Essays in Socioeconomic Inequalities in Health and the Labor Market, with Special Focus on Egypt

Inaugural - Dissertation

zur

Erlangung der wirtschaftswissenschaftlichen Doktorwürde

des Fachbereichs Wirtschaftswissenschaften

der Philipps-Universität Marburg

eingereicht von:

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To my wife Amira and my son Hassan

"Of all the forms of inequality, injustice in health care is the most shocking and inhumane."

Martin Luther King Jr

Declaration

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Curriculum vitae

Ahmed Rashad was born on April 9th, 1984 in Alexandria, Egypt. He grew up in this historical city, which used to be the intellectual and cultural center of the ancient world. He was among top performing students at his preparatory school. Thereafter he completed his secondary education at Mubarak School for high scoring students. Afterward he joined the Economics Department at the Faculty of Commerce Alexandria University and graduated with highest score at his class and hired as a teaching assistant at the Economics Department, where he was responsible for conducting seminars in introductory economics, economics of money and banking, economics of natural resources.

Between 2010 and 2012, Ahmed was enrolled at the American University in Cairo (AUC) as dual degree student, where he completed MA in Economics and Graduate Diploma in Public Policy at the AUC's School of Global Affairs and Public Policy. He was awarded full fellowship from Ford Foundation to pursue his postgraduate studies. He represented the AUC's School of Global Affairs at several occasions including AUC Paris Study Tour, AUC Board of Trustees Spring Meeting 2011 and AUC Sport Committee. He worked as teaching and research assistant to Dr. Ghada Barsoum, where he gave tutorials on SPSS software. In 2012, Ahmed completed his dual degree with overall GPA 3.67 out of 4.

From 2012 to 2015, Ahmed has been awarded Yousef Jameel Scholarship for PhD in Economics at Philipps University Marburg. He joined the Chair of Development Economics, where he is currently affiliated, under the supervision of Prof. Dr. Michael Kirk and Prof. Dr. Bernd Hayo. Additionally, he is a student at the Swiss School of Public Health, where he attended doctoral courses in health economics and presented his research at their workshops. Ahmed's research is concerned with economic and social determinants of public health. He has presented his research at several conferences including the European Health Economics Conference, the 20th Economic Research Forum Conference, and the German Economic Association Research Group on Development Economics Conference.

Acknowledgements

I must admit that the road to the PhD has been long and difficult. It was five years ago that I left my hometown Alexandria, a city used to be the intellectual and cultural center of the ancient world, to reach to this moment. The road started at the American University in Cairo followed by travel to the beautiful city of Marburg. I could not have made to this point without the support of some very important people.

I am profoundly grateful to Prof. Michael Kirk, the Executive Director of the Institute for Cooperation in Developing Countries, Faculty of Business Administration and Economics, Philipps-University Marburg for his valuable guidance and his unbroken encouragement and support throughout this research. It was an honor to work under his supervision. I am deeply grateful for his support and patience. I owe my sincere gratitude to Prof. Bernd Hayo for his encouragement and support during my PhD journey. He has been always a role model to follow not only in academia but also in life.

My greatest thanks to the Yousef Jameel Scholarship Fund for the generous financial assistance during my study. I would like to thank the coordinators of the Yousef Jameel Scholarship, Ms. Miriam Gross and Ms. Heidi Wiegand , for the support from the first day at Marburg.

I would like to thank my friends for support and fun time in Germany that helped me a lot during my stay. I give my sincere thanks to Ms. Barbel Donges, Lawrence Brown, Dr. Thomas Dufhues, Tobais Vorlaufer, Duncan Roth, Simone and Tom Gobien, Boban Aleksandrovic, Moamen Gouda , Shimaa Hanafy, and Florian Neumeier. My gratitude also to Mahmoud Gamal, Mohamed Al Aseal and Mahmoud Gafaar who makes me feel home in Marburg.

Special thanks to my MA supervisor, Dr. Samer Atallah for encouragement and belief in my abilities. I am luckily to meet you. I am very proud to work with Dr. Ghada Brasoum during this work. She is one of the greatest teacher I ever have. I am very thankful to Prof. Laila El Baradei for her constant encouragement.

I am indebted to the Economics Department of Alexandria University and Damanhur University for what they taught me. I dedicate this work to the soul of my Prof. Abedal Azziz Agamia. Special Thanks to Prof. Dr. Abedal Rahman Yousri, Prof. Mohamed El Leithy, Prof. Ahmed Mandour, Prof. Sayeda Moustafa, Prof. Ismail El Shenway, Prof. Iman Attia, Prof. Ramadan Maklad, Dr. Sayed El Sareti, Prof. Hesham Omara, Dr. Mesbah Sharaf, Dr. Iman Gamal and Prof. Kadry Ismail.

I am very grateful to my parents and my younger brother for their unlimited support at each and every single step of my life. I would like to express my gratefulness to my

Outline

Chapter 1
Summary

Income inequalities and large gaps in living standards within countries often play a role in increasing social tension that undermine political stability and social cohesion (Alesina & Perotti, 1996). Countries with large gaps between the poor and the rich tend to have a large degree of socioeconomic inequalities in health (Kennedy, Kawachi, Glass, Prothrow-Stith, et al., 1998; R. G. Wilkinson, 1997; R. Wilkinson & Pickett, 2011). Inequalities in health are more worrying than disparities in most other spheres, as ill health hinders people from generating income and becoming part of daily life. It is not surprising to read an Ethiopian man quoted at the Voices of the Poor saying "For me, a good life is to be healthy" (Narayan-Parker & Patel, 2000). The right to health is a basic human right, irrespective of socioeconomic status. While some extent of income disparities is acceptable, socioeconomic inequalities in health care cannot be justified on any basis. Especially in developing countries, it is the poor who suffer the most from ill-health (Figure 1). They are likely to encounter greater rates of morbidity and mortality than do the wealthy. They have lower rates of utilization of health care and their health spending share of income is often higher than the rich (Yazbeck, 2009).

Socioeconomic inequalities in health and education have been largely understudied in Egypt. Despite their substantial importance, little attention has been given to them and this thesis aims to fill this gap in the literature by rigorously analyzing socioeconomic inequalities in health and education from several angles. This thesis consists of six chapters. The following four chapters are concerned with inequalities in health outcomes specifically child malnutrition, socioeconomic inequalities in the distribution of healthcare subsidies, the impact of medical payments on the poor, and inequalities health care utilization while the sixth chapter

Figure 1: Region Inequalities in Infant Mortality
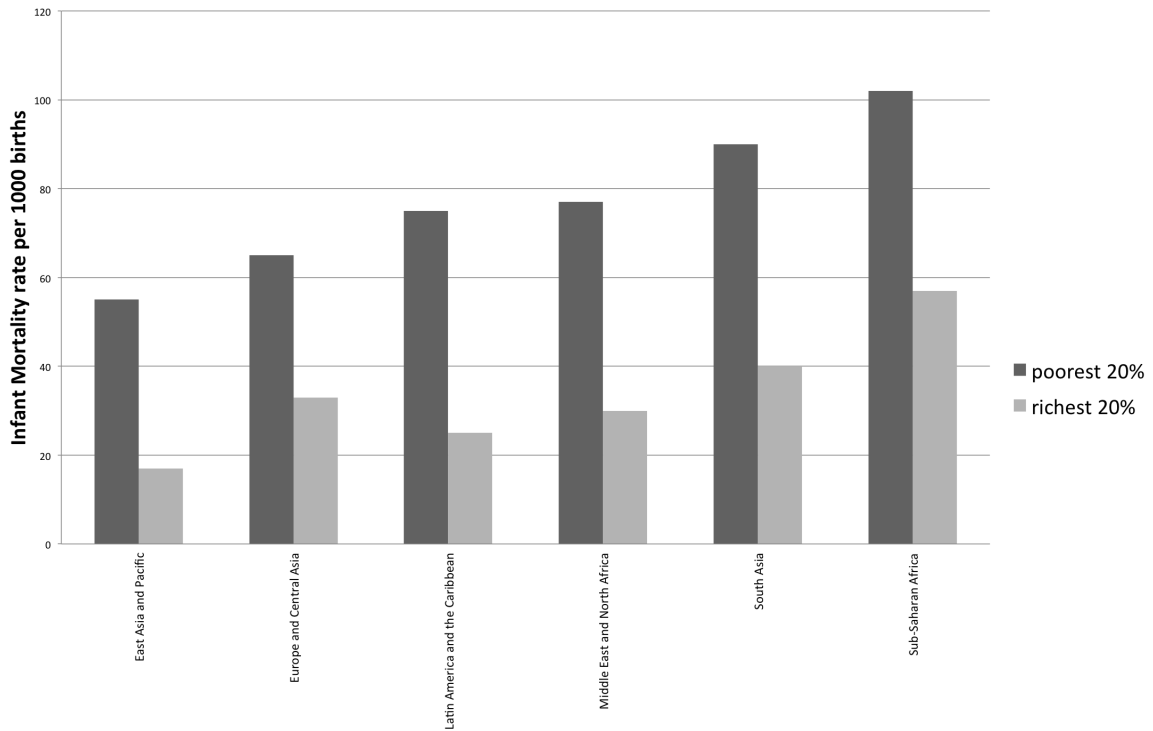
is focusing on labor market outcomes that results from the type of high education received.

The fruits of economic growth are rarely shared fairly among socioeconomic classes, especially in developing countries. It has been widely considered an effective instrument to combat poverty, deprivation and child malnutrition. Though there is a substantial literature on the relationship between economic growth and child malnutrition in a wide range of countries (see chapter 2 for examples), empirical evidence on this relationship is sparse in the case of Egypt. The first research question raised in this book is how economic growth affects child under-nutrition rates in Egypt between 1992 and 2008. On average, the Egyptian economy has been growing at 3.31% annually between 1990 and 2008. This chapter empirically investigates the effect of economic growth on different forms of child malnutrition. The paper hypothesizes that economic growth in Egypt has been accompanied by a reduction in child malnutrition levels. The merit of looking at child health measures is that these indicators are highly sensitive to changes in the public health. The data are collected from several sources including several rounds of Egypt Demographic and Health Survey and Egypt Human Development Reports.

Using panel data methods, the econometric analysis failed to find a robust negative association between economic growth and child health. Results show a modest reductive effect of economic growth on child underweight and wasting rates while the effect on stunting rates was not statistically significant. Though economic growth could be a necessary condition for combating child malnutrition, this paper shows that economic growth by itself is not sufficient and has to be complemented by other intervention measures that aim directly at improving child health and nutrition.

After having studied the relation between economic growth and child health, the next part of the thesis (Chapter 3 and 4) examines the distribution of public subsidies received through the use of public healthcare facilities and the degree of financial protection against unforeseen devastating health-care payments.

Direct subsidization of healthcare services has been widely used in many countries to improve health outcomes. The Government of Egypt allocates a significant proportion of its budget to subsidize the health sector. It is commonly believed that the poor are the main beneficiaries from these subsidies. Chapter 3 titled "Are Public Health Expenditures in Egypt Pro-poor or Pro-rich?" tests this hypothesis in Egypt by empirically analyzing the distribution of public healthcare subsidies using data from Egypt Demographic and Health Survey and Egypt National Health Accounts. The obstacle fronting analysts concerned in this topic is that the amount of subsidies received by each patient is not directly observable. To determine the distribution of public health care subsidies, I conducted a Benefit Incidence Analysis. As a robustness check, both concentration and Kakwani indices for outpatient, inpatient, and total healthcare were also calculated. Results show some degree of inequality in the benefits from public healthcare services, which varied by the type of healthcare provided. In particular, subsidies associated with University hospitals are pro-rich and have inequality increasing the effect, while subsidies associated with outpatient and inpatient care provided by the Ministry of Health and Population have not been pro-poor but have inequality-reducing effect (weakly progressive). Results were robust to the different analytical methods. While it is widely perceived that the poor benefit the most from health subsidies, the findings of this study refute this hypothesis in the case of Egypt. Poverty reduction measures and healthcare reforms in Egypt should not only focus on expanding the coverage of healthcare benefits, but also on improving the equity of

its distribution.

Since the previous chapter found that health subsidies in Egypt are not always pro-poor while out of pocket payments are the principal mean of financing healthcare in Egypt, chapter 4 discusses the devastating implications of medical payments on households' material living standards. The paper argues that conventional poverty estimates do not take into account out-of-pocket health payments. Thus, the chapter attempts to evaluate the poverty impact of out-of-pocket health payments in Egypt. The poverty impact was evaluated using poverty head counts and poverty gaps before and after medical payments. Data on health payments and standard of living are obtained from Egypt Income and Expenditure Survey for the year 2010. This survey is the official source for poverty measurements in the country. The poverty impact of health payments is measured by the proportion of the population who spend below the two World Bank's poverty lines ($1.25 and $2 per day) after paying for health care. The analysis points that a significant proportion of households in Egypt has crossed the $2 a day poverty line because of health payments. Poverty alleviation policies should help reduce the reliance on out of pocket payments to finance healthcare.

In the previous part, the thesis has revealed the lack of financing protection mechanism against health shocks in Egypt and the low degree of progressivity in health subsidies. This implies that inequalities in health care utilization would largely exist between those who have and those who have not. Regular maternal health care is important for both mother and child. Improving maternal health is one of the Millennium Development Goals. Egypt has made substantial progress in improving maternal health. In Chapter 5, "Decomposition of Socio-economic Inequalities in Maternity Care in Egypt", the thesis looks at the degree of health inequity in maternity care utilization in Egypt. It monitors the trend in socio-economic inequalities in maternity care utilization over the period between 1990 and 2008. The chapter is examining whether the poor have benefited from the improvement in population averages, as improvement in national averages does not necessarily reflect improvement among the poor. Data are collected from the available rounds of Egypt Demographic and Health Survey. The concentration index is used for measuring the socio-economic inequalities in maternity care. It decomposes the concentration index to explain the factors that generate inequalities using Wagstaff et al (2003) framework. Multivariate logistic regression was

conducted to assess the trends in the use of public health facilities as opposed to private health care. The analysis points out that the poor have significantly benefited from the improvement in the maternal health indicators and inequalities in health care utilization have declined at the study period. However, the regression analysis demonstrates that the public facilities use for maternal healthcare has constantly dropped over time. The study concludes that the progress in maternal health in Egypt has an inequality-reducing effect, but the intensive utilization of private care raises concern on the poverty impact of out of pocket health payments.

Chapter 6 (with Dr. Ghada Brasoum):" Getting the Money's Worth: Labor Market Outcomes of Public and Private Higher Education Institutions in Egypt" shifts the thesis toward studying the root causes of inequalities in the labor market. Private higher education mainly attracts students of higher socioeconomic status who afford the study fees. We are mainly interested in the effect of private higher education as opposed to public higher education on the probability of employment in the first six months following graduation, wage rate and job quality in the current job. We benefited from the analysis of a recently fielded household survey (2012) tracing university graduates aged 25-40 in two disciplines that have been the target of private education institutions, namely business administration and information technology. The survey obtains data on graduates' socio-economic background and parental characteristics, education experience, first job experience, current job experience and employment history and mobility. Using OLS and logistic models, we observe that investment in private higher education has not paid off for graduates. Public higher education graduates have a higher probability of employment in the first six months and have higher access to job security. We find out that parental and socio-economic background is the key determinant of labor market outcome, which reflects the low degree of social mobility in Egypt.

In sum, the thesis has shed some light on the socio-economic disparities in health and in the job market in Egypt. The author hopes that this thesis would assist the new policymakers in Egypt identify policies that reduce socio-economic injustices in health as well as in other spheres.

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Chapter 2

Does Economic Growth Reduce Child Malnutrition? New Evidence from Egypt

"Development of citizens, households, and public services will not take place unless we have economic growth that is pushed by investments" - Ahmed Nazif, the Prime Minister of Egypt from July 2004 to January 2011, at the 7th Conference of the National Democratic Party in December 2010

Abstract

The effect of economic growth on child malnutrition has been understudied in the literature by much less using panel data approach. This study is the first attempt to empirically analyze the effect of macroeconomic growth on child malnutrition in Egypt, a country with 2.7 million chronically undernourished (stunted) children. The data are collected from several sources including five rounds of the Egypt Demographic and Health Survey and the Egyptian Institute of National Planning. We examine the effect of growth in governorate per capita income on the three forms of child malnutrition (stunting, wasting and underweight) at the governorate level. We find a modest reductive effect of economic growth on child underweight and wasting rates. On the contrary, we fail to find a significant impact on stunting rates. The paper also shows that child malnutrition in Egypt is not a problem of food access and poverty alone and factors like inappropriate feeding practices and poor childcare are more critical to children's development than per capita income growth.

1 Introduction

Economic growth is widely viewed as an effective policy instrument to eliminate poverty and advance human development. The empirical economics literature is abundant with evidence that sustained economic growth is critical for poverty reduction and human development. Two studies (Kheir-El-Din & El-Laithy, 2006; El Laithy, Lokshin, & Banerji, 2003) assessed the effect of economic growth on poverty alleviation in Egypt. They found some evidence that supports the economic growth that took place between 1990 and 2005 has reduced poverty. The purpose of this work is to go beyond income poverty and to examine the effect of economic growth on other measures of human deprivation. In particular, we develop a unique panel dataset to analyze the impact of income per capita growth at the governorate level on childhood undernutrition prevalence in Egypt at the period between 1992 and 2008.

The relationship between economic growth and child malnutrition is two-sided. While poverty and food insecurity can lead to undernutrition, child's malnutrition may have intergenerational consequences slowing down economic growth. The inadequate dietary intake and diseases are the direct causes of child undernutrition. This can arise as a result of household food insecurity, inadequate feeding practices, unhealthy household environment and inadequate health service.

On the other hand, inclusive economic growth can reduce child's malnutrition through three channels (Figure 1). Firstly, higher income increases the ability of parents to purchases more calories. It lowers unemployment and creates jobs and injects the economy with new employment opportunities. Secondly, it widens the tax base and increases public revenues, which may lead to higher public spending on health and social protection such as spending on food ration cards. Thirdly, economic growth can benefit individuals indirectly by higher public spending on roads, schools, and hospitals. However, economic growth might not necessarily translate to better-living conditions to the poor if economic growth does not reach to their hands.

According to the United Nations Children's Fund (UNICEF) Egypt has the largest number of stunted children in the Middle East, about 2.7 million children in Egypt experience growth failure. Poor nutrition in early life has severe consequences on child development. malnourished children have weaker immune

Figure 1: How Economic Growth Influence Children Nutritional Status?
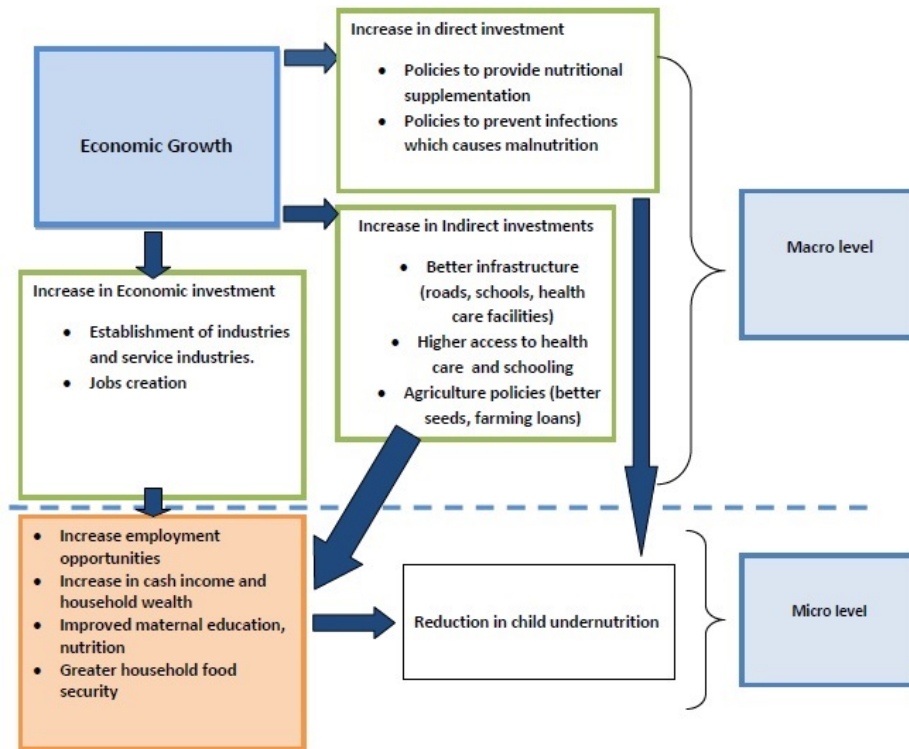
Source: (Subramanyam, Kawachi, Berkman, & Subramanian, 2011)

systems and they encounter a higher risk of mortality and morbidity compared to well-nourished children. In addition, they have a reduced physical ability and are not capable of reaching to their potential height and may remain too short for their age for the rest of their lives. Setboonsarng (2005) suggested child malnutrition as an appropriate measure of poverty.

Figure 2 shows that the level of stunting, wasting and underweight in Egypt in the period between 1992 and 2008. the overall degree of stunting in Egypt is at high level while the degree underweight and wasting are classified as low. The low level of underweight and wasting versus the high level of stunting presents a puzzle that maybe be explained by the global shift toward junk food with a high level of starch, fats, and sugar (De Haen, Klasen, & Qaim, 2011). The indicators that involve weight measurement are sensitive to this type of food, while, height is far less sensitive to this global switch in diet. As a result, the low level of underweight may underestimate the malnutrition problem in Egypt. The economic and social cost of child malnutrition in Egypt is estimated to be equal to LE 20.3 billion, which is equivalent to 1.98% of GDP (ECA & NEPAD, 2013).

