jordan - Employment and Unemployment Survey, EUS 2016	OAMDI, 2017. Harmonized Labor Force Surveys (HLFS), http://erf.org.eg/data-portal/ . Version 1.0 of Licensed Data Files; EUS 2016 - Department of Statistics (DOS), The Hashemite Kingdom of Jordan. Egypt: Economic Research Forum (ERF).
Tunisia - National Survey on Population and Employment, ENPE 2012	OAMDI, 2017. Harmonized Labor Force Surveys (HLFS), http://erf.org.eg/data-portal/ . Version 1.0 of Licensed Data Files; ENPE 2012 - National Institute of Statistics (INS), Tunisia. Egypt: Economic Research Forum (ERF).
<u>Jordan - Employment and Unemployment Survey, EUS 2012</u>	OAMDI, 2016. Harmonized Labor Force Surveys (HLFS), http://erf.org.eg/data-portal/ . Version 1.0 of Licensed Data Files; EUS 2012 - Department of Statistics (DOS), The Hashemite Kingdom of Jordan. Egypt: Economic Research Forum (ERF).
Egypt - Labor Force Survey, LFS 2012	OAMDI, 2016. Harmonized Labor Force Surveys (HLFS), http://erf.org.eg/data-portal/ . Version 1.0 of Licensed Data Files; LFS 2012- Central Agency for Public Mobilization and Statistics (CAPMAS). Egypt: Economic Research Forum (ERF).
Tunisia - National Survey on Population and Employment, ENPE 2013	OAMDI, 2016. Harmonized Labor Force Surveys (HLFS), http://erf.org.eg/data-portal/ . Version 1.0 of Licensed Data Files; ENPE 2013 - National Institute of Statistics (INS), Tunisia. Egypt: Economic Research Forum (ERF).
<u>Jordan - Employment and Unemployment Survey, EUS 2008</u>	OAMDI, 2015. Harmonized Labor Force Surveys (HLFS), http://erf.org.eg/data-portal/ . Version 1.0 of Licensed Data Files; EUS 2008 - Department of Statistics (DOS), The Hashemite Kingdom of Jordan. Egypt: Economic Research Forum (ERF).
Palestine - Labor Force Survey, LFS 2008	OAMDI, 2015. Harmonized Labor Force Surveys (HLFS), http://erf.org.eg/data-portal/ . Version 1.0 of Licensed Data Files; LFS 2008 - Palestinian Central Bureau of Statistics (PCBS). Egypt: Economic Research Forum (ERF).
Egypt - Survey of Young People in Egypt, SYPE 2009	"Population Council, 2009. Survey of Young People in Egypt dataset, SYPE 2009. [Computer file]. Cairo, Egypt: OAMDI; Economic Research Forum (distributor)."

Haerpfer, C., Inglehart, R., Moreno, A., Welzel, C., Kizilova, K., Diez-Medrano J., M. Lagos, P. Norris, E. Ponarin & B. Puranen et al. (eds.). 2020.

Inglehart, R., C. Haerpfer, A. Moreno, C. Welzel, K. Kizilova, J. Diez-Medrano, M. Lagos, P. Norris, E. Ponarin & B. Puranen et al. (eds.). 2014.

Inglehart, R., C. Haerpfer, A. Moreno, C. Welzel, K. Kizilova, J. Diez-Medrano, M. Lagos, P. Norris, E. Ponarin & B. Puranen et al. (eds.). 2014

World Values Survey: Round Seven - Country-Pooled Datafile.
Madrid, Spain & Vienna, Austria: JD Systems Institute & WVSA Secretariat. doi.org/10.14281/18241.13

World Values Survey: Round Six - Country-Pooled Datafile
Version: www.worldvaluessurvey.org/WVSDocumentationWV6.jsp.
Madrid: JD Systems Institute.

World Values Survey: Round Five - Country-Pooled Datafile
Version: www.worldvaluessurvey.org/WVSDocumentationWV5.jsp.
Madrid: JD Systems Institute.