Figure 2: Percentage of Children Under Five Years Classified as Malnourished According to Anthropometric Indices in Egypt
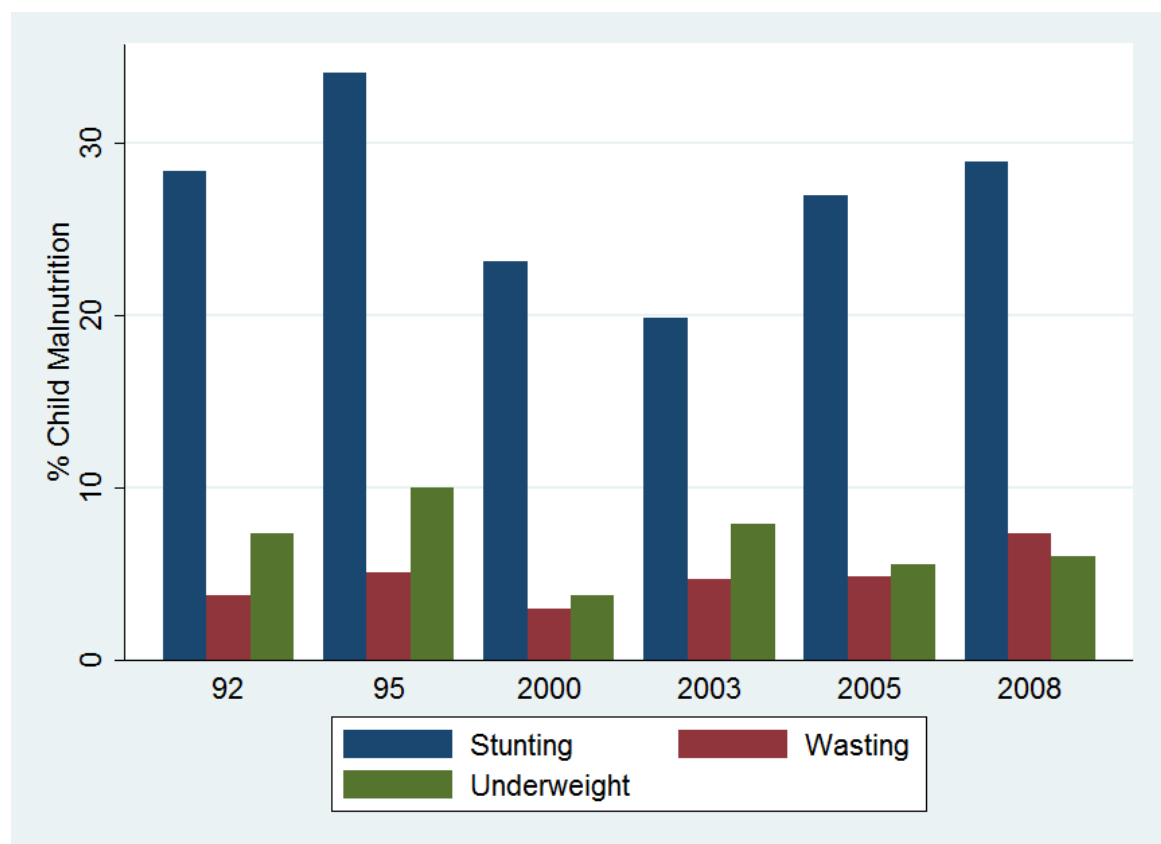
Source: Auhtor's compilation based on EDHS data

Using data from the labor market in the United Kingdom and the United States, Case and Paxson (2006) studied the positive association between adults' height and earning. They argued the height earnings gap cannot be explained by high self-esteem or discrimination, but it is due to good nutrition in early childhood. Workers who received good nutrition during childhood have a higher average IQ test scores than malnourished. Taller workers have a higher probability of reaching their genetic potential in height and intelligence (Case & Paxson, 2006; Case, Paxson, & Islam, 2009; Banerjee & Duflo, 2007) and this differences in IQ accounts for the labor market height premium. In connection with Case and Paxon's findings, UNICEF has reported evidences on the association between poor school performance and stunted growth, which in turn lowers future employment opportunities and income generation causing intergenerational consequences (Subramanyam et al., 2011).

The paper is organized as follows: the next section presents the previous research that addressed this topic followed by an explanation of the determinants of child malnutrition and their methods of measurements. Section 4 discusses the economic performance in Egypt during the period of study and section 5 is related to child feeding practices in Egypt. Section 6 describes the data and the method, before presenting the results in section 7 and section 8 concludes.

2   Literature Review

The literature is scarce with empirical papers examining the effect of economic growth on childhood undernutrition. Five studies have been identified (Smith & Haddad, 2002; Harttgen, Klasen, & Vollmer, 2013; Subramanyam et al., 2011; Alderman, Hoogeveen, & Rossi, 2006; Heltberg, 2009) that have dealt with the topic. These papers can be classified based on the level of the analysis, as one paper performed cross country analysis using macro level data and the rest use data at the household level. Consequently, their results are not directly comparable. Using unbalanced panel data consisting of 63 developing countries between 1970 and 1996, Smith and Haddad (2002) did the first attempt to explore the effect of economic growth on child malnutrition. They regressed childhood undernutrition rates on per capita national income using panel data methods. They suggested that economic growth has a strong reductive effect on child malnutrition. They argued

the global economic growth that took place between 1970 and 1996 is responsible for half of the reduction in the prevalence of child malnutrition through promoting investments in women's education, women's status, health environment quality and food affordability.

Harttgen, Klasen and Vollmer (2013) have examined the association between GDP per capita growth and the reduction on child malnutrition in 15 Sub-Saharan African countries. They have used two types of models, macro, and micro models. For the macro model, they have estimated the overall levels of malnutrition across countries from the Demographic and Health Surveys (DHS) and regressed them on GDP per capita using a fixed effect model. The fixed effect macro model failed to detect a significant relationship between income growth and the level of child malnutrition. Additionally, they have developed a micro model. The dependent variable is a binary variable indicating whether a child is malnourished or not. They pooled all the DHS surveys from Sub-Saharan African countries into one single large dataset. They used individual level variables together with macro variables. In addition to the larger sample, data pooling allows testing the effect of macroeconomic growth on child level instead of the country level. Consequently, the likehood of child malnutrition is not the same for every child within the country. The analysis of pooled data yielded that GDP per capita growth has a mild effect on child malnutrition. Furthermore, their result does not hold for the inclusion of time fixed effect. As a result, the authors concluded that economic growth did not trickle down to the poor. Moreover, they suggested individual-level variables such as mother's education, socioeconomic status, and mother's nutritional status are more critical to children growth than national development indicators. Heltberg (2009) studied spells of malnutrition over time, and suggested a significant, but small, inverse association between income growth and stunted growth among children, where phases of economic boom are often accompanied with reduced malnourishment rates. He claimed that the correlation between economic growth and the stunting rate among children is much lesser than the impact of growth on poverty. The degree of responsiveness (the elasticity) of stunting rates with respect to GDP per capita growth was about -0.2 in a country with very high stunting rates (above 30%), while halving stunting from a level of 30% through economic growth alone would require an annual growth of real per capita income by 3.7% for 25 years.

Instead of cross-country analysis, Subramanyan, Kawachi, Berkman and Subramanian (2011) did a country-specific analysis. They limited their analysis to India, a country with the largest number of children under 5 years old who are stunted in the world. They used several types of models at different levels, but their unique contribution to the literature is in the use of income growth at the state level instead of economic growth rate at the country level. They pooled three national representative surveys of India at the years 1992, 1998 and 2005. They regressed a binary variable taking a value of one if a child is malnourished and zero otherwise on individual level variables and on state-level variables. They found no or only a weak association between economic growth at the state level and different types of child malnutrition. They concluded that the strong economic growth that took place in India was not sufficient to reduce child malnutrition and recommend direct investment in health care for reduction of malnutrition. Similarly, Alderman et al. (2006) did a country-specific analysis for Tanzania and they concluded that a combination of income growth and nutrition interventions are effective in reducing child under-nutrition. At the micro level, the literature is abundant with studies examining the relationship between household wealth and child health. The hypothesis is that better-off households have sufficient level of resources to invest in their children health and education that would improve their nutritional status.

3 How to Measure Child Malnutrition?

There are three major anthropometric indexes for children growth assessment: the height-for-age, the weight-for-age, and the weight-for-height (O'Donnell, Wagstaff, et al., 2008). The height-for-age measures child's body height relative to age. It reflects cumulative linear growth. The weight-for-age measures body mass to age. The weight-for-height measures body weight to height. Low height-for-age called stunting and it reflects inadequate nutrition for an extended period or chronic malnutrition. On contrast, body weight is sensitive to short-term changes in diet; thus, it reflects the current nutritional status. Low weight-for-height is named wasting, which is a result of starvation or illness. Low weight-for-age is called underweight. In spite of the presence of genetic variation, physical measurements remain useful for assessing the quality of nutrient intake specially for children

(O'Donnell et al., 2008).

There are three main approaches for assessing child malnutrition:

1. Z-score is developed by taking the difference between the value of child's height or weight and the median value of the reference population at the corresponding age and sex divided by the standard deviation of the reference population. A child whose z-score is less than -2 standard deviations is considered malnourished. The Egypt Demographic and Health survey uses the World Health Organization (WHO)'s reference as the reference population. This reference is based on the anthropometric measures of children of 6 countries (Brazil, Oman, Ghana, India, USA, and Norway) (De Haen, Klasen, & Qaim, 2011).

2. A percent of the median is simply calculated by dividing the value of child's height or weight by the median value of the reference population at the corresponding age and sex.

3. The percentile gives the rank of a child with respect to the reference population. The percentile is expressed in terms of what percentage of the reference population a child's height or weight falls or exceeds.

Unlike the percentiles, the z-score can be used in producing average means and standard deviations. Furthermore, it is a continuous variable, which is fully observable and can be incorporated directly into regression models. Percentiles measures are not adjusted to the variability in the reference population. As a result, the z-score is the most convenient measure of child malnutrition and it is widely adopted in the literature. Despite its merits, it is not free of critism. The use of single standard growth reference has been criticized (see for example Harttgen, Klasen and Vollmer (2013)), as the genetic difference in height across different regions of the world are not controlled for. For example, Asians are widely perceived to be genetically shorter.

4 Economic Growth in Egypt

The real GDP per capita has grown in real terms from $895 at 1992 to $1456 at 2008. In general, the Egyptian economy has been growing at an increasing

rate between 1992 and 1999 except for a couple of negative spikes. In 1999, The Egyptian economy slipped into recession. The fall in direct investments and the sluggish improvement in labor productivity brought down the growth in income per capita to less than 2% between 2001 and 2003 (World Bank, 2007). However, the growth rate trend was reversed in 2002 and the income per capita was increasing again. It rises from 1.5% to 5.4% by 2008, as the Egyptian government has lunched an economic reform program in 2004. The program aims to stimulate economic growth by simplifying bureaucracy, custom rules and red tape that challenge doing business. Also, the program has implemented a tax reform and lowers the tax rates. It provided easy access to foreign currency in addition to privatization of half of the public banks. The reform policies have pushed the domestic and foreign direct investments significantly. Furthermore, the oil boom in the region has led to increasing in transfer payments from Egyptians living in the Gulf region coupled with an increase in the tourism and capital inflow from the Gulf region. Consequently, the growth rates in total GDP have jumped to 7.1% and 7.2% in the years 2007 and 2008 respectively (See Figure 3).

The structure of GDP and the sources of economic growth could explain the persistence of poverty in Upper Egypt and the high burden of child malnutrition in the region. The service sector in Egypt accounts for more than half of the economy. It has been the main driver of the recent economic growth between 2003 and 2008 more specifically the tourism industry, the telecommunication sector, and the transport sector. On the other hand, the agricultural sector showed a weak economic performance, while it is the employer of the one-fourth of the working population and the majority of the Upper Egypt residents are depending on it for their livehood. If economic growth benefits mostly the service sector workers and bypasses the agricultural sector workers widening the income gap between the two sectors, economic growth will likely have modest or no effect on poverty reduction and child malnutrition.

5   Child Feeding Practices in Egypt

Feeding practices are the principle determinant of a young child's nutritional status, and inadequate dietary intake increases the risk of illness and early child mortality. WHO and UNICEF strongly recommend exclusive breastfeeding during the

Figure 3: Economic Growth in Egypt between 1992 to 2008
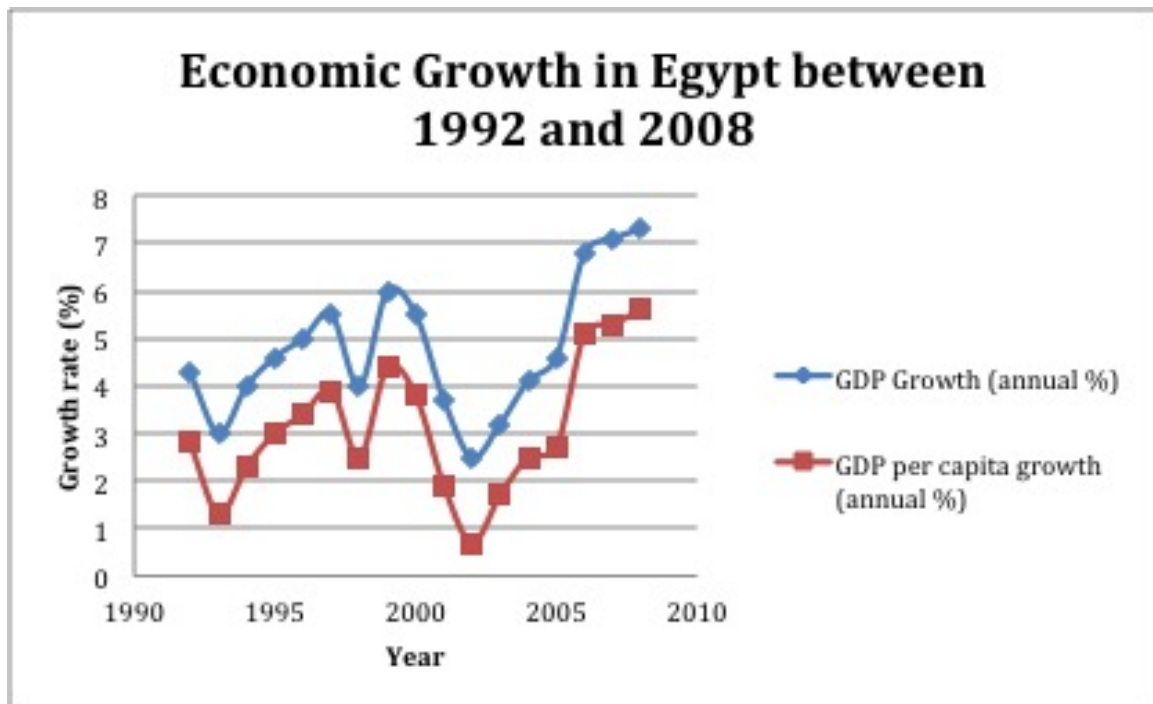
Source: (World Bank. International Economics Dept. Development Data Group, 2014)

first six months, as mother's milk contains all the needed nutrition for this age. Early complementary feeding is not recommended, as it reduces breast milk output and increases the risk of diarrhoeal disease and consequently malnutrition. Figure 4 points out that less than half of children are exclusively breastfed. Early complementary feeding is common by age 4-5 months. Egypt Demographic and Health survey (EDHS) for the year 2008 reveals that 70% of infants received supplementation in the first six months and the median duration of exclusive breastfeeding is 2.6 months. Despite mothers from the richest quintile are more educated than the poor mothers, EDHS data indicated that the median duration of exclusive breastfeeding is the shortest among the wealthiest quintile and it is the longest among the poorest quintile.

According to WHO and UNICEF, by the age of six months complementary feeding becomes necessary as breast milk is no longer enough to provide appropriate nutrition. The EDHS 2008 suggested that one-third of babies at age 6 to 8 months are not offered any solid or semi-solid food beside breast milk (Figure 4). Good complementary feeding includes daily consumption of vitamin-A-rich fruits and vegetable and the consumption of meat, poultry, fish and eggs. Fatty

food is important in babies' diet, as it provides acids that facilitate absorption. On the other hand, tea and coffee are discouraged for children, as they contain compounds that inhibit iron absorption. EDHS collected information on types of foods and liquids child consumed in the last 24 hour prior to the survey interview. It suggested the majority of children did not eat any vitamin-A rich food in the last 24-hour prior to the interview and tea drinking is also common. Appropriate infant and young child feeding practices involve the introduction of food by the age of six months and increasing the amount of food and its frequency while maintaining frequent breastfeeding up to the age of two. In fact, breastfeeding for two years is also a guidance from the Holy Quran, which may form another motivate for mothers to continue breastfeeding. Appropriate nutrition includes feeding children a variety of food groups to ensure that nutrient requirements are met. Overall, only 41% of children met the minimum requirements for appropriate infant and child feeding (see the paper's appendix). The percentage of children who fed appropriately does not vary systemically by the level of mother's education or among the first four wealth quintiles, which may explain the similarity in the child malnutrition prevalence among all wealth quintiles.

This may suggest child malnutrition is not a problem of food access but inadequete feeding practices. Kalve et al., (2014) have conducted Trials for Improved Practices (TIP), which aims to educate mothers about appropriate feeding practices. After a week of appropriate feeding practices, mothers have reported improvements in children's health.

6 Method

6.1 Data

The data on children's nutritional status have been collected from five rounds of EDHS. anthropometric data were collected by EDHS trained staff on height and weight data collection. The DHS is an international survey conducted in 85 developing countries sponsored by the U.S. Agency for International Development. The DHS goal is to assess the changes and the progress in fertility, family planning, maternal health and child health. It is the most powerful source of information on child health and child health service in developing countries. It collects information

Figure 4: Percentage of infants under 6 months old exclusively breastfed
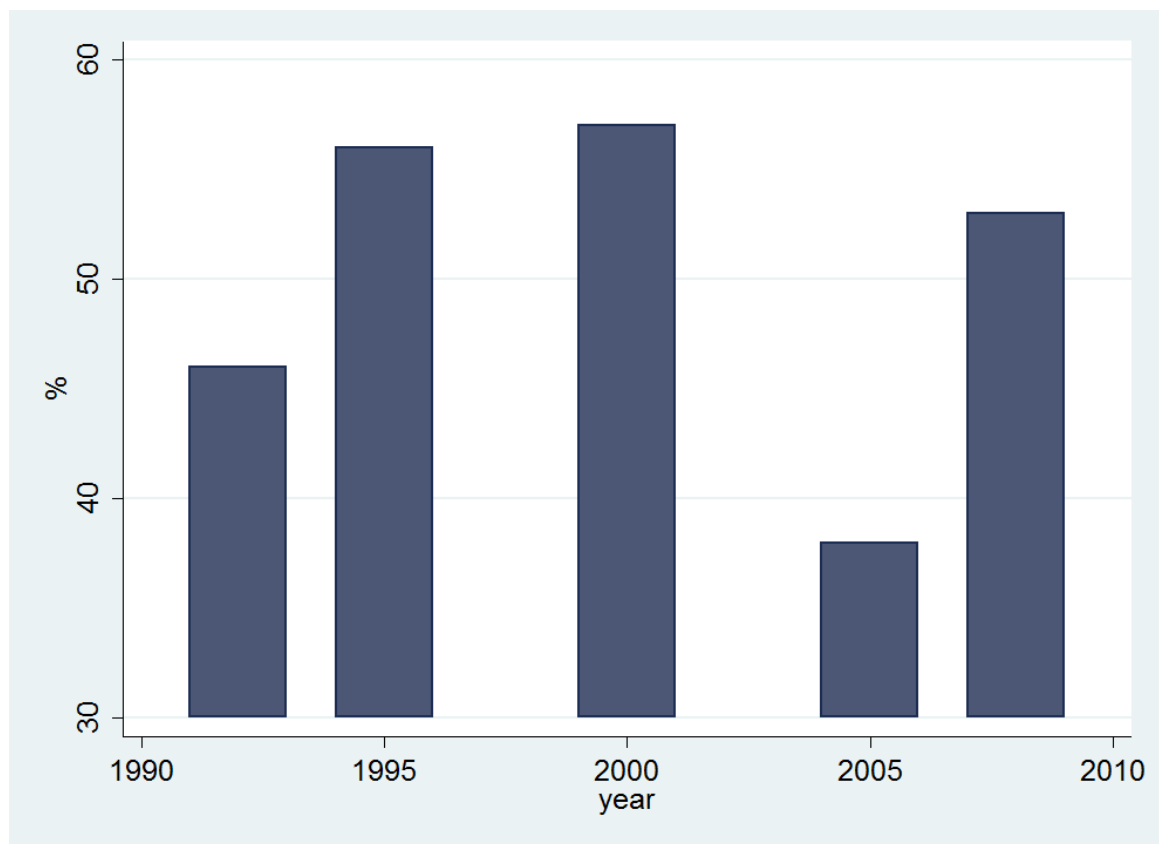
Source: Auhtor's compilation based on EDHS data

on infant and child mortality. Normally it is implemented every five years. The DHS samples are nationally representative household surveys. The DHS interviews women between age 15 and 49 (reproductive age).

The sample has a complex survey design. The design involves stratification based on the level of urbanization and the region. It involves clustering where the selected villages are the clusters for rural areas and the selected districts/towns are the clusters for urban areas. It includes weighting, as some observations have a low probability of selection. These observations are weighted in order for the sample to be nationally representative (El-Zanaty & Way, 2012; Egypt, DHS, 2005; El-Zanaty & Way, 2006). The complex survey design has been taken into account in all the stages of the analysis by adjusting the regional estimates to include the survey weight, cluster and strata in the estimation of regional measures.

The five rounds of EDHS have been conducted between 1992 and 2008. These surveys are at the years 1992, 2000, 2003, 2005, and 2008. EDHS 1992, 2000, 2005, 2008 are standard surveys while EDHS 2003 is an interim DHS survey. Interim DHS survey is a national representative survey, but it has a shorter questionnaire and a smaller sample than standard surveys. The EDHS collects information on all born children. However, children who are dead by the time of interview and children with missing data on height or age have been excluded from the analysis. After data cleaning, the sample size of the EDHS 1992 is 7,356 children and EDHS 2000 collected information on the nutritional status of 10,547 children while EDHS 2003 has information on the nutritional status of 6,182 children. EDHS 2005 has a sample of 12,618 children and EDHS 2008 has a sample of 9,478 children.

Between 1992 and 2008, There are 26 governorates in Egypt divided for administrative purposes. There are four urban governorates and the rest is a mixture of urban and rural regions. These 26 governorates are aggregated into main six regions in the EDHS: Urban governorates, Urban Lower Egypt, Rural Lower Egypt, Urban Upper Egypt, Rural Upper Egypt and Frontier governorates. Each region represents a strata in the EDHS. The EDHS sample of Frontier governorates is always too small to allow governorate representative estimates. As a result, the Frontier governorates have been excluded from the analysis. The Frontier governorates include the Red Sea governorate, the New Valley governorate, the Matroh governorate, the South Sinai governorate, and the North Sinai governorate. Following the exclusion of the Frontier governorates, we left with 21 governorates for

each round of the EDHS.

The Egypt Human Development Reports provide data at the governorate level that cover economics, health, and education (Handoussa, 2010; Handoussa et al., 2008, 2003). The Egypt Human Development Reports is developed by the Institute of National Planning of Egypt with technical assistance from the United Nations Development Programme (UNDP). The paper benefits from the available data on the GDP per capita at the governorate level. The GDP per capita calculations are based on the national income accounts and the Income, Expenditure and Consumption Survey, which is conducted by the Egypt Central Agency for Public Mobilization and Statistics (CAPMAS). The GDP per capita at the year 1995 was not available; thus, the EDHS 1995 was not beneficial to the analysis. The detailed methodology of GDP per capita estimation is provided at the Egypt Human Development Reports.

6.2 Econometric Analysis

To study the effect of the economic growth on child malnutrition, we examine the effect of economic growth on child malnutrition in 21 governorates in Egypt over the period between 1992 and 2008. I develop a first difference model to address the research question. The models control for the governorate fixed effect. Various factors are included in the governorate fixed effect like geographical location, climate, and natural resources. It is likely that economic growth is correlated with the governorate unobserved fixed factors. Therefore, we have dealt with governorate heterogeneity by data differencing. The following model is developed to address the research question:

$$\Delta(cmlntr_{it}) = \alpha_0 + \alpha_1 d2003 + \alpha_2 d2005 + \alpha_3 d2008 + \beta_1 \Delta log(GDP_{it})$$
$$+ \beta_2 \Delta(education_{it}) + \beta_3 \Delta(Gini_{it}) + \Delta u_{it}$$

The dependent variable in the above equation is the change in the child's malnutrition rate $\Delta(cmlntr)$ in two consecutive rounds of EDHS, where $cmlntr_{it}$ is the level prevalence of child malnutrition in governorate i at year t. The parameter α reflects a different intercepts for each time period. They control for governorate trend in child malnutrition.

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Since GDP per capita is measured in current Egyptian pounds and it can be simply increased due to inflation, it is important to adjust for price effect. But since the GDP per capita presented in logarithmic form and time dummies for all periods are included, then the price effect will be absorbed into the time dummies and there is no need to convert nominal income per capita into real value. Unlike time-demeaning, data differencing of $log(GDP_{it})$ gives the percentage change in income per capita, which can be interpreted as economic growth rate between two consecutive rounds of the surveys. This is the merit of using logarithmic form coupled with data differencing over time demeaning methods. Moreover, coefficients obtained from logarithm form have appealing interpretations regardless of the units of measurement of variables.

Our main regressor is the percentage change in GDP per capita. The Gini co-efficient measures the the extent to which the distribution of income among house-holds within a governorate deviates from a perfectly equal distribution. High Gini indicates a high level of income inequality and the opposite is true. $(education_{it})$ is the percentage of women within governorate with a high level of education. The data on women education is developed through population censuses. u_{it} is the idiosyncratic error. Different specifications with additional control variables such as access to sanitation and clean water have been conducted. However, the results did not significantly differ than the presented model.

In differencing more than two time periods, the serial correlation problem may appear, as Δu_{it} maybe correlated over time periods. Consequently, we test for serial correlation with the Wooldridge's test. If the test returns no autocorrelation in the errors, then the usual methods for treatment of heteroskedasticity are valid (Wooldridge, 2012; Drukker, 2003).

The models are conducted using the three anthropometric indices (height-for-age, weight-for-age, and weight-for-height). We use balanced panel data consisting of 21 governorates for five time periods. It consists of 21×5 records.

The inadequate height-for-age reflects poor nutrition over an extended period of time. Therefore, there can be lags between GDP growth and its effect on child's height. These lags are addressed by conducting an additional model using economic growth at (t-5), as it might be more critical to height-for-age than the current rate of growth.

7 Results

Table 1 provides summary statistics of child malnutrition by socio-economic background. Except for the year 2008, the largest burden of undernutrition is located in Upper Egypt, which had the highest incidence of poverty and deprivation. In general, the proportion of malnourished children in the poorest quintile is always higher than in the richest quintile. However, stunting prevalence is also quite high in absolute terms among the better off. This implies that undernutrition in Egypt is not a problem of food access and poverty alone. For instance, children with short preceding birth intervals are associated with child malnutrition (see Table 5 in the appendix).

The models in tables 1, 2 and 3 give that the effect of economic growth on the different forms of child malnutrition. The models show that economic growth always has the expected effect, economic growth lowers malnutrition. In table 3, economic growth always had significant impact on the underweight rate at 10% level of significance and at 5% level at the second column. 10% significance levels might be justified by the small sample size. But the value of the coefficient itself is small. Similarly, economic growth has a significant effect on wasting rate at 5% level of significance but its effect is also modest. The small effect of economic growth might be explained by the low level of prevalence of underweight and wasting in Egypt (see Figure 2).

Table 3 presents the effect of economic growth on the stunting rate in Egypt. While, the coefficient of economic growth has the expected effect on the stunting rate, its effect is very small and it is not statistically significant at any standard level (p-value=0.9). Therefore, economic growth that took place between 1992 and 2008 did not have practical or statistical significance impact on stunting. Similarly, the lagged model could not yield any significant association between economic growth and change stunting rates.

The different time period intercepts show how the child malnutrition prevalence has changed in 2003, 2005 and 2008 relative to the year 2000. In general, time period dummies shows that all measures of child malnutrition were significantly rising state wide at 2008 for reasons that cannot be explained by the control variables. The rest of the control variables have not shown any significant impact on childhood undernutrition that includes the Gini coefficient and women education.

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Table 1: Econometric Analysis: First Difference Models

	(1) $\Delta(underweightrate)$	(2) $\Delta(underweightrate)$	(3) $\Delta(underweightrate)$
$\Delta log(GDP)$	-2.692	-3.007*	-2.895
	(-1.98)	(-2.05)	(-1.92)
d2008	6.622	1.495	1.860
	(1.55)	(0.17)	(0.20)
d2005	4.049	0.0722	0.222
	(1.28)	(0.01)	(0.03)
d2003	5.404***	3.440	3.577
	(3.46)	(1.00)	(1.03)
$\Delta log(education)$		-1.677	-2.074
		(-0.67)	(-0.85)
$\Delta(Gini)$			-0.0297
			(-0.44)
_cons	-0.950	1.042	0.959
	(-0.68)	(0.31)	(0.28)
N	84	84	84
R^2	0.37	0.37	0.37
$Prob > F$	0.0000	0.0000	0.000

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

There is no evidence of serial correlation in the models. The Wooldridge's test cannot reject the null hypothesis that claims no first-order autocorrelation. However, the likehood ratio test shows the model testing the effect of economic growth on underweight has panel heteroskedasticity; thus, the model has been estimated with robust standard errors.

Table 2: Econometric Analysis: First Difference Models

	(1) $\Delta(wastingrate)$	(2) $\Delta(wastingrate)$	(3) $\Delta(wastingrate)$
$\Delta log(GDP)$	-4.363*	-4.606*	-3.991
	(-2.01)	(-2.09)	(-1.78)
d2008	-2.979	0.811	13.94
	(-0.49)	(0.10)	(1.07)
d2005	-4.002	-0.403	10.01
	(-0.92)	(-0.06)	(0.95)
d2003	-0.949	0.809	6.242
	(-0.42)	(0.23)	(1.15)
$\Delta(education)$		0.140	0.330
		(0.64)	(1.27)
$\Delta(Gini)$			-0.150
			(-1.32)
_cons	3.203	1.471	-3.683
	(1.43)	(0.42)	(-0.70)
N	84	84	84
R^2	0.14	0.14	0.16
$Prob > F$	0.01	0.02	0.02

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3: Econometric Analysis: First Difference Models

	(1) $\Delta(stuntingrate)$	(2) $\Delta(stuntingrate)$	(3) $\Delta(stuntingrate)$
$\Delta log(GDP)$	-0.811	-1.500	-0.620
	(-0.13)	(-0.23)	(-0.09)
d2008	22.46	33.22	52.03
	(1.28)	(1.35)	(1.36)
d2005	12.34	22.56	37.47
	(0.98)	(1.09)	(1.21)
d2003	1.677	6.665	14.45
	(0.25)	(0.64)	(0.91)
$\Delta(education)$		0.397	0.670
		(0.63)	(0.88)
$\Delta(Gini)$			-0.215
			(-0.64)
_cons	-4.971	-9.885	-17.27
	(-0.77)	(-0.97)	(-1.12)
N	84	84	84
R^2	0.12	0.12	0.13
$Prob > F$	0.03	0.05	0.08

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

8 Discussion and Conclusion

The paper failed to find a strong robust relationship between economic growth and child malnutrition. Despite the real income per capita has been continuously growing from LE 8369 in 1992 to LE 12,807 in 2008, which is equivalent to 3.31% growth rate per year, the proportion of stunted children has remained unchanged at 29% in the years 1992 and 2008. On the other hand, economic growth has some statistical significant effect on underweight and wasting. However, it has no economic significance.

In fact, the association between economic growth and child malnutrition is relying on the assumption that as households become richer, they purchase more food and feed their children more. But this assumption may not necessarily hold. People may choose to spend their additional income gained from economic growth on non-food items or on foods with little or nutritional value. An additional possible explanation for the non-significance of economic growth is widespread of poor feeding practices and care in Egypt. Kavle et al., (2014) have suggested children in Egypt fed little to no animal-source foods while junk food is a major complementary food and increasing with age. The junk food consumption is supported by parents and some health care providers and it often replaces other nutritive foods. There is also excessive consumption of black tea and juices. An additional factor that intensifies the malnutrition problem is that parents do not relate inadequate feeding practices to low height for age. They commonly viewed stunting as hereditary (Kavle et al., 2014).

This is not the first paper that fails to find a significant relationship between economic growth and childhood undernutrition. For example, in spite of India's rapid growth performance, Subramanyan et al., (2011) failed to find a significant association between economic growth and child malnutrition. Similarly, Harttgen, Klasen and Vollmer (2013) studied the effect of economic growth on child malnutrition in Sub-Saharan Africa and they rejected that economic growth has reduced childhood undernutrition. There are growing evidence in the literature that suggest there are other factors that are more critical to child nutritional status than macroeconomic development (Klasen, 2008). For instance, Jayachandran and Pande (2013) have suggested the fact that Indian children are shorter than Sub-Saharan African children is explained by the parental preferences regarding

higher birth order children driven by culture norms of eldest son preference. In Sub-Saharan African countries, Harttgen, Klasen and Vollmer (2012) have suggested factors like women's education and low fertility are more important to child health than economic growth.

There are several evidences that suggest child's malnutrition in Egypt is not a problem of food insecurity and hunger. Firstly, The level of child malnutrition is almost equally distributed among wealth groups (see table 5 at the appendix). In the years 2005 and 2008, the proportions of wasted children, wasting indicates starvation, are higher at the richest wealth quintile compared to the poorest quintile. In 2008, the level of extreme stunting is higher among the richest quintile compared to the poorest quintile. This suggests that there is a common driver of childhood undernutrition among different socio-economic groups. Secondly, Egypt is a middle-income country with a very low level of extreme poverty. The proportion of population below $1 (PPP) a day equals 3.5% in 2005. Thirdly, the problem of underweight among adults is a minor problem. For example, the percentage of underweight among adult women does not exceed 1% in the period between 2000 and 2008. On the contrary, Egypt is experiencing a very high rate of obesity and overweight exceeding 70% among adults (Ng et al., 2014). This implies that malnourished child and obese parents coexist under one roof. Fourthly, Egypt has one of the largest food subsidy programs. In 2008, the government of Egypt spent about $4 billion in food subsidies (2% of the GDP). Subsidized food in Egypt is an inferior good for non-poor household (Ahmed, 2001). Finally, Dehaen, Klasen and Qaim (2011) have argued that the high rates of childhood undernutrition are not a good indicator of development and food insecurity. For example, despite countries like India and Egypt outperforms Sub-Saharan African countries on several development indicators such as infant and maternal mortality, life expectancy, poverty incidence and educational attainment but they are enduring higher rates of child malnutrition than Sub-Saharan African countries.

We stress that the standard explanation in the literature for the high prevalence of undernutrition cannot explain the situation in Egypt. Higher income has not led to a better nutritional status of children and further research is needed on the impact of individual factors such as short birth interval, feeding practices, culture norms on undernutrition in Egypt.

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Table 4: Among all youngest children 6-23 months living with mother, percentage breastfed and receiving other foods according to minimum practices for breastfed children

Background characteristic	3+ or 4+ food groups	Minimum number of times	Appropriate feeding practices
Age in months			
6-8	31.3	51.3	27.7
9-11	61.1	43.4	37.1
12-17	80.2	55.4	50.6
18-23	87	47	43.8
Sex			
Male	67.4	50.8	42
Female	69.6	49.2	40.8
Place of residence			
Urban Governorates	70.5	58.1	48.5
Lower Egypt	70.5	46.7	39
Urban	71	44.6	37.3
Rural	70.4	47.3	39.5
Upper Egypt	65	50	40.6 Source:
Urban	67.2	52	42.7
Rural	64	49	39.7
Mother's education			
No education	61.9	48.9	39.3
some primary	69.4	43.99	38.8
primary complete/ some secondary	69.5	49.5	42
Secondary complete/ higher	70.8	51.3	42.4
Weatlh quintile			
Lowest	63.7	51.2	41.6
Second	66.5	49.2	40
Middle	70	46.1	39.1
Fourth	67.1	49.8	39.4
Highest	75	54	47
Total	68.5	50	41.4

Table 5: Child Malnutrition by Background Characteristic

Background/ Year	Stunting (%)				Underweight (%)				Wasting (%)			
	2000	2003	2005	2008	2000	2003	2005	2008	2000	2003	2005	2008
Household Wealth Index												
Lowest	31.3	22.6	30.2	29.5	5.2	9.8	5.8	7.5	3.2	5.4	5.1	7.1
Second	26.6	21.4	24.1	30.5	4.2	8.9	5.5	6	3.2	4.8	3.4	7.9
Middle	24	19.3	22.7	27.3	3.7	6.5	4.9	5.9	2.9	4.9	3.6	8
Fourth	19.7	17.6	18.8	30.3	3	7.6	4	5.1	3.6	6	4.6	5.6
Highest	14.9	17.9	17.6	26.9	2.4	6.1	4.8	5.4	2	4.2	7.8	7.6
Birth Interval												
First birth	22.6	19.2	21.2	27.8	3.2	7.9	4.8	5.7	3.1	5.1	4.6	7.2
Less than 24 months	28.2	21.8	26.3	34.1	5.4	8.8	6.4	7.7	3.1	6.1	5.7	7.2
24-47 months	23.5	19.9	25.3	28.5	3.9	8.3	5.2	5.8	3.3	5	4.4	7.2
48+ months	20.8	19.5	18.6	28.4	2.6	6.7	4.1	5.8	2.2	4.7	5	7.5
Sub-national regions												
Urban Governorates	13	18.8	20.5	22.3	2.3	5.1	5.8	5.9	2.2	4.1	9.2	9.8
Lower Egypt	19.9	14.4	17.3	34.2	2.5	6.4	3.5	5.5	3.8	4.5	3.4	6.8
Lower Egypt - urban	17.3	13.2	19.7	39.3	2.3	4.9	3.7	5.2	3.8	4.3	3.1	6.3
Lower Egypt - rural	20.9	14.9	16.6	32.7	2.5	6.9	3.4	5.6	3.8	4.6	3.4	6.9
Upper Egypt	31.5	25.6	28.5	25.7	5.7	10.3	6.2	6.7	2.6	6	4.7	6.8
Upper Egypt - urban	27	20.9	23.1	22.7	4.3	10.2	4.9	7.1	2.2	7.7	4.9	8
Upper Egypt - rural	33.2	27.3	30.6	26.9	6.2	10.4	6.7	6.5	2.8	5.4	4.6	6.3

Table 6: Child Malnutrition according to Governorate

Governorate/ Year	Underweight (%)					Wasting (%)					Stunting (%)				
	1992	2000	2003	2005	2008	1992	2000	2003	2005	2008	1992	2000	2003	2005	2008
Urban Governorates															
Cairo	6.11	1.39	5.92	7.47	7.51	4.00	2.00	5.20	12.15	13.10	23.26	12.06	20.56	21.23	23.94
Alexandria	9.59	3.82	3.52	2.77	2.99	10.00	2.40	2.50	4.30	5.60	17.81	15.09	19.60	19.76	18.26
Port said	2.39	2.16	3.45	1.47	5.88	7.10	2.15	1.70	1.20	7.40	14.83	10.79	6.03	4.99	41.71
Suez	3.53	1.65	6.75	4.44	7.17	1.25	1.30	3.00	1.80	9.00	14.11	12.87	6.13	31.48	12.35
Lower Egypt															
Damietta	2.42	2.20	8.70	3.76	4.71	1.20	6.60	5.00	1.60	3.90	14.11	7.49	8.70	18.82	48.63
Dakahlia	2.41	1.83	5.83	1.91	2.57	2.00	5.20	6.70	2.00	0.60	27.59	13.18	11.17	8.90	27.19
Sharkia	5.22	1.67	9.71	4.15	5.26	1.37	1.10	4.00	3.00	3.94	37.64	20.26	14.39	18.05	49.44
Kayubia	5.52	1.90	12.56	4.69	7.48	1.94	1.50	9.30	3.20	0.27	26.30	13.47	19.53	20.00	65.37
Kafr-El Sheikh	7.41	3.69	1.55	5.77	16.94	4.00	6.30	0.50	7.00	21.20	23.57	14.50	6.70	20.19	23.26
Gharbia	4.49	3.42	6.50	0.26	0.49	1.40	6.80	4.00	0.50	0.24	27.54	25.64	19.51	10.20	37.86
Menoufia	10.39	1.66	4.26	4.39	1.73	3.90	1.40	2.00	5.30	1.90	29.03	29.15	5.53	25.37	19.55
Behera	6.59	3.09	3.04	2.01	8.96	5.60	4.10	4.70	3.50	24.30	45.81	24.69	23.91	18.08	14.50
Ismailia	6.21	3.35	6.17	14.75	2.51	4.40	1.40	1.80	11.20	7.50	19.23	23.42	11.73	40.65	20.92
Upper Egypt															
Giza	8.96	4.80	6.76	3.21	7.02	3.00	2.00	5.40	3.90	6.50	33.13	25.94	18.58	19.64	21.70
Beni suef	1.76	4.80	15.81	5.84	3.68	5.20	3.00	14.40	3.70	2.90	18.82	34.34	27.91	48.61	27.67
Fayoum	9.74	3.23	17.31	4.27	7.80	3.50	2.00	10.00	2.30	16.20	41.09	18.94	45.67	25.81	19.92
Menya	11.03	5.49	7.17	7.82	8.18	6.60	2.70	3.50	7.70	7.20	34.10	28.60	20.72	38.27	26.54
Assiut	12.29	7.86	13.33	6.01	6.51	2.20	1.50	8.00	2.65	5.50	46.57	48.74	24.67	19.43	32.72
Souhag	11.91	5.70	9.49	8.09	6.25	4.80	2.70	2.50	3.49	4.60	35.74	40.07	31.96	29.04	26.19
Qena	9.71	7.00	10.73	8.54	5.72	3.80	4.60	5.20	7.50	5.40	26.41	23.88	22.49	28.23	28.88
Aswan	10.72	5.99	5.81	8.58	8.62	3.20	3.10	2.30	7.50	10.60	24.69	18.30	25.00	41.60	24.83

Table 7: GDP Per Capita (L.E) and Gini Coefficient

Governorate/ Year	GDP Per Capita (LE)					Gini Coefficient				
	1992	2000	2003	2005	2008	1992	2000	2003	2005	2008
Cairo	2782	10167.7	11277	6157	7726	34	39	41	38	38
Alexandria	2310	8066.6	8947	5840	8978	37.9	32.3	38.1	34	30
Port said	3715	12098.8	13419	6823	10550	33.6	33.7	30.9	34	34
Suez	2170	9157	10156	6254	8746	35.6	28.7	26	29	29
Damietta	3201	6250.9	6933	6652	7884	29.9	15.5	22	25	21
Dakahlia	3489	4373.6	4851	6769	9112	34.8	21.3	23.5	23	22
Sharkia	2050	4181.9	4638	6614	8700	30	19.4	18.8	20	19
Kayubia	1554	5391.8	5980	6154	8134	30.3	24.7	25.4	25	23
Kafr-El Sheikh	2612	5037.8	5588	6270	8928	37.9	21.9	29.8	24	21
Gharbia	2133	5314.8	5895	7072	8800	35.1	24	30.2	26	24
Menoufia	1666	4212.7	4672	6799	9854	32	22.6	22.4	22	23
Behera	1566	4672.9	5183	8396	9452	34.7	19.9	23.5	20	19
Ismailia	2345	5989.3	6643	6752	8970	26.9	22.9	21.7	22	27
Giza	2123	6153.4	6825	5552	8243	34.4	33	42.3	35	34
Beni Suef	1663	3331.1	3695	7043	8857	42.8	25.2	25.9	26	21
Fayoum	1581	3612.8	4007	5706	8434	47.5	21	25.6	25	21
Menya	1554	3916	4343	6823	8656	56.1	24.3	24.8	24	24
Assiut	1519	3008.8	3337	5420	8020	52.2	23.3	24.6	25	27
Souhag	1729	3278.1	3636	5370	7330	52.2	22	25.3	24	23
Qena	1768	3930.3	4359	5543	6388	41.3	22.8	26.4	19	23
Aswan	1680	4780	5302	6053	7057	34.9	26.2	23.2	21	27

Source: Egypt-Human Development Reports (http://www.arab-hdr.org/reports/nationalarab.aspx?cid=5).

Chapter 3

Are Public Health Expenditures in Egypt Pro-Poor or Pro-Rich?

Abstract

Subsidization of health care can raise public health and productivity of labor increasing income for all. Egypt has been relying on subsidization policy for decades to help make health care more affordable. A significant proportion of public spending in Egypt goes to health care subsidization. This study uses data from Egypt Demographic and Health Survey together with data from Egypt National Health Accounts to empirically analyze how health sector subsidies vary with household economic status. The paper serves as a baseline for assessing equity in the distribution of subsidies in Egypt. To address the research question, the paper uses Benefit Incidence Analysis coupled with dominance test of significance to identify who received the lion's share of health subsidies. The study's findings show that subsidies associated with University hospitals are pro-rich and have inequality increasing effect, while subsidies associated with the Ministry of Health and Population have not been pro-poor, but they have inequality-reducing the effect (weakly progressive). Overall, the paper concludes while it is widely perceived that the poor benefit the most from health subsidies, the reality in Egypt indicates it's not.

1   Introduction

Progressive and pro-poor social spending is an objective of numerous governments. It is a strong instrument for alleviating poverty in developing countries, where di-

rect targeting of the poor is seriously obstructed by the data and administrative constraints (Besley & Coate, 1991). However, its effect depends on how the benefits of social spending are distributed. The right to health is a basic human right and many countries rely on public spending to improve the accessibility to the health care services. Guaranteeing that the government health subsidies are progressive is very critical to policy makers to ensure that the poor can afford access to health care. Adequate access to health care services is not only crucial for its humanitarian considerations, but also for maintaining the productivity of the labor force, and hence increasing the economic growth. Health subsidies can reduce income disparities if the subsidies are benefiting the poor more than rich. Thus, the effect of in-kind subsidies on income distribution depends on the distribution of the subsidization benefits across classes.

Egypt has been adopting a subsidized health care system for several decades. Following the establishment of the Republic of Egypt in 1952, the new socialist regime has relied on redistribution system that promoted a minimum standard of living by providing universal subsidies of basic consumption goods (Silva & Morgandi, 2012). Egypt still has one of the biggest subsidy programs that provides food aid and energy on a massive scale. In the health sector, the government of Egypt has pledged to provide free health care to all citizens. The right of access to health is a constitutional right. The government uses general tax revenues to provide subsidized health care to all citizens. On average, public health spending accounts for 6% of total public spending between years 2000 and 2009 (Figure 1).