CV

Shlair A. Al-Zanganeh

Summary

Fulbright scholar, PhD Candidate, Master of Social & Applied Economics, Master of Science in Economics and Finance. 5+ years working experience with transnational corporations in the Middle East in project management, logistics, contracting, sales and marketing, 6 years teaching experience. Solid multi-cultural communication skills and knowledge of cultural diversity and business ethics in the Middle East area. Seeking teaching and training position in NGOs and training centers.

Education

PhD Candidate - Economics

May 2018

Istanbul University
Turkey

Istanbul,

Master of Science – Social & Applied Economics

Apr 2014

Wright State University

Ohio, USA

Graduate work focused on pluralistic approach to economic phenomena and the interdisciplinary perspective of heterodox economics to the economic development process that incorporates sociology, politics, and anthropology in economic analysis.

Fulbright Scholar

Recipient, 2013 Outstanding Student, Department of Economics

Graduate member in recognition of high scholastic achievement in the field of economics, Omicron Delta Epsilon (ODE) – The International Honor Society of Economics, nominated by the faculty members in the Department of Economics

Master of Science – Economics & Finance

Jun 2010

University of Kurdistan – Hewler

Erbil, Iraq

Graduate program was a market-oriented approach to the economic phenomena, focused on the applications of financial economics in business transactions.

Passed dissertation with distinction: Iraq's Economy, Oil Price Fluctuations Impact

BSc- Economics

Jun 1999

University of Damascus

Damascus,

Syria

Teaching & Training Experience

American Culture Centre

Istanbul-Turkey

Jul 2017 – Mar 2020

Development Capacity Trainer

Conducting development capacity courses for business executives and employees of corporates.

Courses are designated according to corporates' needs covering various topics like communication, interpersonal skills, business correspondences and business management strategies.

International University of Erbil

Erbil, Iraq

Sep 2017-Jul 2018

Ishik University

Erbil, Iraq

Sep 2014-Jul 2017

SABIS University

Erbil, Iraq

Sep 2010-Jul 2012

Instructor-College of Business and Management Studies

Conducted interactive teaching sessions that allow for more students participation

Incorporated up-to-date software and innovative technology applications in the course material that allow for more access to database management tools and bookkeeping practices.

Dedicated office hours for further discussions on research potentials, and for providing guidelines of appropriate citations styles

Conducted extra class sessions held for helping struggling students by providing foundational and elementary levels of calculus, derivatives, and other mathematical and statistical skills

Curricula development, selecting up-to-date course material, textbooks, and further enhancing references

Developed courses syllabi and pacing charts

Participated in proctoring and fulfilled exam committee assessment practices

Conducted individual academic advising to helped students selecting core and elective courses according to each student's preferences, areas of interest, and professional orientation

Courses Taught: Principles of Microeconomics, Principles of Macroeconomics, Principles of Accounting, Intermediate Accounting, Quantitative Methods of Business Decisions, Principles of Financial Management, Introductory Business Management, Business Statistics, and Business Math.

International Business Experience

AREVA T&D

Damascus,

Syria

Project Assistant

Jul 2005 –

Oct 2006

Project administration utilizing multi-tasking skills, including monitoring fulfillment of project activities on behalf of project managers and disseminating project information on timely basis to subcontractors, clients, and staff members in different locations

Conducting financial planning, budgeting, and ratio analysis

Developed financial pacing charts and cash flow reports and statements

Implemented extensive time management skills and high level of accuracy and punctuality to arrange logistics necessary for the accomplishment of the project multiple phases in different locations

Coordinated provisioning of required supplies shipped from multiple international regions to project locations on timely basis; met project deadlines, guaranteed smooth progress of work with no interruptions
 Maintained analytical skills to diagnose problems and devise viable solutions
 Sustained ability to remain unflustered during frenzied periods like tax seasons proved my ability to work well under pressure

Siemens AG
 Syria
Project Assistant
 Jun 2005

Damascus,
 Mar 2004 –

Developed financial statements that comply with governmental rules and regulations
 Prepared tax reports, financial reports of legal fees, and other financial liabilities
 Utilized extensive interpersonal and communications skills to develop productive work relationships with clients and subcontractors; employed listening and interviewing skills to extract key information from clients
 Administered and audited data gathering and input into databases and monitored the compliances with the government contracting regulations
 Organized project committee meetings with public entities' representatives and prepared the necessary reports and agendas