Hinder by the availability of data especially in developing countries, few studies could examine the distribution of health subsidies. O'Donnell et al (2007) looked to the distribution of health subsidies in 11 Asian countries. They reported mixed findings with a pro-poor distribution of subsidies in Hong Kong, Malaysia and Thailand, even distribution in Sri Lanka while pro rich distribution of subsidies has been found in the rest of countries. In addition to cross-country studies, a growing number of country-specific studies have examined the distribution and equity aspects of public health care subsidies in a wide range of countries, during different periods, and using different estimation techniques with similarly mixed findings. In addition to cross-country studies, a growing number of country-specific studies have examined the distribution and equity aspects of public health care subsidies in a wide range of countries, during different periods, and using different

Figure 1: Public Health Spending in Egypt
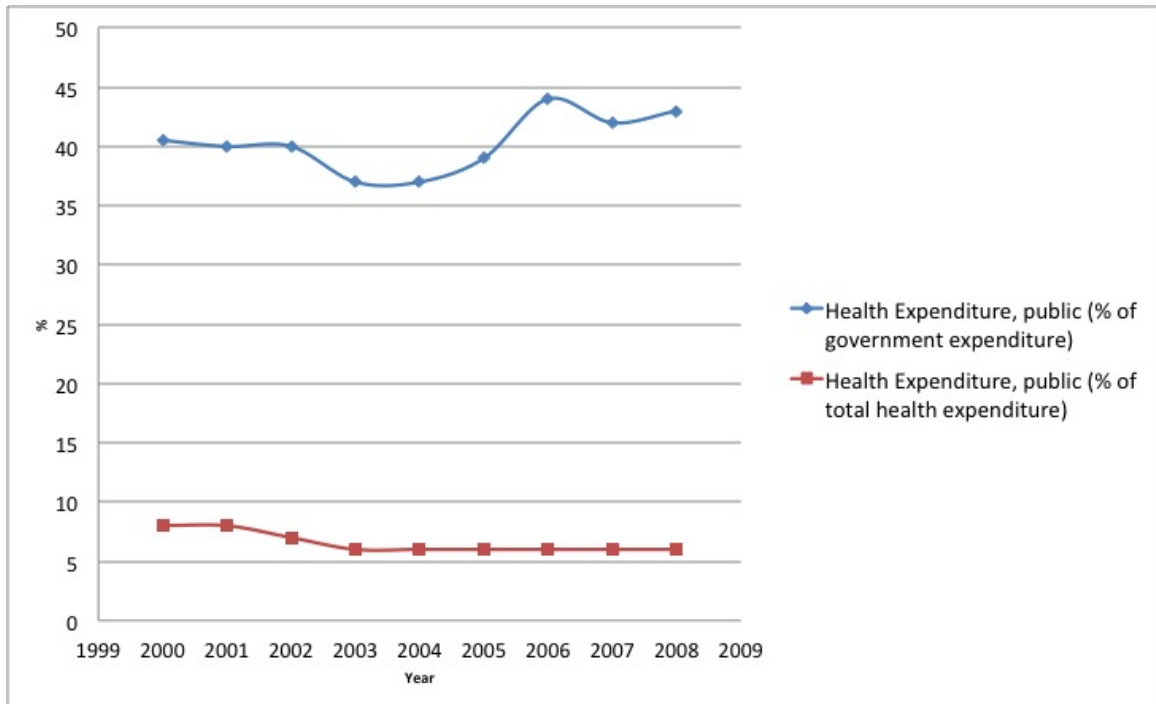
Source: World Development Indicators

estimation techniques with similarly mixed findings (Akazili, Garshong, Aikins, Gyapong, & McIntyre, 2012; Halasa, Nassar, & Zaky, 2010; Onwujekwe, Hanson, & Uzochukwu, 2012; Chen et al., 2015)

Only one related study has investigated the distributional aspect of public health care expenditure in Egypt. In an earlier study, Rannan-Eliya et al. (2000), combined data from the national health accounts, and micro data from the National Household Health Utilization and Expenditure Survey conducted in 1994, to examine the degree of inequality in the distribution of health expenditures in Egypt. The incidence of overall health expenditures in Egypt was found to be progressive. They concluded that the social insurance programs in Egypt and the use of cost recovery in some public sector institutions contributed to greater inequality in the access to health care resources, both when evaluated by the level of income, and gender. The 1994-1995 expansion of social health insurance coverage to children has not improved the distribution of health care spending in favor of lower income households. The current study extends the earlier study of Rannan-Eliya et al. (2000) by using an up to data from the Egyptian Demographic and Health Survey, and using a Benefit Incidence Analysis.

This paper contributes to the extant literature by empirically analyzing the

distribution of public health care subsidies by focusing on the specific case of Egypt on which limited research has been conducted. Who benefits most from subsidies? Is it the better off households or the poor? What is the effect of government health subsidies on income distribution? These are the issues addressed in this paper. It is the first attempt to assess the distribution of government health sector subsidies across economic classes in Egypt. To evaluate whether public health spending is pro-poor or pro-rich, the paper uses Benefit Incidence Analysis (BIA) (Onwujekwe et al., 2012; O. A. O'Donnell, Wagstaff, et al., 2008; Wagstaff, 2012), which is an accounting procedure that can determine who gets how much of the amount the government spends providing health care to the population. In the next section, we will shed the light on the structure of the healthcare system in Egypt followed by a description of BIA and the survey used in the analysis then a presentation of the results and conclusion.

2   Background

Egypt has a highly pluralistic health care system, with several different public and private providers and financing agents (El Zanaty & Way, 2006). Public health providers include the Ministry of Health and Population and other organizations that receive budgetary support from the government general revenues. Only public health providers who receive budgetary support are considered in BIA. Private for-profit health providers and other non-profit organizations that are not subsidized from the government revenue are not taken into account.

The subsidized health system is under continuous population pressure resulting from the significant increase in life expectancy and the high fertility rate. Consequently, this has led to increasing use of private health facilities, which require fees (El Zanaty & Way, 2006; Benova, Campbell, Sholkamy, & Ploubidis, 2014). The majority of total health spending in Egypt comes from household out of pocket payments, which may cause catastrophic economic consequences on household's economic situation in case a household member falls sick (Rashad, 2014; Van Doorslaer et al., 2006). In 2008, the share of out of pocket payments in total health spending is about 60% (United States Agency for International Development (USAID), 2010).

The Ministry of Health and Population (MOHP) operates a large network of

health facilities that offer comprehensive health care to all Egyptians at highly subsidized rates. It owns more than 441 hospitals and 4,839 primary health care centers. In effect, 80% of MOHP's service are free and the rest requires some fees. In addition to out of pocket payments and donations, the vast majority of MOHP funding comes from the Ministry of Finance. University hospitals are important health providers. They are autonomous facilities affiliated to individual universities and falling under the responsibility of the Ministry of Higher Education. The number of University hospitals is 76 hospitals in 2008 (the year of study). The majority of University hospitals funding comes from the Ministry of Finance through the Ministry of Higher Education and 30% comes from user fees. They provide primary, secondary, and tertiary treatment. They are highly concentrated in Cairo and urban areas.

In addition to MOHP and University hospitals, Teaching Hospitals and Institutes Organization (THIO), Curative Care Organization (CCO) and the Health Insurance Organization are additional key health providers. They are quasi-governmental organizations. Teaching Hospitals and Institutes Organization runs 11 general teaching hospitals and 20 research institutes. It provides primary, secondary, and tertiary services. Half of THIO's services are free of charges. It serves a small proportion of the population due to its small size. It receives funding from the Ministry of Finance, MOHP through contracts, private firms through contracts, international donors through grants, the Health Insurance Organization through contracts and direct user fees. CCO is a non-profit organization under the authority of MOHP. It operates 11 urban hospitals. Consequently, it mainly serves urban residents. It provides a comprehensive range of curative care services. It does not receive any subsidy from the Government, it is 100% cost recovery. The Health Insurance Organization is an independent public organization under the authority of MOHP. It provides compulsory insurance to formal sector workers, widows and pensioners, school children and newborns. It is funded mainly from insurance premiums and co-payments and it covers 55% of the population at the year 2008. However, less than half of the insured are really benefiting from the insurance scheme (Shawky, 2010). Previous studies have documented a number of access constraints which contribute to inequities in the distribution of health service benefits. These include long queues, long waiting hours, and inadequate staff and equipment in health care facilities especially in rural areas (O'Donnell,

Figure 2: Delivery in a Health Facility by Wealth Quintile in 2008
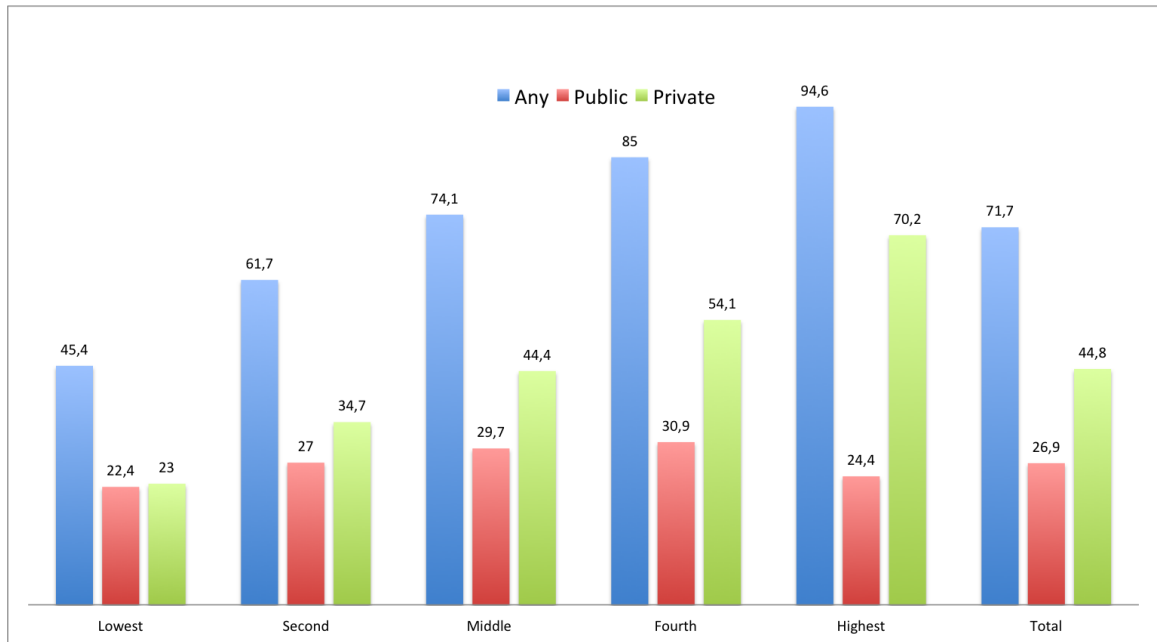
Source:Author's compilation based on Demographic and Health Survey

2007; WHO, 2008; Akazili et al., 2012).

There is a large disparity in health care utilization across wealth quintiles. Household wealth is a key determinant of access to health care. For example, women in the richest quintile are more than twice as likely as women in the poorest quintile to deliver in a health facility (Figure 2). Based on a survey, 70 percent of poor households mentioned financial cost as a significant impediment to health care (Silva & Morgandi, 2012).

Despite the subsidization, the utilization of MOHP outpatient facilities is very low (Nandakumar, Chawla, & Khan, 2000). The most striking fact about the choice of health care provider is the high use of private health care among the poor. Figure 3 displays the choice of provider for outpatient care by income quintile. The private sector dominates the provision of outpatient care even among the poor. For households in the poorest quintile, 15% of all outpatient visits occurred in MOHP outpatient facilities, while 70% occurred in the private sector. The utilization of MOHP outpatient facilities steadily decreases with income. A similar pattern is observed for inpatient care (Figure 4). The utilization of MOHP inpatient facilities is more frequent than MOHP outpatient facilities, which is likely due to the high fees associated with inpatient care at the private sector. The private sector is the preferred provider for inpatient care for the wealthiest quintile and even for the

Figure 3: Choice of Outpatient Care Provider by Income Quintile
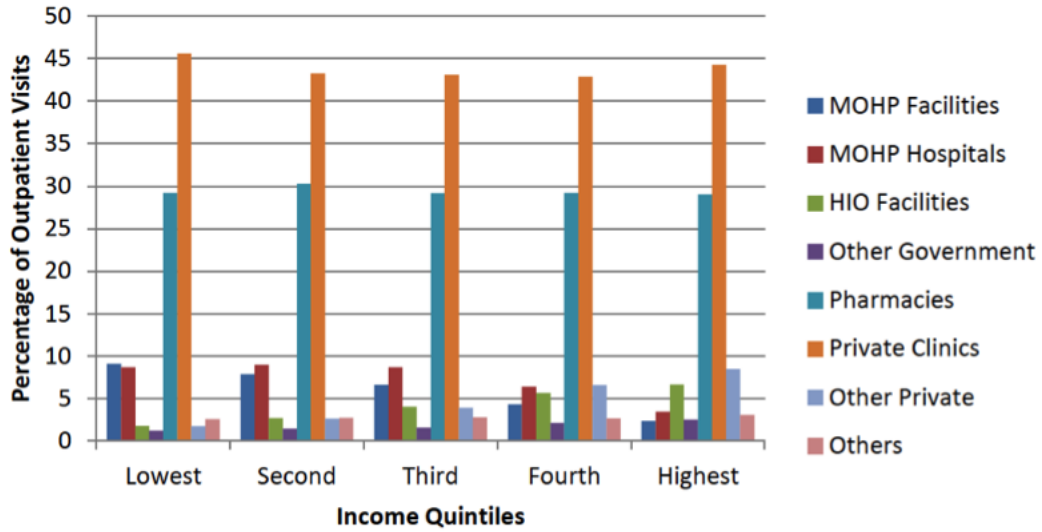
Source: Egypt National Health Accounts:2008/2009

insured patients if they can afford it.

It is difficult to run BIA on quasi-governmental organizations, as they raise funds from several sources and it is not possible to identify the subsidized patients from the non-subsidized patients. Consequently, BIA has been limited to MOHP and University hospitals, as both mainly get funding from the general tax revenue. Three categories of health care service are explored in BIA: ambulatory visits to MOHP, hospital stays in MOHP, and hospital stays in University hospitals.

3 Method

BIA requires micro data on the use of different types of health care. Egypt Demographic and Health Survey (EDHS) implemented in the year 2008 collected information from 12,008 women and men on outpatient visits to health care providers, hospital stays and on expense incurred (El-Zanaty & Way, 2009). The survey distinguishes between public and private care. It collects information on the level of household ownership and the information are used on constructing a measure of living standard (Table 1) based on principal component analysis. The recall period for outpatient visits and hospital stays is four weeks.

BIA needs the amount of public spending on each type of health care service for which utilization data are available on the survey. Data on public spending on

Figure 4: Inpatient Care Provider by Income Quintile
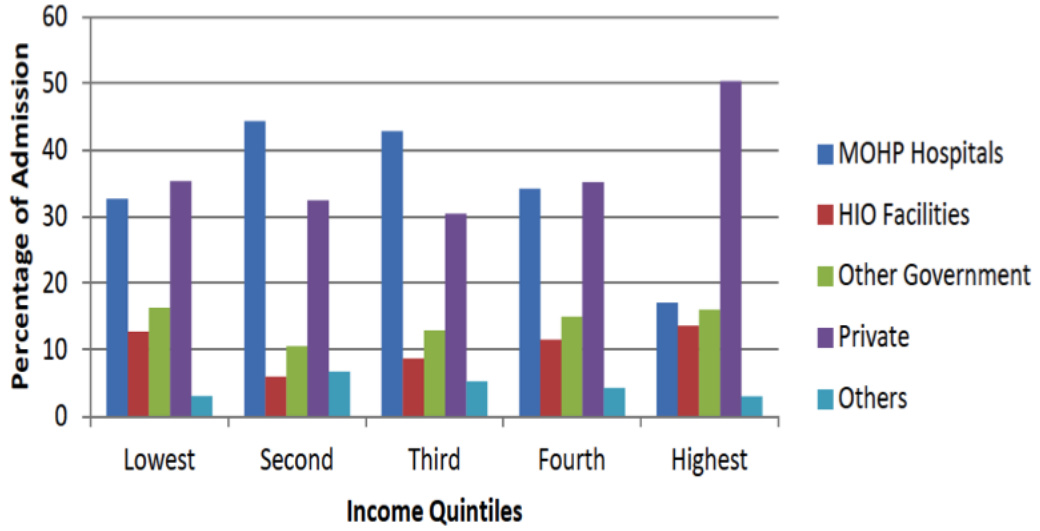
Table 1: List of Assets Commonly in Wealth Index

Usual assets used in construction of wealth index in DHS surveys	
Type of flooring	Refrigerator
Water supply	Type of vehicle
Sanitation facilitilies	Persons per sleeping room
Electricity	Ownership of agriculture land
Radio	Domestic servant
Television	Country specific items
Telephone	

health care are computed from the Egypt National Health Accounts 2008 (Table 2). Table 2 assumes that the unit cost is the same for a given type of service. Additionally, variations in the quality of health care services across regions are not captured in the analysis.

The starting point for BIA is the estimation of unit subsidy received by a patient. The service specific subsidy received by a patient can be calculated as:

$$s_{ki} = q_{ki}c_{kj} - f_{ki} \tag{1}$$

Table 2: Public Health Spending in Egyptian pound for the year 2008

Health Provider	Public Expenditure	Out of Pocket Payments	Unit cost
Inpatient care			
MOHP Hospitals	3,819,458,728	288,049,928	281
University Hospitals	2,638,095,984	294,610,573	536
Outpatient care	2,180,591,664	527,439,388	60

where q is the quantity of health service (measured by the number of visits or number of nights in hospital) k utilized by patient i. f is the fee paid for service k by patient i. The 2008 EDHS recorded the expense incurred for each type of health service. c is the cost per unit of health service k at region j. Unit cost can be calculated by dividing total spending on service k by the weighted quantity of utilization provided in the survey.

$$c_k = \frac{S_k + F_k}{\sum q_{ki}}$$

Where S_k and F_k are the sum of government subsidies and out of pocket payments on service k respectively divided by the aggregate utilization. The weights used are expansion factors. The expansion factor reflects how many individuals in the population are represented by each sample observation.

The total amount of subsidy received by patient i can be calculated as:

$$s_i = \sum_k \alpha_k (q_{ki} c_{kj} - f_{ki}) \tag{2}$$

α_k standardizes the recall period across different types of health care services. It equals one if the recall period is one year and equals 13 for four weeks recall period.

Following the estimation of the amount subsidy received by each individual in the sample, the next step is to evaluate the distribution of subsidy across income quintiles. A concentration index is used to determine whether the subsidization of health care is pro-poor or pro-rich. The concentration index (CI) is a quantification

of the degree of economic related inequality in the variable of interest. A positive CI indicates the pro-rich distribution of subsidies and a negative CI reflects pro-poor distribution (O. A. O'Donnell et al., 2008). It ranges between +1 and -1. The higher the absolute value of the CI, the higher the degree of concentration of subsidies among the economic group. The CI can get more pro-poor either due to low utilization public health facilities by the rich or higher concentration of user fees among the rich. It is calculated as follows:

$$CI = \frac{2}{\mu}Cov(S, W)$$

Where S is the amount of subsidy received by individual i and μ its mean while W is the measure of living standard. Therefore, the CI depends on the covariance between the amount of subsidy received and its association with the measure of living standard. In addition to the CI, the concentration curve is used to illustrate the share of subsidies accounted for by cumulative proportions of individuals in the population ranked from poorest to richest.

The concentration indexes and curves are powerful tools for assessing the distribution of health sector subsidies. However, a visual inspection of the concentration curve is not sufficient to conclude whether subsidies are pro-poor or pro-rich. A formal test of statistical dominance is necessary to definitively decide whether health sector subsidies benefit the poor or the better off. Using the concentration curve dominance test, the concentration curve for outpatient care is statistically pro-poor if at least one quantile point at which the concentration curve for outpatient care lies significantly above the 45 degree line and there is no quantile point at which the 45 degree line lies above the concentration curve (O. O'Donnell et al., 2007).

4   Result

The first part of Table 3 gives the average subsidy received by each wealth quintile for inpatient admission at University hospitals, the outpatient visit to MOHP, and hospital stays at MOHP respectively. The table shows that subsidies for University hospitals increase with wealth level. The fourth quintile (121.09) benefiting

six times more than the poorest quintile. On the contrary, public subsidies for ambulatory care in MOHP and inpatient care in MOHP hospitals are inversely related to wealth level. Kakwani's progressivity index is also reported in the result. It evaluates whether health sector subsidies reduce inequality (weak progressivity) by comparing income distribution to subsidies distribution. It is equal to the difference between the subsidies CI and the Gini index and it ranges between -2 and 1. Data for the Gini coefficient and income shares are obtained from the World Bank Development Indicators database.

The second part of the table gives the share of each quintile in public subsidies in relative terms. Households at the poorest quintile receive 40% of public subsidies associated with ambulatory care while households at the richest quintile receive 16% of subsidies associated with ambulatory care. A similar pattern is observed for inpatient care at MOHP hospitals. For University hospitals, the poorest quintile receives only 11% of subsidies, while the fourth quintile alone receives 67% of subsidies.

The positive CI for University hospitals suggests that subsidies associated with University hospitals are strongly concentrated among the better-off. The Kakwani index for inpatient admission at University hospitals is positive, which indicates that subsidies associated with hospital care at University hospitals are increasing the income gap between the rich and the poor. On the other hand, the CIs for outpatient visits and inpatient care at MOHP are both negative, indicating they are pro-poor. Overall, health sector subsidies seem slightly pro-poor, as the CI of total subsidies is almost equaled to zero. Finally, the Kakwani indexes are both negative indicating that subsidies associated with the MOHP are closing the income gap between the poor and the better off (Table 3).

The dominance tests are conducted to investigate whether health sector subsidies are significantly pro-poor at the 5% significance level. The tests fail to reject the null hypothesis that curves are indistinguishable from the line of equality, which points that health subsidies are not pro-poor. However, testing the concentration curves against the income distribution shows that the concentration curves for outpatient and inpatient care at the MOHP dominate the income distribution curve. This suggests that subsidies associated with the MOHP are inequality-reducing (weakly progressive).

Figure 5 is a visualization of Table 3. It shows that the concentration curves

Table 3: Distribution of Health Subsidies in Egyptian Pounds

	Income	Uni Hospitals	MOHP		Total [a]
			Outpatient	Inpatient	
Mean subsidy					
Lowest quintile	5,153	20.05	35.94	103.81	159.60
(standard error)		(20.05)	(5.58)	(38.82)	(43.97)
Second quintile	7,216	5.95	34.22	52.32	92.33
		(5.95)	(4.42)	(23.99)	(25.51)
Middle quintile	9,086	12.28	32.06	44.64	88.91
		(7.60)	(4.23)	(20.41)	(22.55)
Fourth quintile	11,687	121.09	22.14	16.61	159.75
		(69.35)	(3.57)	(12.38)	(70.50)
Highest quintile	22,341	19.77	24.23	42.09	86.01
		(19.77)	(4.81)	(20.54)	(28.98)
Total	11,192	35.82	29.72	51.87	117.30
		(15.10)	(2.04)	(11.09)	(18.87)
Shares					
Lowest quintile	9.3	11.2	24.1	40.0	27.2
		(10.92)	(3.19)	(10.86)	(6.70)
Second quintile	13	3.3	23.0	20.2	15.8
		(3.50)	(2.73)	(8.36)	(4.41)
Middle quintile	16.4	6.9	21.6	17.2	15.2
		(4.89)	(2.64)	(7.36)	(4.04)
Fourth quintile	21	67.6	14.9	6.4	27.2
		(16.84)	(2.28)	(4.66)	(9.23)
Highest quintile	40.3	11.0	16.3	16.2	14.7
		(10.81)	(2.90)	(7.39)	(4.79)
Total	100.0	100.0	100.0	100.0	100.0
Test of dominance					
against 45 degree line		none [b]	none	none	none
against Lorenz curve		none	D-	D+	D+
Concentration Index		0.3182	-0.1051	-0.2168	-0.0252
		(0.15)	(0.04)	(0.12)	(0.09)
Kakwani Index		0.1	-0.309	-0.51	-0.31

[a] Total refers to overall subsidies.

[b] None indicates that the concentration curve is indistinguishable from the 45 degree line or Lorenz curve. D- or D+ indicates the concentration curve is significantly distinguishable from the compared distribution.

Figure 5: Concentration Curves for Health Sector Subsidies
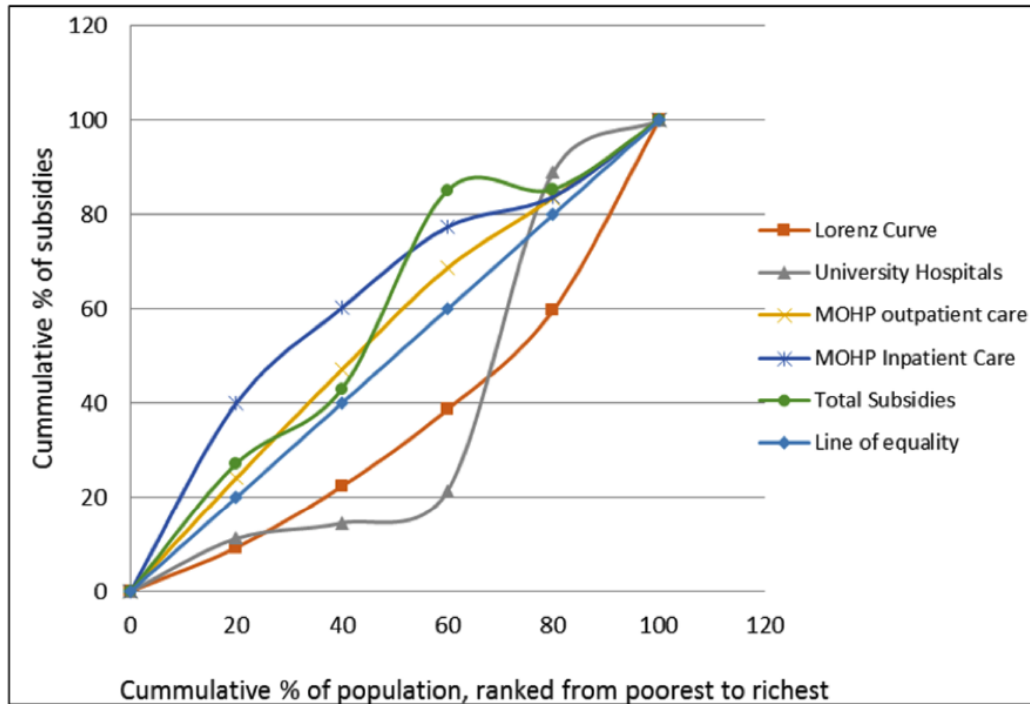
for outpatient care and inpatient care at MOHP lay above the line of equality, which means that the poor benefits more from public subsidies than the better off. In contrast, the concentration curve for University hospitals lies below the line of equality, which indicates the better off benefit more from subsidies. The concentration curve for total subsides is slightly above the 45-degree line for the first two quintiles and farther is almost on the top of the 45-degree line.

5 Conclusion

Egypt has been adopting a subsidized healthcare system for decades. This paper examined whether public healthcare subsidies in Egypt are pro-poor or pro-rich. Results show that public subsidies to healthcare services in Egypt are not pro-poor, meaning that subsidies tend to benefit wealthier groups more than the poorer groups. Under less restrictive assumption, in which the distribution of subsidies is compared to income distribution, the BIA showed that subsidies associated with the MOHP have inequality-reducing effect (weakly progressive). University hospitalsâ subsidies are mainly benefiting the rich and did not contribute to closing the income gap.

Previous studies have documented a number of access constraints which contribute to inequities in the distribution of health service benefits. These include long queues, long waiting hours, and inadequate staff and equipment in healthcare facilities especially in rural areas (Akazili et al., 2012; O. O'Donnell, 2007).

Geographical access is a major challenge, particularly for rural populations. This could explain why subsidies associated with University hospitals in Egypt are pro-rich. The poor are more likely to live in rural communities, while University hospitals are in urban areas. In addition, University hospitals require some sort of user fees and the poor are most affected by high user fees. This implies that user fees would reduce access to health-care more for the poor than for the better off. Therefore, the burden of user fees and transportation costs could be among the primary reasons for the inequitable distribution of the University hospitalsâ subsidies in Egypt. Red tape and long waiting lists for many healthcare services especially surgeries, medical exams and hospitalization have also been reported as major access barriers by the poor. Statistics from Egypt National Health Accounts show that in 2008, only 8.1% and 21% of the insured individuals use Health Insurance Organization (HIO) facilities for outpatient and inpatient healthcare. Insured individuals reported several reasons for not using HIO facilities: distance was cited by 18% of the individuals, 35 percent cited the long waiting time, and 44 percent cited lower-quality services (United States Agency for International Development (USAID), 2010).

To ensure an equitable distribution of health service benefits, poverty reduction policies should tackle the access constraints that affect the distribution of benefits. One policy measure for improving the distribution of subsidies is targeting health subsidies more toward illness associated with poverty. For instances, poor housing, poor nutrition, and lack of sanitation are associated with certain types of diseases. The government could link subsidies to these types of diseases. We recommend re-engineering the allocation of health sector subsidies toward healthcare services and facilities that are mostly used by the poor households. Another policy option is reducing the user fees associated with University hospitals, especially for the poor, and redirecting subsidies from University hospitals to MOHP facilities, which are the main source of healthcare services for the poor and rural residents.

Addressing the problems associated with the HIO facilities, and improving the quality of the provided services could also be an essential step to achieve

an equitable distribution of public healthcare subsidies and increase the usage of HIO facilities. This has to be supplemented with improved focus on primary care and immunization, especially in rural and remote communities, in which the Non-Governmental Organizations (NGOs) and the private sector could play a vital role.

This paper has some limitations that warrant acknowledgment. First, the cross sectional nature of the used survey limits the ability to infer causality and to examine how the equity aspects of public subsidies evolve over time. The availability of longitudinal data in the future would stimulate further research to study the dynamics of the problem under investigation which will help design more effective policies to tackle it. Second, there could be other confounding factors that affect the benefit incidence of public health subsidies which we did not control for such as differences in geographical access to healthcare facilities, variations in the quality of healthcare services across communities, and patient satisfaction.

We found robust evidence that in Egypt, public healthcare subsidies associated with University hospitals are pro-rich and have inequality increasing effect, while subsidies associated with outpatient and inpatient care provided by the MOHP have not been pro-poor but have inequality reducing effect (weakly progressive). While it is widely perceived that the poor benefit the most from the health subsidies, the findings of this study refute this hypothesis in the case of Egypt. Poverty reduction measures and healthcare reforms in Egypt should not only focus on expanding the coverage of healthcare benefits but also on improving the equity of its distribution. Addressing the problems associated with HIO facilities, improving the quality of the provided services, and contracting with NGOs and the private sector to deliver healthcare or nutrition services, especially in rural and remote areas, could also be a promising policy option.

Health care is crucial for maintaining the productivity of labor force and, accordingly, economic growth. Direct subsidization of health care is considered a major policy instrument to improving health in developing countries. Egypt has adopted the subsidization policy for several decades now. It is commonly thought that the poor are the ultimate beneficiaries from health sector subsidies. This paper is questioning this presumption by empirically analyzing the distribution of health subsidies in Egypt. The analysis yields health subsidies in Egypt are not pro-poor meaning that subsidies tend to benefit wealthier groups more than

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the poorer groups. Under the less restrictive assumption, in which the distribution of subsidies is compared to income distribution, the BIA finds that subsidies associated with the MOHP have an inequality-reducing effect.

University hospitals' subsidies are mainly concentrated among the rich and it failed to close the income gap. The distance to University hospitals may explain why subsidies associated with University hospitals are pro-rich. The poor are more likely to live in rural regions while University hospitals are in urban areas. Additionally University hospitals require some user fees and the poor are most affected by high user fees. This implies user fees would reduce access the access to health-care more for the poor than for the better off. Therefore, the burden of user fees and transportation costs could be the primary reasons for the inequity in the distribution of University hospitals' subsidies. Overall, the findings of this study refute this hypothesis that claim the poor are the ultimate gainers from health subsidies in the case of Egypt.

Health subsidies are extremely important to the poor and with the chronic budget deficit, the Government of Egypt must adopt a corrective policy to ensure public spending on health is pro-poor. Poverty reduction measures and healthcare reforms in Egypt should not only focus on expanding the coverage but also on improving the equity of distribution of healthcare benefits.

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Chapter 4

The Poverty Impact of Payments for Health Care on Poverty Rates in Egypt

Abstract

Illness could drive households with no health insurance coverage into financial catastrophe, which might lead them to cut spending on necessities, sell assets, or use credit to cope with health payments. At extreme cases, an illness could have devastating consequences on households' economic status that would push them into extreme poverty. Using a nationally representative survey from Egypt, this paper assesses the poverty impact of out-of-pocket health payments (OOP). The poverty impact was evaluated using poverty head counts and poverty gaps before and after OOP. Results show that OOP exacerbate households' living severely in Egypt pushing more than 4 percent into extreme poverty. Poverty alleviation policies should help reduce the reliance on OOP to finance health care. Moving toward universal health coverage could also be a promising option to protect households from the devastating economic consequences of illness.

1 Introduction

In the absence of adequate health insurance system in many developing countries, illness exposes households to the risk of financial catastrophe and in extreme cases to poverty. Illness could cause severe financial hardship directly via health care payments and indirectly due to lost income from inability to work. Households could use savings, borrow or sell assets to cope with health shocks. However, households with tight financial constraints may have no option but to cut spending on necessary goods to cover health expenses. To obtain adequate health care, many households rely on out-of-pocket payments (OOP) health care expenditures, which increases the risk of becoming impoverished if OOP were substantial and for prolonged periods. Excessive reliance on OOP may increase inequalities in access to health care, as only the better off households could afford paying for healthcare. This could also increase inter-generational inequality if the households' ability to invest in their children health and education is reduced (Xu et al., 2007; Alam & Mahal, 2014).

Households with no health insurance coverage rely on OOP to cover health expenses, which could drive them into a financial catastrophe and reduce their economic welfare. It has been documented that catastrophic health expenditure and impoverishment [1] are more prevalent among the poor, which constitutes a major challenge to poverty alleviation efforts in many countries [2].

There is limited evidence on the magnitude of the poverty impact of OOP in the Arab world. Very few studies have explored the impoverishing effect of health expenditure in the Arab region (Mataria, Raad, Abu-Zaineh, & Donaldson, 2010; Elgazzar et al., 2010). This paper adds to the extant literature by providing empirical evidence on the effect of OOP on impoverishment on Egypt on which limited research has been conducted. This paper aims to assess the degree by which households in Egypt are financially protected against the medical payments associated with healthcare use.

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[1]Impoverishment due to OOP occurs when households who are considered to be non-poor (average consumption above the national poverty line) are pushed into poverty after payment for health care services (average consumption after payment for health care is below the national poverty line).

[2]Catastrophic health expenditure is defined as health spending that drives households to cut spending on necessities, sell assets or use credit to the extent that leads to disruption to living standards to cope with the cost of the health care treatment.

The paper is organized as follows: Section 2 presents a brief review of the related literature. Section 3 provides an overview on the structure of the health care systems in Egypt. The data and the empirical methodology of the paper are presented in Section 4 and the obtained results are discussed in section 5. Section 6 summarizes the findings of the paper and discusses some policy recommendations. Section 7 concludes the paper.

2   Literature Review

There is substantial literature on the economic consequences of health shocks [3]. For example, Wagstaff (2007) found evidence in Vietnam that health shocks, including the death of a working-age household member and hospitalization, negatively affect earned income, increase medical spending, especially for the uninsured, and reduce per capita food consumption within households.

A growing number of studies examined the prevalence of catastrophic health payments, and assessed the poverty impact of OOP in a wide range of countries, during different periods, and using different econometric methodologies. There is substantial evidence that OOP may push households into poverty (Shahrawat & Rao, 2012; Van Minh, Phuong, Saksena, James, & Xu, 2013; Narcı, Şahin, & Yıldırım, 2015; Bredenkamp, Mendola, & Gragnolati, 2011; Alam & Mahal, 2014; Arsenijevic, Pavlova, & Groot, 2013; Xu et al., 2007). For example, Arsenijevic et al.(2013) found that OOP have a catastrophic effect on poor households in Serbia. In particular, they found that households that are above the absolute, relative and subjective poverty lines respectively, after the subtraction of OOP fall below these poverty lines. They also found that the probability of catastrophic out-of-pocket patient payments is higher in rural areas, in larger households, and among chronically sick household members. In another study, Van Minh et al.(2013) examined the catastrophic and poverty impacts of OOP in Vietnam and found that between 2002 and 2010, 4 to 5% of households have incurred catastrophic health expenditure, and between 3 to 4% of households have been impoverished because of health expenditure. Shahrawat and Rao (2012) found that 5% of the households in India suffer from catastrophic health expenditures and that the

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[3] For a recent review of the literature on the economic impacts of health shocks on households in low and middle income countries see Alam and Mahal (2014).

poverty deepening impact of OOP was at a maximum in people below the poverty line compared to those above. They also found that medicines and outpatient care constitute the main share of total OOP and hence the insurance schemes, which cover only hospital expenses, like those existing nationally in India, will fail to adequately protect the poor against impoverishment due to spending on health. In a recent study, Narci et al.(2015) reported an increase in catastrophe and poverty in Turkey due to OOP during the period 2004 to 2010.

In a cross-country study of 11 Asian countries, Van Doorslaer et al. (2006) examined whether OOP exacerbate poverty. They found that poverty estimates after accounting for OOP were much higher than the conventional estimates, ranging from an additional 1.2% of the population in Vietnam to 3.8% in Bangladesh. In another cross country study of Western Balkan countries, Bredenkamp et al. (2011) found evidence that health expenditure contributes substantially to household impoverishment in Albania, Bosnia and Herzegovina, Montenegro, Serbia, and Kosovo, which increases the prevalence of poverty and push poor households into deeper poverty.

Previous studies mostly agree that reducing reliance on OOP in financing health care significantly protects households from financial catastrophe resulting from illness. For example, Xu et al. (2007) examined the determinants of catastrophic health expenditure in 59 countries and found that the proportion of government health spending to total health spending, opposed to OOP share of total health spending, is the main factor explaining the prevalence of catastrophic health expenditures across countries.

Poor households develop strategies to cope with health shocks. These strategies aim to sustain the economic viability of the household. There are strategies that deal with mobilizing funds to meet direct costs such as borrowing or selling assets. Other strategies deal with the indirect cost such as intra-household labor substitution. The ability of households to deal with health shocks depends on their assets portfolio, in addition to the type, severity, duration of illness and the family members affected.

Leive and Xu (2008) examined how households in 15 African countries characterized by low government health spending and lack of health insurance cope with health shocks [4]. In 12 countries, high inpatient spending increased the likelihood

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[4]The 15 African countries are Burkina Faso, Chad, the Congo, Cote d'Ivoire, Ethiopia, Ghana,

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of borrowing or selling assets. They also found that the high-income quintiles were less likely to use coping strategies relative to the poorest households. In addition, urban households were less likely to use coping strategies than rural households.

There is limited evidence on the magnitude of catastrophic health payments and the poverty impact of OOP in the Arab world. Among the few studies that explored the catastrophic and impoverishing effect of health expenditure in the Arab region see for example, Abou-Ali, (2007), Elgazzar et al.(2010) and Mataria et al.(2010). In a cross-country study, Elgazzar et al. (2010) examined the extent of OOP and their effects on living standards in six Middle East and North African countries including Yemen, the West Bank and Gaza, Egypt, Iran, Tunisia, and Lebanon. They found that OOP constitute 49 percent of total national health care on average and that households pay an average of 6 percent of their total household expenditure on health. 7 to 13 percent of households face catastrophic health expenditures and poverty rates tend to increase by up to 20 percent after health care spending is accounted for. Lower-income and rural households generally face higher financial risk. In another study, Mataria et al. (2010) examined the incidence and intensity of catastrophic and impoverishing healthcare payments borne by Palestinian households between 1998 and 2007. They found a low incidence of catastrophic health payments with only 1% of the surveyed households spent more than 40 percent of their total household expenditures (net of food expenses) on health care in 1998; however, the percentage was almost doubled in 2007. They also found an increase in the percentage of households who fell into deep poverty from 11.8 percent in 1998 to 12.5 percent in 2006.

3   Health System in Egypt

Egypt is the most populous country in the Arab world with a population of 82 million in 2010. It is a lower middle income country with a large number of poor people. In 2011, Egypt experienced a dramatic political change putting an end to Hosni Mubarak's rule that lasted more than 30 years. However, the political instability caused negative economic consequences. In fiscal year 2011/2012, the country incurred a large budget deficit equals to 11 percent of the GDP, and the economic growth rate has declined from 5.1 percent in 2010 to 1.8 percent in 2011.

Kenya, Malawi, Mali, Mauritania, Namibia, Senegal, Swaziland, Zambia and Zimbabwe.

According to the World Health Organization (WHO) database, the share of the general government in total health spending declined from 41.7 percent in 2010 to 37 percent in 2011 putting more burden on households. In average, OOP accounts for 60 percent of total health spending.

In Egypt, the health care system provides health care services through three channels. These channels are the public sector, the private sector, and the civil society. The public sector refers to different ministries that provide health service such as the Ministry of Health and Population, Ministry of Higher Education, Ministry of Defense and Ministry of Interior. Along with ministries, the public sector includes Health Insurance Organization and the Curative Care Organization. They are financially independent organizations under the authority of the Ministry of Health. The private sector refers to for-profit hospitals, clinics, and pharmacies while the civil society consists of non-profit, non-governmental organizations (NGOs). The Ministry of Finance is the major funding source for health care activities in different ministries. It raises funds from tax revenue. For instance, it funds 93 percent of the Ministry of Health's activities. The Ministry of Health and Population provides a wide range of health services to all citizens at highly subsidized rates. In addition, public health insurance exists under the Health Insurance Organization. In 2013, the Health Insurance Organization covered 57 percent of the population. The coverage includes coverage for school students, infants, pensioners, and widows, in addition to employees through employment-based schemes. It raises funds from beneficiaries' payments, the Ministry of Finance and users' fees.

Shawky (2010) assessed the effect of the public insurance on health care utilization and catastrophic health payments. She found out that less than half of the insured members are actually benefiting from the health insurance scheme. Moreover, only 8% of insured use insurance for outpatient care. Furthermore, she pointed out that the public health insurance did not increase service utilization, but it has protected households from encountering catastrophic payments. Similar results are suggested by Egypt National Health Accounts 2008/2009.

Table 1 breaks down the OOP by type of health provider. It suggests that private clinics and pharmaceuticals account for the great bulk of OOP. Consequently, they are likely the drivers of the catastrophic impact of health payments. Based on Egypt Household Health Expenditure and Utilization Survey 2010, the insurance beneficiaries explain why they do not use insurance. One of the tops reported rea-

sons (44%) is low quality services, followed by long waiting times (35%) then by the distance to the health facility (18%). In fact, the survey suggests even insured members prefer to use private health care if they can afford it (Rafeh, Williams, & Hassan, 2010).

Table 1: The Distribution of OOP across Health Care Providers

Type of Health Care Provider	The Arab Republic of Egypt
Private Hospitals (%)	8.2
Private Clinics (%)	38.4
Public Hospitals (%)	9.1
Pharmaceuticals (%)	33.1
Others (%)	11.2

Source: Egypt National Health Accounts 2008

4 Data and Methods

The paper uses the Household Income, Expenditure and Consumption Survey (HIECS) for 2010/2011. It is a nationally representative survey. The survey is conducted by the Central Agency for Public Mobilization and Statistics (CAPMAS) and covers 26,500 households across Egypt. HIECS is the only source of poverty measurement in Egypt and is conducted every two years. Access to the survey was provided by the Economic Research Forum (Economic Research Forum and Central Agency for Public Mobilization and Statistics, 2013). HIECS collects data for all categories of household expenditure in addition to information on employment status, educational status, marital status and other socio-economic variables.

The effect of health care payments on poverty estimates, both poverty headcount, and poverty gap is measured using the following methodology due to O'Donnell et al. (2008).

$$P^{gross} = \frac{\sum_{i=1}^{N} s_i p_i^{gross}}{\sum_{i=1}^{N} s_i} \qquad (1)$$

Equation (5) measures the poverty headcount P^{gross} in which s_i is the household size, and N is the number of households in the sample. $p_i^{gross} = 1$ if $x_i < PL$ and is 0 otherwise, where x_i per capita spending in household i and PL is the poverty line. The conventional poverty gap is calculated as in Equation (6).

$$G^{gross} = \frac{\sum_{i=1}^{N} s_i g_i^{gross}}{\sum_{i=1}^{N} s_i} \tag{2}$$

Where $g_i^{gross} = p_i^{gross}(PL - x_i)$. The effect of health payments on poverty headcount and poverty gap are captured by replacing p_i^{gross} with p_i^{net}. Where $p_i^{net} = 1$ if $(x_i - T_i) < PL$ and zero otherwise and by replacing g_i^{gross} with $g_i^{net} = p_i^{net}(PL - (x_i - T_i))$, where T_i is the per capita health spending at household i. Then I compare between P^{gross} and P^{net} and between G^{gross} and G^{net} to demonstrate the effect of health payments. Also I measure the normalized poverty gap (NG) gross of health payments and net of health payments which can be calculated by:

$$NG = \frac{G}{PL} \tag{3}$$

In order to measure the effect of health payments on poverty, we need the poverty lines for Egypt. A Poverty line could be either absolute or relative. In this paper, I used the World Bank absolute poverty lines, the \$1.25 per head per day (PPP) and the \$2 per head per day (PPP) (Ravallion, Chen, & Sangraula, 2009). These two poverty lines are considered extreme poverty lines and they do not have a special allowance for health care needs. Thus, measuring poverty after taking out health payments from total spending using these lines does not require reducing these poverty lines.[5]

5   Results

Table 2 shows the impoverishing effect of OOP at \$1.25 per day and \$2 a day. It presents the poverty estimates in Egypt both gross and net of OOP. The first line in Table 3 gives the poverty headcount, which is the percentage of the population living on less than the poverty line. Comparison of poverty headcount gross and

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[5]The World Bank poverty lines are based on 2005 prices. I adjusted these poverty lines to account for the changes in prices between 2005 and 2010.

net health payments gives a rough approximation of impoverishing impact of OOP. The method assumes that all OOP are nondiscretionary. Poverty gap reflects the intensity of poverty. It can be interpreted as the average gap required to reach the poverty threshold. While the normalized poverty gap is equal to poverty gap divided by poverty line. Lastly, the normalized mean positive poverty gap is the average poverty gap of the poor divided by the poverty line.

When evaluated based on the conventional method of measuring poverty, I find that 1.2% of the population are living on less than \$1.25 a day. However, if OOP are netted out from total expenditure, this proportion increases to 2%. So 0.8% of Egyptians is not considered to be poor while in fact they spend less than \$1.25 a day after OOP are discounted. This suggests a significant rise of 66% in poverty headcount. The normalized poverty gap has increased from 0.15% to 0.22% while the normalized mean positive poverty gap has declined. This suggests that the increase in poverty gap is not due to a deepening of the poverty of the already poor but due to more households pushed into poverty because of health payments rather than deepening poverty of the poor.