ExxonMobil
 Syria
Sales & Marketing Coordinator
 Mar 2004

Damascus,
 Nov 2001 –

Supervised implementation of strategies and plans developed by sales and marketing executives to achieve corporate objectives for products and services, in addition to the stated objectives of revenue, profitability and market share
 Supported Sales Team by providing forecasts, market trends, new production information, pre-sales, post-sales and contract support
 Maintained high stress tolerance and experience in communicating multi-culturally to fulfill the requirements of the regional diversity
 Assisted with development of marketing budget and price analysis to make recommendations for pricing decisions

Seminar & Conferences

U.S. Department of State's Bureau of Educational and Cultural Affair – 2013 Fulbright Enrichment Seminar: American History & Westward Expansion, St. Louise, Missouri, USA.
 Wright State University – Department of Economics – 2014 Honor Dialogue Event: Neoliberalism: Ideology, Economics and Movement , Dayton, Ohio, USA
 Wright State University – Department of Economics and History – 2014 Environmental Crises: History, Economics, and Politics, Dayton, Ohio, USA

Language Skills

Arabic: Native proficiency
 Turkish: Bilingual proficiency

English: Bilingual proficiency
 French: Limited working proficiency

Publications

Al-Zanganeh, S. (2017) Impact of Crude Price Volatility on Levels of Economic Activity: Evidence from Iraq, *European Scientific Journal*, April /SPECIAL/ edition ISSN: 1857 – 7881 (Print) e - ISSN 1857- 7431
 Al-Zanganeh, S. (2014) The Conversion to Compressed Natural Gas-Fueled Vehicles – Social and Environmental Sustainability in India, *International Journal of Social Science & Educational Studies*, Vol.1, No. 2 – 2409- 1294.
 Al-Zanganeh, S. (2014) Conversion to a Greener Fleet: A Cost-Benefit Analysis of a Conversion to Compressed Natural Gas for a Municipal Bus Fleet, *International Journal of Social Science & Educational Studies*, Vol.1, No. 2 – 2409-1294.

- Al-Zanganeh, S. (2015) Forecasting Brazil's Per Capita GDP Growth, *International Journal of Social Science & Educational Studies*, Vol.1, No. 3 – 2409-1294.
- Al-Zanganeh, S. (2015) The Conversion to Compressed Natural Gas-Fueled Vehicles – Social and Environmental Sustainability in India, Book of Proceedings – 2nd International Conference on Ecology, Environment & Energy, 978-0-9962570-0-8.
- Al-Zanganeh, S. (2015) Conversion to a Greener Fleet: A Cost-Benefit Analysis of a Conversion to Compressed Natural Gas for a Municipal Bus Fleet, Book of Proceedings – 2nd International Conference on Ecology, Environment & Energy, 978-0-9962570-0-8.
- Al-Zanganeh, S. (2015) Causes and Effects in Macroeconomics - Nobel Prize Lecture in Economic Sciences, *International Journal of Social Science & Educational Studies*, Dec. 2015, Vol.2, No. 2 - 2409-1294
- Al-Zanganeh, S. (2015) Why Nations Fail? Daron Acemoglu: The Role of Inclusive and Extractive Institutions on Shaping Technological Change, Innovation, and Prosperity, *International Journal of Social Science & Educational Studies*, Dec. 2015, Vol.2, No. 2 - 2409-1294
- Al-Zanganeh, S. (2016) Revisited: The Conversion to Compressed Natural Gas-Fueled Vehicles – Social and Environmental Sustainability in India, Proceedings E- Book II Business & Economics - International Turgut Ozal Congress on Business, Economics, and Political Science II, 978-605-4894-16-1
- Al-Zanganeh, S. (2016) The Great Depression: Slow Recovery & Policy Mistakes, *International Journal of Social Science & Educational Studies*, Mar. 2016, Vol.2, No. 3 - 2409-1294