The second part of the table uses a poverty threshold of \$2 a day. The analysis suggests that 3.8 percent of the population in Egypt are brought into poverty because of health payments. This represents an increase of 30% in poverty headcount. This is not surprising, considering the significant use of private health care even among households from a lower socio-economic background. The percentage change increase in the normalized poverty gap is about 33%. Similarly, comparing the normalized poverty gap and normalized mean positive poverty gap suggests that the increase in poverty gap is also due to more households ended up in poverty.

Figure 1 shows the effect of health care payments on Pen's Parade of the household consumption in Egypt.[6] The graph shows the total household consumption expressed as multiples of the \$2 poverty line. The paint drip or vertical bar reflects the degree to which OOP for health care lower household consumption. If the paint drip crosses the poverty line, then a household is pushed into poverty because of OOP. The graph suggests that OOP are the largest among the better off household. However, it is mainly households that live near poverty are the ones pushed into deprivation. The figure also suggests that even households near the

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[6]Since health care payments could produce re-ranking in the income distribution, Wagstaff and Van Doorslaer (2003) utilized the "paint drop" chart to visualize the effect of health care payments on the parade.

Table 2: OOP Effect on Poverty Estimates in Egypt using $2 and $1.25 poverty line

	Indicator	Gross of OOP	Net of OOP
$1.25 a day	Poverty headcount	1.2	2.0
	Normalized poverty gap	0.15	0.22
	Normalized mean positive poverty gap	13	11.7
$2 a day	Poverty headcount	13.7	17.5
	Normalized poverty gap	2.4	3.2
	Normalized mean positive poverty gap	17.6	18

Source: Authors' compilation based on the data from HIECS

top of the income distribution can also end up in poverty because of OOP.

6 Discussion and Policy Implications

This paper investigated the extent of impoverishment in Egypt by commonly used methodology in the literature. In this paper, I hypothesized that the conventional methods of measuring poverty, which do not take into account the non-discretionary health spending, underestimate the size of poverty and its severity. Accordingly, I reassessed the measures of poverty in Egypt at two international poverty lines ($1.25 (PPP) and $2 (PPP) per head per day). I found that 7.4 percent of households in Egypt are pushed into extreme poverty because of OOP.

Despite that two international poverty lines ($1.25 (PPP) per head per day and $2 (PPP) per head per day) that are widely cited in measuring and comparing poverty across the world, however, these two poverty lines do not adequately incorporate the cost of health needs. They have no special allowance for health care needs, as they represent a measurement of extreme poverty. Illness can force households to increase their health spending by cutting its food spending below the subsistence level and such household would be counted as non-poor as its total spending exceeds the threshold. Van Doorslear et al. (2006) considered that 78 million persons in Asia are not classified as poor, however, their level of spending are below $1.25 per head per day after taking out nondiscretionary

Figure 1: Effect of Health Payments on Pen's Parade of the Household Consumption in Egypt
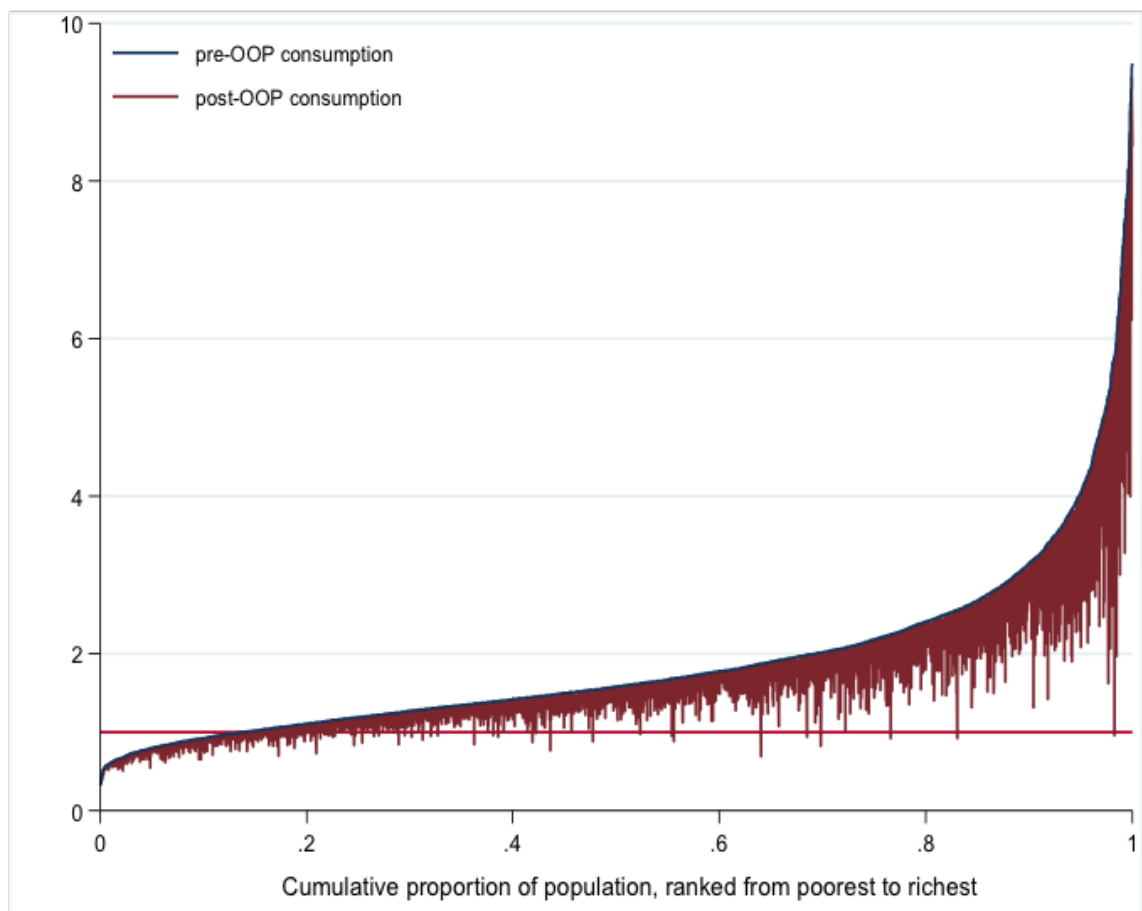
health payments. Therefore, measuring poverty after taking out nondiscretionary health payment could be more revealing than the conventional method of measuring poverty (O'Donnell et al., 2008). The findings of the current study support this argument. In addition, this paper provides additional evidence that the share of government spending in total health spending, as opposed to the share of OOP in total health spending, is a key determinant of the prevalence of impoverishment by OOP across countries. In Egypt, where the government is one of the lowest spenders on health care compared to middle income countries and OOP are the major funding source of health spending, a large percent of households are brought into poverty because of OOP.

Given that health shocks increase households' vulnerability and disrupt their livelihood, government intervention is required to correct market failure and to provide health and social protection for the poor. Xu et al. (2007) stressed the importance of government health financing in protecting households from financial catastrophe. They studied the relationship between the incidence of catastrophic expenditure and the size of public health spending in 59 countries. They found a negative correlation between the extent of catastrophic expenditure and the size of public health spending.

The key policy implication of this study is that reducing reliance on OOP on financing health care, increasing public health investments, and moving toward universal health coverage should be at the core of any poverty reduction policy to protect vulnerable households from the catastrophic economic consequences of illness. OOP are likely to aggravate the extent of poverty and hence poverty reduction policies should take them into account.

One limitation of the current study that arises from non-availability of data is its cross-sectional nature. This limits our ability to examine how the problem of the poverty impact of OOP evolves over time. The availability of longitudinal data in the future would stimulate further research to study the dynamics of the problem under investigation which will help design more effective policies to tackle it.

There are other limitations that are directly related to the used methodology. One of these limitations is that the focus is only on OOP, where the lost earnings resulting from the inability to work due to illness, injury or death are not captured, despite the fact that they may be more critical to household welfare

(Gertler and Gruber 2002). However, the objective of this paper was to assess the degree of financial protection regarding healthcare payments in Egypt, and the lost earnings are not related to the health financing system itself, but to the whole social safety net. Additionally, the used methodology assumes that OOP are involuntary payments that consequently hinder households from using these funds to boost their welfare. With some exceptions, healthcare payments do not usually result from a planned choice by patients; instead, they are usually driven by unanticipated health shocks. In this context, healthcare expenditures cannot be viewed as a regular consumption spending that contributes to household's utility. Consequently, it sounds reasonable to assume that healthcare payments are non-discretionary payments. Moreover, the adopted approach assumes that households use current income to finance health payment. If households borrow or use savings to finance healthcare payments and smooth current consumption at the expense of future consumption, the assumption that households are necessary impoverished by health payments will no longer stand. The study approach focuses on those who actually pay for healthcare, and ignores those who might be discouraged from using healthcare due to high medical fees. Consequently, the results of the current study could underestimate the impact of health payments on household welfare, and the actual burden of healthcare payments could be larger than the estimates of the current study. Despite these limitations, large healthcare user fees in comparison to household income remain insightful for revealing at least a part of the catastrophic financial consequences of health shocks.

7 Conclusion

I found empirical evidence that OOP exacerbate households' living severely in Egypt pushing more than 4 percent into extreme poverty. Poverty alleviation policies should help reduce the reliance on OOP on financing health care. Moving toward universal health coverage to protect households from the devastating economic consequences of illness could also be a promising solution.

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Chapter 5

Decomposition of Socioeconomic Inequalities in Maternity Care in Egypt

Abstract

Medical care during pregnancy is crucial for protecting women from health risks during and after pregnancy. Improving maternal health is one of the Millennium Development Goals. Egypt has made strong progress towards achieving the Millennium Development Goals for maternal health. The current study examines the trends in the socio-economic inequalities in maternity care utilization in Egypt during the period 1995-2014, using repeated cross sectional data from the National Demographic and Health Survey. A multivariate logistic regression model, concentration curves and concentration indices are used to examine the demographic and socio-economic correlates of maternity care utilization, and how the degree of socio-economic disparities in maternity care has evolved over time. Additionally, this paper investigates the factors that generate socio-economic inequalities in maternity care utilization by decompositing the concentration index into its determinants. The analysis yields that inequalities in maternity care utilization are much smaller in 2008 than they were in 1990. Despite the subsidization of public health care, there has been a steady decline in the usage of public health facilities relative to private maternity care. The decomposition analysis shows that socioeconomic disparities in maternity care utilization is mainly due to the lack of economic resources and its correlates among the poor.

1   Introduction

According to the World Health Organization, in the year 2010 around 287,000 women died of complications during pregnancy or childbirth. These deaths are unnecessary and avoidable since the medical interventions are available and widely known. Medical care during pregnancy and childbirth allows monitoring pregnancy and reduces the health risk for the mother and her baby. As part of the global effort to curb maternal mortality, the United Nations included the reduction in early child deaths by two third, between 1990 and 2015, as one of the Millennium Development Goals (MDGs). Egypt along with other countries has adopted these goals to be achieved by 2015.

A growing literature has emerged to study the trends of maternal health, and its determinants, in a wide range of countries (Hogan et al., 2010; Lozano et al., 2011; Benova, Campbell, & Ploubidis, 2014; Khadr, 2009). These studies have documented that Egypt has made a significant progress toward achieving the MDGs for health. For instance, Lozano et al (2011) tracked the progress toward the MDGs for health across the world and described Egypt as a top performing country. The under-five mortality rate went down from 85 per 1000 live birth in 1990 to 28.3 by the year 2008. The maternal mortality ratio has declined from 174 per 100,000 in the year 1992 to 55 in the year 2008. The percentage of women assisted by a skilled health provider in delivering has increased from 40 percent in the year 1992 to 61 percent in the year 2008. The Government of Egypt has explained the improvement in maternity health indicators by the substantial increase in the number of maternity care units, and the adoption of integrated maternity care system, which includes prenatal care, immunization against tetanus infection, vitamin A, and folic acid supplements and delivery (Ministry of Economic Development, Cairo., 2010).

While the trend in maternal health has been overstudied, little attention in the literature has been given to disparities in maternal health among socioeconomic classes in Egypt. In fact, the strong progress toward MDGs for health may mask socio-economic disparities underneath it. Because the MDGs for health call for improvement in national averages, which may attain either by improvement in the health of the poor or the better off. Consequently, the improvement in national averages may result from the improvement in the health of the better off while

the poor is lagging behind. This work is concerned with who benefits from the improvement in maternity health indicators in Egypt? Does the poor benefit? Is the strong progress in maternity care indicators has reduced health inequalities between classes over time? What are the root causes of socio-economic inequality in reproductive health? What is the public health facilities' role in provision of maternity care service?

The concentration index (CI) is adopted as a measure of socio-economic disparities in access to maternity care. It is a standard measurement tool of inequalities in health economics (Wagstaff, 2000; Van Doorslaer, Masseria, Koolman, et al., 2006). Then it is decomposed into contributing factors using Wagstaff et al.,(1991)'s approach. The merit of this method is that it allows identifying the root causes of socio-economic disparities in maternity care utilization.

The next section is a description of the data followed by an illustration of the methodology and the variables used in the analysis. Section 3 is a presentation of the results and section 4 concludes.

2   Method

The data obtained from the available rounds of Egypt Demographic and Health Survey (EDHS) implemented in the years 1995, 2000, 2005, and 2008. EDHS is the most important source of children and health data in Egypt. The surveys are national representative surveys. They collect information from ever-married women at reproductive age. The number of interviewed women in EDHS 1995 is 14,779, while for EDHS 2000, 2005 and 2008 are 15,573, 19,474 and 16,572 respectively. They contain information on demographic characteristics, maternity care, reproductive behavior, and housing characteristics. The surveys asked women who give birth in the last five years about access to prenatal care and its contents, type of place of delivery and access to postnatal care. They cover the period between 1990 and 2008 and have a complex design, which involves stratification by geographical location and cluster sampling that involves randomly selecting a number of clusters. The analysis has taken the complex survey design into account.

The CI is a measure of the extent of socio-economic inequalities in health care utilization. In fact, the CI ranges between -1 and +1. The sign of CI reflects the direction of the relation between the health variable of interest and household's

position in the living standard distribution. A CI with negative sign implies that the maternity care utilization is concentrated among the poor, while a positive CI suggests that it is the better off who benefit the most. In absolute value, the magnitude of the CI indicates the strength of the relation between the health variable of interest and economic status; the higher the value of the CI, the higher the degree of the concentration among the poor or the better off depending on the CI sign. Analogous to the Gini coefficient, a CI with zero value indicates perfect equality. The CI is computed as in equation 1 (O'Donnell, Wagstaff, et al., 2008).

$$CI = \frac{2}{\mu} Cov(H, W) \tag{1}$$

Where H is an indicator of health variable and μ its mean, while W is a measure of living standard and cov is the covariance between H and W. The CI is computed for the years 1995, 2000, 2005, and 2008. By comparing the values of concentration indexes over time, we can determine whether the degree of socio-economic inequalities in maternity care are smaller in the year 2008 than they were in the year 1995.

Wagstaff et al,.(2003) showed that the CI could be decomposed into the contributions of individual determinants, where each contribution is the product of the sensitivity of receiving maternity care with respect to that factor and the level of economic-related inequality in that factor. For any linear model of health care (H), such as

$$H_i = \alpha + \sum_k \beta_k x_{ki} + \varepsilon_i \tag{2}$$

The CI for H can be shown as

$$CI = \sum_k \left(\frac{\beta_k . \overline{x}_{ki}}{\mu} \right) C_k + \frac{GC_\varepsilon}{\mu} \tag{3}$$

Where μ is the average mean of maternity care utilization and $\overline{x}$ is the mean of factor x. C_k is the concentration index for factor x and GC is the concentration index for error term. The above equation shows that the overall CI is constituted of two parts, a part that is explained by the systemic variation in the determinants and a part that cannot by explained by it. The unsystematic part approaches zero

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in a well-specified model. Thus, the CI is the product of the elasticity of the dependent variable H with respect to the regressor x $(\frac{\beta_k.\bar{x}_k}{\mu})$ and income related inequality in that factor C_k. The decomposition analysis is conducted in the following steps:

1. The maternity care utilization variable is regressed on its determinants using an adequate model. This produces the coefficients of the determinants.

2. The average means of the dependent variables and independent variables are computed.

3. The concentration indexes for the dependent variable and the explanatory variables computed using equation 1.

4. The percentage contribution of each determinant can be computed by:

$$\frac{(\frac{\beta_k.x_{ki}}{\mu})C_k}{C} \tag{4}$$

The two dependent variables are binary variables. Therefore, probit models have been used. If a non-linear model is used, the decomposition analysis is only possible if linear approximation to the non-linear model is made (O'Donnell et al., 2008). Estimates of the partial effects evaluated at the average means are used to give a linear approximation of equation 2:

$$H^m = \alpha^m + \sum_k \beta_k^m x_{ki} + \varepsilon_i \tag{5}$$

Where β^m are the marginal effects evaluated at sample means. Since equation 5 is linearly additive, the decomposition method can be applied. However, the decomposition result is not unique, as the partial effects are at particular values of the determinants.

$$CI = \sum_k (\frac{\beta_k^m.\bar{x}_{ki}}{\mu})C_k + \frac{GC_\varepsilon}{\mu} \tag{6}$$

The main variables of interest are regular antenatal care (four or more visits to prenatal care provider during pregnancy) and delivery in a health facility (dummy variable). Both represent the necessary care during pregnancy.

The decomposition analysis is conducted only on the most recent round of EDHS. It includes the following standard set of covariates: mother's age at the time of birth, household wealth index based on the level of household's assets ownership, mother's educational level (zero if no education, 1 if primary, 2 if secondary, 3 if higher education), high-risk fertility behavior (binary variable equals one if a mother is younger than 18 years old or older than 34 years, or latest birth less than 24 months ago, or latest birth being of order 3 or higher), location of residence (1 if mother lives in Urban Governorates, 2 if mother lives in Lower Egypt Urban, 3 for Lower Egypt Rural, 5 for Upper Egypt Urban, 6 for Upper Egypt Rural and 7 for Frontier Governorates), a binary variable taking a value of 1 if the interviewed mother ever had a pregnancy that terminated in a miscarriage, abortion, or still birth, i.e., did not result in a live birth and zero otherwise.

3 Result

3.1 Trends in Socio-economic Inequalities

Table 1 gives the proportion of women who received prenatal care or medically assisted at delivery according to wealth quintile. The column total provides the national averages. It shows the steep increase in access to maternity care between 1990 and 2008. The numbers in table 1 suggest that even women in the poorest two quintiles have increased their utilization of maternity care substantially over the 18 years period. The last column provides the CIs for the years 1995, 2000, 2005 and 2008. They all have positive value, which points the positive association between economic status and utilization of maternity care. Comparing the estimated CIs over time suggests that the degree of socio-economic inequalities in maternity care have significantly declined. Economic inequalities in maternity care are smaller in 2008 than they were in 1995. Despite the progress, there is a significant proportion of the poor who have not obtained prenatal care or medically assisted during delivery.

The Government of Egypt and Khadr (2009) have attributed the improvements in maternity health to the state's success in the provision of health care (Ministry of Economic Development, Cairo., 2010). The Ministry of Economic Development (2010) has explained the progress in maternity care indicators by the increase in

Table 1: Socio-economic inequalities in Maternity care

	Q1	Q2	Q3	Q4	Q5	Total	CI
Regular Prenatal Care							
1995	7	11	25	41	72	28	0.43
2000	14	22	36	51	76	39	0.32
2005	31	46	61	77	88	59	0.19
2008	42	56	65	81	91	67	0.15
Medically Assisted at Delivery							
1995	20	30	47	62	87	47	0.28
2000	31	46	62	76	94	61	0.21
2005	51	65	79	88	97	75	0.12
2008	55	70	83	91	97	79	0.10

the number of maternity care units and the adoption of integrated maternity care system. The EDHS does not collect data on the type of prenatal care provider. However, it asked about the type of the place of delivery whether the delivery took place in a public or private facility. After pooling the four rounds of EDHS into one data set, the following model examines what has happened to the use of public health facilities over time. The dependent variable is a dummy variable taking a value of one if a mother gives birth at a governmental health facility and zero if she gives birth at a private health facility. The model mainly interested in the pattern of coefficients on the time dummies.

After controlling for household economic status, mother's education level, mother's age at time of delivery, and region of residence, time dummies show the steady drop in the use of public health facilities over time in comparison to private health care (Table 2). This finding has important implications, it is true that the Government of Egypt has increased the number of maternity health units and introduce new programs to encourage maternity care utilization, which led politicians to conclude that the government's role in provision of maternity care was an important determinant of maternal health when in fact it was not. Direct state's intervention cannot explain the increase in the use of medical care during pregnancy. The private sector has been the main provider of maternity care in the study period. The increasing use of private maternity care, which requires out of pocket payments, has the disruptive effect on the poor and near-poor households.

The model also reveals that women in urban governorates are more likely to deliver at a private health facility. As expected delivery at a private facility increases with mother's level of education. The probability of delivering at a private facility

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Table 2: Estimation results : Place of Delivery (Public vs Private)

Variable	Odds ratio	(Robust Std. Err.)
Time Dummies		
d2000	0.761**	(0.034)
d2005	0.576**	(0.024)
d2008	0.544**	(0.023)
Wealth Quintiles		
Second	3.30**	(0.200)
Middle	2.80**	(0.153)
Fourth	2.57**	(0.122)
Richest quintile	1.86**	(0.077)
Mother's Education Level		
No education	2.23**	(0.127)
Primary	2.74**	(0.163)
Secondary	1.81**	(0.085)
Regions		
Lower Urban	0.419**	(0.021)
Lower Rural	0.290**	(0.013)
Upper Urban	0.659**	(0.030)
Upper Rural	0.504**	(0.024)
Frontier Governorates	1.078	(0.068)
Mother's age at delivery	1.006**	(0.002)
Intercept	0.514**	(0.044)
N	25400	
Pseudo R2	0.07	
Log-likelihood	-16128.943	
$\chi^2_{(16)}$	2192.222	

Significance levels :   † : 10%   * : 5%   ** : 1%

increases monotonically with wealth level. Mother's age has almost no effect on the type of the place of delivery.

3.2 Decomposition Result

The next step is to decompose the concentration index for the last EDHS round in order to identify the drivers of socio-economic inequalities in maternity care utilization. Table 3 gives the basic summary statistics of the variables used in the analysis. The first column shows the number of observations while the next three columns give the mean, minimum, maximum for each variable. The last column indicates the number of unique values. The majority of the population lives in rural regions. Mean mother's age at the time of birth is 26 and the minimum is 14 years.

Table 3: Summary Statistics

	N	mean	min	max	N unique
Urban/Rural	10,872	1.6	1.0	2.0	2
Wealth Index	10,872	-15,473.3	-304,730.0	291,711.0	6,808
Mother Age at birth	10,872	26.1	14.2	47.5	378
Mother's Education	10,872	1.5	0.0	3.0	4
Sampling weights	10,872	1.0	0.2	1.7	27

Figure 1 presents the concentration curve for antenatal and delivery care. These curves show the cumulative share of maternity care utilization according to the cumulative share of the population, ranked by economic status. If the concentration curve lies below the 45-degree line, it indicates that maternity care utilization is more concentrated among the rich and the opposite is true. Similar to the Lorenz curve, the farther a curve from the equality line, the higher the degree of concentration. Comparing the concentration curves for the regular prenatal care at the years 1995 and 2008 shows that disparities in receiving regular maternal care has narrowed, as the concentration curve for the year 2008 is closer to the equality line relative to the concentration curve for the year 1995. The same finding is observed for receiving medical care during child delivery.

The decomposition of the CI for the maternity care variables is given at table 4. The decomposition analysis allows distinguishing inequality from inequity (the part of inequality that is unjustifiable). There are two types of variables in the decomposition analysis, the standardizing variables (variables that reflect health

Figure 1: Concentration Curves of Medical Maternity Care Utilization
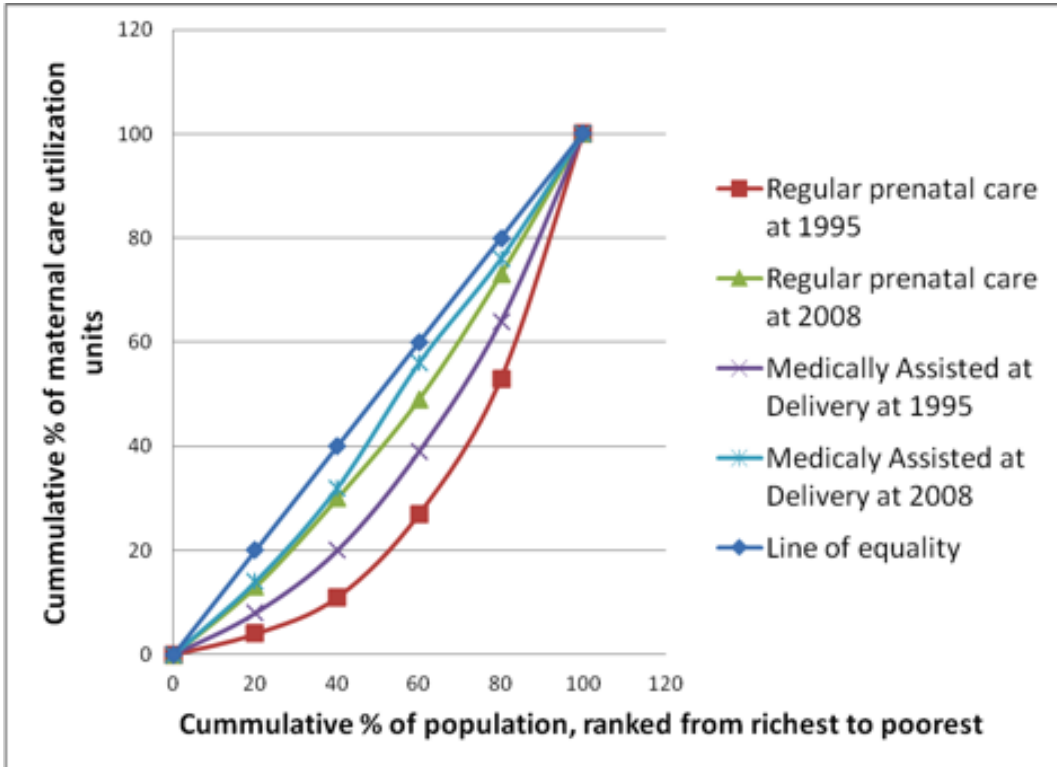
Source: Author's compilation based on EDHS data

care need and their association with health utilization is justifiable such as age) and control variables (variables whose correlation to health utilization is unfair such as income).

The first part of the table shows the contribution of the standardizing variables to the CI. The second part of the table gives the contribution of the control variables to the CI. The CI can be computed by adding the residuals to the contribution of both types of variables. Each contribution to the CI is the product of the sensitivity of maternity care utilization with respect to the corresponding determinant and the degree of income-related inequality in that determinant. A factor with a significant effect on maternity care utilization but with no income related inequality will have a small contribution to the CI.

The analysis shows that factors like history of mother's terminated pregnancy, mother's age at birth and risky birth interval have a small contribution to socio-economic inequality (0.005). On the other hand, the decomposition analysis reveals that the direct effect of wealth inequality accounts for the majority of the CI. It accounts for 62% ($\frac{0.094}{0.15}$ as in equation 4) of the CI for prenatal care and 58% of the CI for delivery in a health facility.

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Table 4: Decomposition of Concentration Index for Maternity Care Utilization, non-linear model

	Antenatal Care	Delivery in a Facility
Standardizing (need) variables		
Mother's age	-0.0015	0.0014
Ever had a terminated preg.	-0.0002	-0.0001
Risky birth	0.0068	0.0084
Subtotal	**0.0051**	**0.0097**
Control variables		
Wealth index	0.0946	0.0810
Mother's educational	0.0364	0.0253
Region	0.0229	0.0302
Subtotal	**0.1539**	**0.1366**
Residual: regression error	-0.0069	-0.0074
Residual: missing data	0.0000	0.0000
Inequality (total)	0.1521	0.1388
Inequity/Unjustified inequality	0.1470	0.1292

Mother's illiteracy is more prevalent among the poor and associated with a low probability of using reproductive health care. The wealth-related inequality in women education contributes to the CI by 24% for antenatal care and 18% for delivery in a health facility. Similarly, rural residence is more common among the poor and associated with lower likelihood of seeking maternal health care. The average utilization of maternal health service in the rural regions is below the national average. Consequently, early child mortality and maternal mortality are higher than nationally. The contribution of the place of residence accounts for 15% of the CI for antenatal care and 21% for delivery in a health facility.

4 Discussion and Conclusion

This paper investigated the socio-economic inequalities in maternal health care in Egypt during the period 1995-2014 using repeated cross-sectional data from the Egypt Demographic and Health Survey. A multivariate logistic regression model, concentration curves , CIs and decomposition of CIs are used to address the research question of this study. The analysis has drawn three main findings. Firstly, the analysis yields that the extent of socioeconomic inequalities in maternity care utilization has declined between 1990 and 2008. Women in households of lower

socio-economic status have increased their use of reproductive health substantially between 1990 and 2008. Secondly, despite the dramatic rise in access to medical care during pregnancy in Egypt, disparities in pregnancy care indicators between the poor and the better off exist and family wealth remains a significant determinant of access to medical care. The decomposition analysis results are in line with these findings, as it reveals that socio-economic inequalities in maternity care are not due to health care need by women of high socio-economic status. Poverty itself, in the form of low level of assets ownership, explains most of the socio-economic inequalities in maternity care. Correlates of poverty (residence in rural regions, low education levels) have a significant contribution to the CI. This implies that increasing women education among the poor and poverty reduction in rural regions would narrow disparities in maternity care. Thirdly, while It is commonly thought that the increase in the use of maternity care in Egypt is arising from the use of subsidized care, the paper explores the time trend toward the use of public health facilities for delivery service and it suggests that the rise in the use of maternity care in Egypt is mainly coming from the use of private health facilities. Although public health facilities provide services at low or no charge and the vast majority of the population has a health unit within five kilometers from their residence, affordable private care remains the preferred health care provider. The market for maternity care is mainly controlled by private health providers. In 2008, 63% of women who deliver in a health facility used private facilities and incurred expense for the service (El-Zanaty & Way, 2009).

A potential explanation for the domination of private maternal care that requires user fees is the perception of public health care providers as an inferior service. Yip and Orbeta (1999) have developed an index that measures the individuals perception of quality of health care. They have found that private sector substantially outscores government health sector across all dimensions of quality. They have suggested the public failure in the provision of health care that meet consumers needs is mainly due to the poor quality of public health facilities. An additional potential explanation for the low usage of public health facilities is the diversion of patients by doctors of the public sector to their private clinics, as physicians of MOHP are allowed to work in private sector. The literature suggested that MOHP doctors increase their working hours at private sector at the expense of their working hours at MOHP facilities. There is a remarkable in-

verse association between working hours at MOHP facilities and working hours at private clinics (Nandakumar, Chawla, & Khan, 2000).

Several programs have been conducted in developing countries to remove disparities in maternity care. These include conditional cash transfers, private provider reimbursement, voucher schemes (Morris, Flores, Olinto, & Medina, 2004; Sosa-Rubí, Walker, Serván, & Bautista-Arredondo, 2011; Ahmed & Khan, 2011; Agha, 2011; Meuwissen, Gorter, & Knottnerus, 2006). These programs could have a positive impact on the utilization of maternity care in Egypt.

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Table 5: Medical Maternity Service Utilization by Household Characteristics

	Antenatal Care	Delivery at facility
Area of residence		
Urban	0.808467	0.855167
	(0.006961)	(0.006204)
Rural	0.580159	0.636726
	(0.006312)	(0.006073)
Mother's educational level		
No education	0.453209	0.515586
	(0.009861)	(0.009822)
Primary	0.606858	0.650206
	(0.016066)	(0.015520)
Secondary	0.725335	0.781462
	(0.006536)	(0.005951)
Higher	0.899706	0.925674
	(0.008900)	(0.007640)
Wealth Quintiles		
Poorest quintile	0.417019	0.453559
	(0.010709)	(0.010774)
Poorer	0.558784	0.614945
	(0.011279)	(0.010979)
Middle	0.649958	0.737838
	(0.011218)	(0.010184)
Richer	0.800029	0.840401
	(0.009737)	(0.008932)
Richest quintile	0.898812	0.941516
	(0.007566)	(0.005811)
Total	0.665129	0.717684
	(0.004885)	(0.004592)
Standard CI	0.152	0.139
	(0.0042)	(0.0038)

Standard errors in parentheses

Table 6: Fitted Non-linear Model: Probit Model

	Antenatal Care		Place of Delivery	
	coef	se	coef	se
Standardizing (need) variables				
Mother's age	-0.0033	0.0009	0.0034	0.0008
ever had a terminated preg.	0.0655	0.0117	0.0441	0.0105
risky birth interval	-0.0756	0.0115	-0.0997	0.0106
Control variables				
Wealth Index				
poorest				
poorer	0.0954	0.0160	0.0905	0.0157
middle	0.1321	0.0173	0.1514	0.0166
richer	0.2561	0.0184	0.2216	0.0177
richest	0.2974	0.0197	0.2797	0.0184
Highest Educational Level				
no education				
primary	0.0761	0.0185	0.0452	0.0180
secondary	0.1200	0.0140	0.0984	0.0131
higher	0.1930	0.0176	0.1329	0.0160
Region				
urban governorates				
lower Egypt urban	-0.0685	0.0167	-0.0300	0.0145
lower Egypt rural	-0.0890	0.0147	-0.0322	0.0133
upper Egypt urban	-0.0351	0.0165	-0.0476	0.0144
upper Egypt rural	-0.1224	0.0168	-0.1742	0.0159
frontier governorates	-0.0558	0.0219	-0.0320	0.0198
Intercept	0.5924	0.0300	0.5063	0.0282
Number of observations		10,795		10,870
Adjusted R2		0.16		0.18

Chapter 6: Does Private Higher Education Improve Employment Outcomes? Comparative Analysis from Egypt

Abstract

This paper examines whether there are differences in the labour market outcomes for graduates of public and private higher education institutions in Egypt in the two fields of information and computing technology, and business administration. The paper focuses on outcomes related to employability in the first six months upon graduation; earnings and access to job fringe benefits in the current job. The analysis relies on unique data set tracing graduates aged 25-40 years in the two fields of focus. The analysis in this paper is based on two modeling approaches: linear probability model for the probability of employment in the first six months after graduation; and ordinary least squares analysis of determinants of access to job fringe benefits and earnings. Private education had a significant negative effect on the likelihood of getting a job in the first six months following graduation and had no significant effect on job fringe benefits and earnings in the current job. Ascribed characteristics of gender; parental and socio-economic background were key predictors of the labour market outcomes, regardless of the type of higher education institution.

Keywords: private higher education, labour market outcomes, Egypt, Youth

1. Introduction

The expansion of private higher education has been a global policy approach, described by Altbach et al. (2009:13) as a "private revolution". About one third of global higher education enrollment is currently provided by private institutions (Altbach et al. 2009, Levy and Zumeta 2011). The growth of private higher education has been a response to higher education massification, where access shifts from being a privilege limited to the elite to trickling down to the middle and lower-middle classes (Trow, 2006). Systems with a tradition of highly subsidized tertiary education, similar to Egypt, particularly suffer as they experience this massification process. The increasing demand for higher education places pressures for more institutions and seats beyond the capacity of state budgets. This situation opens the way for a bigger role by private institutions to respond to the increasing demand. Altbach et al. (2009) note that most of the growth in higher education worldwide over the past decades has been in private higher education, with private higher education institutions representing the fastest-growing sector. Neoliberal approaches for higher education reform and the globalization tide have both constituted two driving forces for a growing role of markets in higher education (Mok, 2009). Public policy pertaining to the private provision of higher education is, therefore, of global importance (Levy and Zumeta 2011).

Despite the growing role of private higher education, there is little knowledge about their labour market outcomes in comparison to public higher education. Comparative research concerning private and public higher education is quite rare, with research primarily focusing on public institutions (Levy and Zumeta 2011). Whether these new comers to the higher education landscape are effective in delivering quality education that prepares graduates to the labour market is an important policy and empirical question. Students and their families, the key stakeholders and consumers of private higher education, pay the consequences of information asymmetries as they take the decision to choose this newly uncharted route of higher education. Research on labour market outcomes of these institutions could ameliorate the consequences of these information asymmetries. This is particularly relevant in Egypt, because students in public institutions predominantly pay nominal fees, while those in private institutions pay much more fees. It is important to investigate whether the graduates of private institutions are getting a

return on the financial investment made by their families for higher education, in comparison to graduates of public institutions

The key research question that this paper seeks to address is whether there is a difference in the labour market outcomes between graduates of private and public institutions. The analysis is limited to two key specializations that have witnessed an exponential growth in private provision in Egypt, business administration and information and computing technology (ICT). Similar to the global experience, Egypt's private higher education is primarily provided by non-university-ranked institutions in predominantly applied fields (Levy 2011). This paper is organized as follows. This introductory part is followed by a description of the situation of the labour market and the higher education system in Egypt. The methodology, data and the descriptive statistics are then discussed, followed by the estimation results. The paper concludes with a discussion of the policy implications of these results.

2. Background: The Structure of the Higher Education System in Egypt and Youth Employment Issues

The higher education system in Egypt is the largest in the Arab region. The system enrolled 2.6 million students in 2009/10 and is expected to enroll 1.1 million more students in 2021, increasing the higher education participation rate from 28% to 35% over the same period (OECD & WB, 2010). The system carries a legacy of state monopoly over the provision of higher education. The onset of system expansion is rooted in the legacy of Egypt's development project of the socialist era of the 1960s, particularly when higher education was declared a free right to all Egyptians in 1962 based on a meritocratic admission system.[1] Two- and four-year Private higher institutes, which do not have the rank of universities, started to show presence in Egypt's higher education landscaper since the 1970s with the implementation of market-oriented policies. Since their inception, these private institutes were designed to absorb students who could not achieve the needed score in the secondary school completion examination to join universities.

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[1] This has been the case despite the fact that the first modern university in Egypt, Cairo University, was established as a private university in 1908.

Until the 1990s, Egyptian universities were almost exclusively public.[2] In 1992, Law 101 was passed to authorize and regulate the establishment of private universities. Following the promulgation of the law, four new universities opened their doors in 1996, followed by five institutions in 2000 and six universities in 2006 (OECD and World Bank, 2010).

According to recent data obtained from the Ministry of Higher Education, private higher education institutions provided education to about 21.2% of tertiary education in Egypt in 2010/11. Most of this private higher education is provided by non-university-ranked institutes (providing 17.6% of total higher education enrolment in 2010/11). The number of these institutes jumped from 132 institutes in 2010/11 to 1711 in 2014/15 as listed in the Ministry of Higher Education's website. Private universities only provide higher education to 3.5% of students enrolled in tertiary education in Egypt, provided by 20 private universities in 2014/15, up from 19 universities in 2010/11.[3] Similar to the global experience, it is envisioned that their role will increase with the impact of massification, globalization and neoliberalism. The higher education system in Egypt, A larger role by private higher education institutions has been one of the key recommendations by international entities to the Egyptian government (e.g. ibid.; World Bank, 2008).

There are two key differences between private and public higher education institutions that should be explained as background to the analysis. The first is that private institutions are at education fees, whereas public institutions are predominately for nominal administrative fees. The second is that, with the exception of elite universities, private institutions have been historically designed to absorb students who did not achieve the cut-off score in the secondary education completion examination. The system has been historically designed to make this group of less achieving students pay for their higher education. This legacy started to change with the pressures of massification and neoliberal policies. The cut-off score for public scores is getting very high, pushing families to send achieving students to private institutions to remain in their specialization of choice. Moreover, there has been a movement to establish elite at-fee programs

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[2] A key exception was the American University of Cairo, which was founded in 1919 as private non-profit American institution. The sample did not include graduates of this institution.

[3] Data provided in this paragraph build on the author's communication with the Strategic Planning Unit at the Ministry of Higher Education. The author is grateful for the support extended by this unit to the study. More recent data was obtained from the governmental website for higher education admission: http://www.tansik.egypt.gov.eg/application/Certificates/Fani/Dalel/12.htm.

in a few public institutions. Public universities are also opening sections for students not achieving the cut-off admission score in certain disciplines at added fees. Private institutions, on the other hand, are far from uniform. This is a reflection of the global typology of private higher education institutions, offered by Altbach et al. (2009), into elite, semi-elite, and demand-absorbing institutions. In Egypt, private universities with international linkages can be appropriately ranked as elite. Private universities without the international linkages and offered at less fees can be considered as "semi-elite". The rest of the higher institutes, whose fees structure can be as low as $500 per year, can be safely described as demand absorbing. The Egyptian labor market is characterized by high-educated youth unemployment. Those with post-secondary education constitute 39 per cent of the unemployed (Assaad and Kraft, 2013). Unemployment affects approximately one-sixth of the youth (15-29) in the labour market in Egypt are unemployed (15.7 per cent) (Barsoum et al., 2014). Young women are at a particular disadvantage in Egypt's labour market, with their unemployment rate reaching more than five times the rate among young men (38.1 per cent compared to 6.8 per cent) (Barsoum et al., 2014).

Unemployment is not the only concern about youth labour market outcomes in Egypt. Nine out of ten workers from the youth aged 15-29 (91.1 per cent) are in informal employment in Egypt (Barsoum et al., 2014). These include workers in informal (unregistered) enterprises and paid employees holding informal jobs in the formal sector but do not receive other benefits such as social security contributions or paid annual or sick leave. Higher education in Egypt has long been a shelter from employment informality, thanks to a scheme of guaranteed employment for graduates in the civil service and state-owned enterprises that was initiated in 1962. This sector of employment provides job stability and security benefits that are not matched by the private sector. With the relinquishing of the guaranteed employment scheme and the implementation of structural adjustment policies in the early 1990s, university graduates came to face new realities of employment informality. Informality, as the analysis in this paper shows, is also highly prevalent among the sample of university graduates included in this study. Employment characteristics are greatly defined by the sector of employment in Egypt. The civil service sector and state-owned enterprises provide employees with work stability, work contracts and different social security benefits. Their salaries, however, can be lower than the formal private sector

(Said, 2009). Barsoum (2015) documents the continued valorization of civil service jobs among youth for benefits related to job security.

3. Research Framework

3.1 Private Institutions and Higher Education Outcomes

There is little empirical research examining the labour market outcomes of private higher education institutions in comparison to public institutions. The fact that the growing role of private institutions is a relatively recent phenomenon in the higher education landscape worldwide explains this dearth of empirical studies. The novelty of the phenomenon and the typology of institutions take the prime focus of research (e.g. Altbach et al., 2009; Mok, 2009). Similarly, the idea of "privateness" in higher education and the impact of globalization and the neoliberal tide dominate the literature (e.g. Mok, 2009). Issues of governance and relationship to the state have also attracted researchers and debates (e.g. Dobbins and Leisyte, 2013; Neave, 2012). In Egypt, most of the research on private higher education focuses on issues of equity due to the legacy of subsidized education (e.g. Fahim, 2010; and Al-Araby, 2010).

There is, however, a rich body of literature on higher education access and outcomes that would be relevant to the study of private institutions. In this literature, the role of the family background and socio-economic status has shown to be a significant determinant of life opportunities and labour market outcomes. The Nobel Prize winner, Gary Becker (1988:10), stresses how earnings regress strongly to the mean between fathers and sons "in every country with data" that he has seen. Rumberger (2010), looking at data from the United States, confirms the powerful impact of social class background on college completion, showing that the odds of completing college for a student from a higher socio-economic status are more than six times higher than for a student from a lower social class background. Similarly, Bowles and Gintis (2002: 21–22) note that parental income and wealth are strong predictors of the likely economic status of the next generation. The sociological literature on the impact of family background on education outcomes is abundant. Seminal works by Pierre Bourdieu and colleagues stress the impact of social and cultural class reproduction (for example Bourdieu, 1990; and Bourdieu and Passeron, 1977).

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A few studies focused on determinants pertaining to the type of higher education in labour market outcomes. For example, Rumberger and Thomas (1993) focus on the role of the type of specialization, the undergraduate performance as measured by grade point average (GPA), and the quality of the higher education institutions. Smith et al. (2000) similarly focused on the subject of study and status of the institution as significant determinants, while still accounting for the importance of family background and socio-economic status on labour market outcomes in the UK. Støren and Wiers-Jenssen (2010) compared outcomes of foreign and local diplomas in labour market outcomes in immigrant societies. Pavlin (2014) looked at the commitment of senior professors and managers in higher education institutions in Post-Bologna Europe to their role in preparing graduates for entry to the labour market. Deželan et al. (2014) looked education-job match of political science graduates from Slovenia and other countries in Europe.

In terms of outcome variables, earnings and employability remain the predominant variables in empirical research on higher education outcomes. Rumberger and Thomas (1993) looked at earnings as their dependent variable. Smith et al. (2000) focused on the employability of graduates and their first destination as the outcome variable. This paper extends the analysis on labour market outcomes for higher education by also looking at job fringe benefits as an outcome. The rationale for the inclusion of job benefits relates to the earlier discussion on the increasing employment informality in Egypt, particularly among the youth. This analysis resonates with Baah-Boateng (2015) for the inadequacy of the focus on unemployment as a measure of economic integration in contexts with high informality such as sub-Saharan Africa or the Middle East. By addressing job security, it is hypothesized that investment in higher education would safeguard graduates from precarious jobs and would offer a higher level of job security and benefits in comparison to the general population. Job security remains an understudied domain in relation to higher education outcomes. This is probably the case since it has been long assumed that graduates of higher education would be sheltered from bad jobs by virtue of their education. Given the prevalence of informality in Egypt and limited access to job security and fringe benefits, we opted in this paper to focus on this central issue. Anker et al. (2002; 2003) address security at work in relation to the need to help safeguard health, pensions

and livelihoods, and to provide adequate financial and other protection in the event of health and other contingencies. The focus on job benefits and security recognizes workers' need to limit insecurity associated with the possible loss of work and livelihood. Adequate social protection is a defining feature of decent work around the world (Anker et al., 2002:52). The ILO estimates that only some 20 per cent of the world's labour force has access to adequate social protection (ibid.).

3.2 Research Questions

This paper is concerned with the question on whether there are differences in the labour market outcomes between graduates of at-fees private higher education institutions and those of free (at nominal fees) public institutions. The paper addresses three specific labour market outcomes: the employment probability during the first six months after graduation; the level of job fringe benefits in the current job through a constructed job fringe benefits (including job security) as discussed in the following section; and the earnings of the current job.

4. Data and Method

The paper benefits from the analysis of a recently fielded household survey (2012) tracing university graduates aged 25-40 in two disciplines that have been the target of private education institutions, namely business administration and information technology. The survey data collection tool collected information on graduates' socio-economic background and parental characteristics, education experience, first job experience, current job experience and employment history and mobility. The sample for this survey has been extracted from recent rounds of the Labour Force Survey (LFS), with the help of Egypt central statistical bureau, CAPMAS.[4] The interviewed graduates were identified as a sub-sample of the LFS. The sample of the LFS is a nationally representative sample extracted based on a two-stage stratified cluster sample and self-weighted to the extent practical (CAPMAS, 2012). The survey sub-sample was selected based on a number of criteria. Because university graduates are highly heterogeneous in terms of skills and specialization, we limited the sample and the analysis to a small number of

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[4] Central Agency for Public Mobilization and Statistics. Data collection for this study was undertaken by CAPMAS in collaboration with the Economic Research Forum.

specializations, namely business administration and information sciences. As noted earlier, these two specializations were selected because of the larger role of private universities play in the production of these skills. The survey focused on graduates aged 25-40 in these two disciplines who are currently working or have ever worked.

The final sample of the survey had 1713 graduates. Out of this sample, 413 graduated from private higher education institutions, constituting 24% of the sample. This is a good representation that resonates with national statistics about private higher education in the country as noted earlier. The mean age of the subsample of graduates was 28.9 years, with a standard deviation of 4.2 years. About 74% of the respondents in the sample were male. This gender skewedness in the sample representation is due to the fact that the survey design limited the criteria for inclusion to graduates who ever worked. The increasing de-feminization of the Egyptian labour market (Assaad, 2005) explains the low representation of female graduates in the sample.

4.1 Methodology

To evaluate the effect of university education type and quality on labor market outcomes, the below model has been used, where y measures labor market success while X is a vector that contains graduate's characteristics and Uni is vector that indicates education type and quality. The studies focusing on the return of education are commonly subject to selection bias, as students with high grades are attracted to high quality and prestigious universities causing ambiguity in disentangling between the quality of education obtained and innate ability. Consequently, it is necessary to control for this bias through the incorporation of pre-university factors that control for the heterogeneity in innate ability among students. Additionally, students of economically better-off households may have the option to enroll at prestigious foreign universities in Egypt such as the American University or the German University in Cairo that implies the impact of education type and quality maybe picked up by the socio-economic status of the graduate. Therefore, variables that assess the graduate family-economic status before university enrollment have been included in the model. Factors such father's occupation status, father's education, mother's education, student's achievement in secondary school and other factors are used for above purpose.

$$y = \beta X + \alpha Uni + \varepsilon$$

Using the graduate tracer study data, the analysis in this paper is based on two modeling approaches. Linear probability model with robust standard error for the dependent binary variable of the first model is applied, looking at the probability of employment in the first six months after graduation. In the second and third models, an ordinary least squares (OLS) model is applied for the two continuous dependent variables of job fringe benefits and earnings. The dependent variable of job fringe benefits is an index built based on access to the following benefits: stable work contract that is for a minimum duration of one year; social insurance; health insurance; paid annual leaves; paid sick leaves; end of service compensation; and access to bonuses and salary raises. The index is based on a principal components analysis with each of the above characteristics receiving a weight based on the analysis of principal components. In the analysis of the third model, wages in the current job are transformed into natural log form. This reduces the influence of outliers in income and allows for the interpretation of the effect of covariates as a percent change in wages.

The paper examines three categories of explanatory variables for all three models:

1. Individual background variables: These include gender; years since graduation; access to computers at home at age 15; pre-university type of schooling in terms of access to foreign languages (with dummy 1 for private language schools, which is more expensive than other schooling); and score in the secondary education graduation completion examination "*thanawya ama*", in addition to the overall grade at the end university study (excellent, very good, good, average, accepted). The models control for the type (public vs private) of preparatory and secondary school. The analysis also control for the father's education level; mother's education level and father's working status (wage worker in public sector, wage worker in formal private sector, wage worker in informal private sector, employer, self employed, contributing family worker, other, not working, deceased, and do not know). Binary variables whether the graduate had internships opportunities; volunteering experience; and summer-time employment during school. The analysis includes a dummy 1 for employment in civil service and publically owned

enterprises. Governorate's fixed effect has been controlled for by the inclusion of dummies for each governorate.

2. Education Institution level variables: these include factors that capture the type and quality of education in the education institution. A binary variable 1, for private institutions. Other institutional level variables include the language of instruction in higher education (dummy variable for access to teaching in English or a mix of English and Arabic); and use of active learning methods in teaching (group work, problem solving techniques, student presentations and research projects, with a dummy variable of 1 for any of these teaching techniques) in addition to a binary variable based on the response of the following question: "Did the university provide students with the opportunity to evaluate faculty members on a regular basis?" In absence of institutional ranking in Egypt, similar to those used by Rumberger and Thomas (1993) or by Smith et al. (2000), the analysis is limited to these variables at the institution level.

5. Results

5.1 Descriptive Statistics

In the first model, the paper examines the probability of employment during the six months following graduation. A little more than half the graduates were employed in the first six-month following graduation, with 51.9 per cent being wage workers, 2.3 per cent being employers and 4 per cent being self-employed. Unemployment prevalence in the first status after graduation was at 29.3 per cent among all graduates, with more prevalence about graduates of public universities (30.5 per cent) than among graduates of private universities (26.9 per cent). Moreover, 11.1 per cent of graduates were detached from the labour market, with the prevalence among graduates of private universities higher than among public universities (17.8 per cent compared to 7.7 per cent). These results are commensurate with labour statistics in Egypt with regards to university graduates discussed earlier.

Figure 1: Employment Status during the Six Months Following Graduation by Type of Higher Education (%)
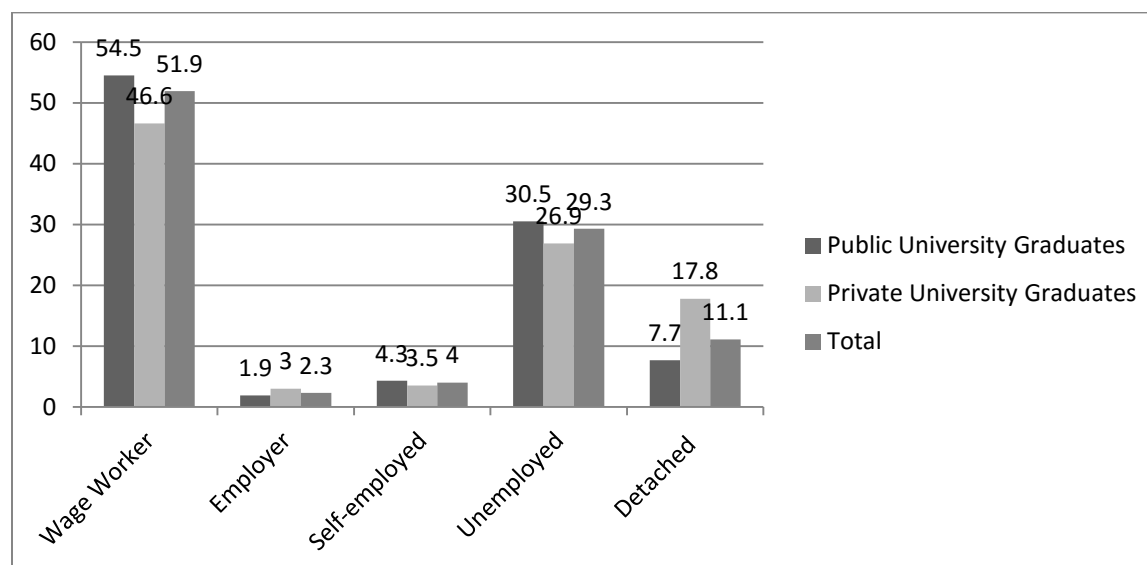
Source: Authors' calculations, survey data

The second dependent variable relates to access to better job quality measures as explained in the earlier section. The table below shows that graduates of private institutions generally had a lower score on the job quality index.

Table 1: Mean of job fringe benefits by type of Higher Education

Education's type	Mean	Std. Err.	95% Confidence Interval	
Graduates of Public Institutions	0.05	0.03	-0.01	0.11
Graduates of Private Institutions	-0.10	0.04	-0.19	-0.02

Source: Authors' calculations, survey data

The third dependent variable is the current salary earnings. Table 2 shows that the mean current salary for graduates from both public and private institutions was LE 1531.27 (about US$230) and the minimum monthly pay was LE 200 (about US$90). Table 3 in the appendix provides a description of selected variables included in the analysis.

Table 2: Monthly Salary in Egyptian pounds by type of education

Education's type	Mean	Std. Err.	95% Confidence Interval	
Public	1516	57.2	1404.7	1629.2
Private	1562	69.4	1426.3	1698.7

Source: Authors' calculations, survey data

5.2 Estimation Results

5.2.1 Employment in the First Six Months after Graduation

We first explore the probability of being employed within six months of graduation. Table 4 in the appendix includes the results of this model. The results indicate that there is a significant negative impact of graduating from a private institution on the likelihood of getting a job in the first six months following graduation. Private higher education is associated with a lower likelihood of being employed in the first six months after graduation. This might reflect a preference in the job market for graduates of public institutions; lower social capital and networking potentials to find jobs; or that these graduates prefer to wait for better opportunities and do not accept the first job opportunity made available. The significant impact shown in the table of the variable of years since graduation is interesting. While this model looks at graduates in their first months after graduation, older graduates seem to have been less privileged than the more recent graduates. The years since graduation variable here is to interpret in this model as cohort effect. One explanation for this was provided by Assaad and Kraft (2013) who argue that the impact of the youth bulge on the labour market has eased, comparing data from 2006 and 2012.

Ascribed characteristics such as low of parents' education and low profile job are a significant determinant to the likelihood of finding a first job within six months of graduation. Another significant predictor for the probability of employment within the first six months of graduation as table 7 shows is summer work. In the context of OECD countries, public programs promoting early labour market contacts for high school students are commonplace and have been repeatedly advocated by the OECD (Alam, Carling and Nääs, 2013). Häkkinen (2006) notes that pre-graduation employment may provide an opportunity complement the formal education and improve study motivation, particularly when the employment relates to the field of study. Pre-graduation work allows improving job search skills along with other important life skills such as better communication skills (ibid.). These opportunities also familiarize students with the world of work and allow them to gain a sense of responsibility. These valuable skills can have a positive impact on employment outcomes post-graduation. Häkkinen (ibid.) also argues that summer employment might signal potential future employers about attributes such as motivation and work ethics. Other favorable arguments for summer jobs discussed by Alam, Carling and

Nääs (2013) include access to skills and knowledge not accessible through in-class education; the potentials to enhance motivation to study; and the earnings that can alleviate poverty. Summer work can also smooth the transition from school to work by collecting information and establishing a social network that helps in finding their first regular job (ibid.).

5.2.2 Level of Access to Job Fringe Benefits in the Current Job

The second dependent variable relates to access to job fringe benefits measures in the current job. In this model, we apply multivariate OLS. Unlike the earlier model on the probability of finding a job in the first months after graduation, the results of this model indicate that the type of institution does not have a statistically significant impact on the level of job benefits in the current job, with a value coefficient that is very close to zero. The quality of received education measured by teaching approaches also does not hold a significant impact on this labour market outcome. The results in table 4 show that, similar to the earlier model, ascribed characteristics are significant determinants to labour market outcomes in Egypt. Father's education is also another key determinant to the level of job benefits in the current job. Private schooling in the primary stage is another proxy for family higher socio-economic status, since these schools are more expensive than other schools. The impact of these ascribed and pre-education variables dwarfs the effect of the type of higher education institution in the labour market outcome pertaining to job benefits.

Score in the secondary education completion examination had a positive significant impact on the level of job benefits. Higher scores could indicate higher innate abilities pertaining to hard work or intellectual and mental capabilities. The score provides a proxy for innate abilities and allows the model to avoid bias in coefficient. While the impact of the score is not significant in the first model, perhaps because students with higher scores prefer to wait for better jobs, it pays off in terms of job quality as table 4 shows. The score can also be a proxy for the family background and socio-economic status. Because it is common for families to complement secondary school education with private tutoring, higher scores can be a proxy of the family's spending on this usually costly support to students in order to perform better in the final examination (El-Badawy, 2009). While most families provide their children with private tutoring, the variation in cost is very high, reflecting a variation in quality and possible outcome

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in terms of final scores (ibid.). As would be expected, years since graduation improve the level of job benefits. This concurs with international literature on the decent work deficit among new entrants to the labour market from the youth (ILO, 2014).

5.2.3 Earnings of Current Job

In the analysis of the third model, we transform wages in the current job into natural log form. As noted earlier, the log form reduces the influence of outliers in income and allows for the interpretation of the effect of covariates as a percent change in wages. The results show that private higher education has no significant effect on job earnings. The analysis supports the arguments made earlier about the role of ascribed characteristics. First, gender is a major predictor of income. Being male is associated with an increase of income by more than 50%. Another significant predictor is the father's education, which is associated with higher income in the current job. As the table shows, the value of the father education coefficient is quite high relative to the rest of the variables, associated with a stark increase in wages. Father who works as employer and owns business is associated higher earning for his son and daughters. Also directly related to the family background is the access to primary computer. Attending private school has a significant positive impact on earnings. Private schooling is more expensive than public schooling, which is offered at nominal fees. Private schooling is a marker of family wealth. Better-off families opt to give their children more expensive private schooling, particularly in the early stages.

6. Discussion and Conclusion

The analysis in this paper shows that the type of the institution does not have a significant impact on labour market outcomes for graduates in ICT and business in Egypt. Ascribed characteristics, particularly parental socio-economic status were the significant determinants to the likelihood of finding a first job within six months of graduation; level of job fringe benefits in current job and income in current job. The male advantage has also been significant in the earning outcome. Father's education has been a significant determinant in all three models. Score in the secondary education completion examination had some positive significant impact on the level of job benefits and income. While higher scores could indicate higher innate abilities pertaining to hard work or intellectual and mental capabilities, they can also be a proxy for the family socio-

economic status due to the prevalent use of private tutoring. We, therefore, relate the impact of the score in secondary education completion examination to the parental socio-economic background and ascribed characteristics. Surprising, achieving high grades at the high education institution did not a return at the labor market outcome. This has bleak interpretation as family connection and nepotism may have higher weight on getting a decent job.

Graduates of public institutions were more likely to join the civil service and publicly owned enterprises. This relates to recent regulation of hiring in this sector, where top performing students from public higher education institutions are invited to apply to civil service jobs (El-Baradei, 2013). These policies have been reflected in our analysis of their labour market outcomes in terms of job benefits and earnings. The argument in relation to the impact of summer work corresponds with the mixed results in the international literature on this issue (Häkkinen, 2006; Hotz et al., 2002; Alam et al., 2013). Summer work is positively associated with the likelihood of finding a job in the first six months after graduation. However, its impact diminishes in looking at the level of job benefits or income in the current job. A number of issues in relation to the difference between private and public higher education institutions seem to be dwarfing the impact of the type of the institution on labour market outcomes. The first is that private institutions are at fees, whereas public institutions are predominately for nominal fees. With the significant impact of the family socio-economic background that we discuss in this paper, the fees paid signify a higher socio-economic background and would be associated with a positive impact on the labour market outcomes of graduates from private institutions. However, the fact that not all public institutions are for nominal fees confounds this argument. Elite at-fees programs that provide education in foreign languages in public institutions confound these results. This has been the case for business administration, with English section opened at higher fees. The presence of these programs confounds the difference between public and private institutions labour market outcomes. Moreover, with the exception of elite universities, private institutions accept lower grades in the secondary education completion examination. Graduates of public institutions, therefore, could have higher innate abilities pertaining to hard work or intellectual and mental capabilities. This would have an unobservable impact on labour market outcomes. Moreover, because public institutions accept students with a higher score, this too can be a proxy to a higher socio-economic background as noted earlier.

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To summarize, institutional-level variables in terms of teaching approaches and language of instruction had no significant impact on the labour market outcomes. This corresponds with the argument by Assaad et al. (2014), looking at data from Egypt and Jordan, that the labour markets in these two countries are less responsive to the education institution variables and is primarily affected by ascribed characteristics of family background and gender. As the analysis in this paper shows, pre-education and post-education variables mattered most in determining the labour market outcomes, regardless of the type of higher education obtained.

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Table 3: Summary Statistics

Variable	Obs	Mean	Std. Dev	Min	Max	Variable Description
Dependent Variable						
Emply	1710	0.58	0.49	0	1	First employment during the six months following graduation
Security_index	1505	0	1	-1.0	1.5	Job index is a proxy of job quality
logwage	1371	7	0.77	5.2	10.4	Log salary in current position
Individual background						
Gender	1710	0.74	0.43	0	1	Male=1 , female=0
Yrsgrd	1710	6.50	4.2	0	20	years since graduation
Computer use	1710	0.33	0.47	0	1	Access to computer at home at age 15
Private_school	1710	0.23	0.42	0	1	pre-university type of schooling in terms of public or private, private =1, other=0
Score	1654	75.7	9.6	50	97	Grade percentage in the secondary education graduation completion examination "thanawya ama
univ_priv	1710	0.33	0.47	0	1	0-1 dummy variable, =1 if student is a graduate of private institute (University or institute)
language	1710	0.15	0.36	0	1	language of instruction in higher education, English or English and Arabic=1, only Arabic=0
Active	1710	0.33	0.47	0	1	use of active learning methods in teaching in higher education. Dummy variable=1 if teaching always involves groups projects, research projects, students' presentations, teaching based on problem solving and case studies
internship	1710	0.11	0.32	0	1	Had an internship during university study=1 and otherwise=0
summerwork	1710	0.46	0.49	0	1	Had a job during university study or summer vacation during the bachelor=1 and otherwise=0
volunteer	1710	0.05	0.22	0	1	Volunteer work during university study=1 and otherwise=0

Source: Authors' calculations, survey data

Table 4: Regression Results

Variable	Log Wage	Job Prospect	Job benefits
Male	0.508***	0.0510	0.0608
	(9.78)	(1.64)	(1.86)
Years since graduation	-0.0107	-0.00977**	0.0352***
	(-1.84)	(-3.15)	(10.86)
Access to Computer at home			
Yes	0.114*	0.00299	-0.0268
	(2.10)	(0.09)	(-0.75)
Access to internet at home			
Yes	-0.00877	-0.000217	-0.00579
	(-0.13)	(-0.01)	(-0.13)
Access to books and magazines at home			
Yes	0.00081	-0.000660	-0.0470
	(0.02)	(-0.02)	(-1.54)
Private Secondary school			
Yes	-0.11	-0.0517	0.0465
	(-1.00)	(-0.79)	(0.70)
Grade at high school (thanawya ama)	0.0042	0.000421	0.00337*
	(1.64)	(0.29)	(2.28)
Private University			
Yes	-0.0239	-0.139**	0.0192
	(-0.32)	(-3.12)	(0.43)
Grade at University (pass is base group)			
excellent	-0.365	0.215	0.0622
	(-0.90)	(1.58)	(0.34)
very good	-0.0115	0.0862	0.0183
	(-0.09)	(1.41)	(0.31)
good	0.00273	-0.0179	0.0926**
	(0.05)	(-0.56)	(2.79)
average	0.327	0.114	0.260*
	(1.72)	(0.81)	(2.22)

Interaction term private university graduate and university grade			
Private. Excellent	-1.297	-0.0411	-0.0958
	(-1.46)	(-0.13)	(-0.32)
Private.very good	0.00376	0.134	-0.0558
	(0.02)	(1.43)	(-0.56)
Private.good	-0.0195	0.135*	-0.126*
	(-0.20)	(2.35)	(-2.20)
Private.average	-0.217	-0.0832	-0.0719
	(-0.99)	(-0.44)	(-0.41)
Language of instruction at university			
English or English and Arabic	0.0894	0.00251	0.00649
	(1.51)	(0.07)	(0.17)
Active learning methods at university			
Yes	0.0303	-0.00222	-0.0268
	(0.60)	(-0.08)	(-0.91)
Had internship during university			
Yes	-0.0603	-0.0267	0.0378
	(-0.85)	(-0.68)	(0.94)
Job during summer			
Yes	0.00439	0.155***	-0.0208
	(0.09)	(5.61)	(-0.72)
Volunteer work during university			
Yes	0.069	0.0779	0.0467
	(0.63)	(1.33)	(0.72)
University allow faculty evaluation			
No	-0.059	-0.0842	-0.0240
	(-0.50)	(-1.20)	(-0.35)
Father's education (Illiterate=base group)			
Preparatory or lower	0.0566	-0.113**	-0.0130
	(0.70)	(-2.58)	(-0.29)
Secondary or diploma	0.248**	-0.0440	0.0388
	(3.12)	(-0.98)	(0.85)

above secondary	0.331***	-0.0578	0.116*
	(3.58)	(-1.07)	(2.16)
Postgraduate	0.308	-0.0498	0.173
	(1.33)	(-0.42)	(1.25)
Mother's education level			
Illiterate	-0.0577	-0.0343	0.0508
	(-0.89)	(-0.91)	(1.35)
Preparatory or lower	-0.0405	-0.0401	0.00398
	(-0.64)	(-1.01)	(0.10)
Secondary or diploma	-0.166	-0.0218	0.0209
	(-1.85)	(-0.42)	(0.39)
above secondary	0.385	-0.00898	0.143
	(0.89)	(-0.03)	(0.59)
Attended primary private school			
Yes	-0.0186	-0.0293	0.0490
	(-0.26)	(-0.65)	(1.10)
Attended preparatory private school			
Yes	0.228*	0.0582	-0.0115
	(2.57)	(1.10)	(-0.21)
Father's occupation (Wage worker in public sector =omitted)			
Wage worker in formal private sector	0.095	-0.0437	-0.0370
	(1.43)	(-0.96)	(-0.77)
Wage worker in informal private sec.	0.0031	-0.0347	-0.155**
	(0.03)	(-0.67)	(-3.15)
Employer	0.197**	-0.0518	-0.0675
	(3.07)	(-1.30)	(-1.66)
Self-employed	-0.0227	-0.134**	-0.103*
	(-0.31)	(-3.30)	(-2.50)
Other	-0.0147	-0.190	0.0139
	(-0.04)	(-1.01)	(0.10)
Not working	-0.3	-0.0672	0.0269
	(-1.42)	(-0.47)	(0.20)

Deceased	-0.0295	-0.0512	0.0361
	(-0.28)	(-0.74)	(0.52)
Unknown	0.662	0.0504	0.0368
	(1.24)	(0.18)	(0.14)
_cons	5.535***	0.713***	-0.107
	(21.93)	(4.81)	(-0.71)
Governorate Fixed effect	Yes	Yes	Yes
N	1304	1637	1442
R2	0.22	0.1	0.172

t-statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001