Interdependencies of Health, Education Poverty in Egypt, Morocco and Turkey Using Demographic and Health Survey

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Abstract

The interdependencies of health, education and poverty that are common knowledge to individuals are also present at the aggregate levels of countries and internationally. The assessment of these interdependencies is the central task of this research but based on the Demographic Health Surveys (DHS) of Egypt, Morocco and Turkey. The results attained through dependency tests and probit models, confirm the existence of major interdependencies at the levels of households. These findings support the need for accelerating and developing further integrated and transversal economic and social policies.

Keywords: Interdependencies; Health; Education; Poverty; Egypt; Turkey; Morocco.

JEL: D31-I1-I2-I3

Introduction

This study aims at analyzing the interdependencies between health, education and poverty in Egypt, Morocco and Turkey. If enough empirical research has been accumulated about different regions of the world, only limited evidence about exists for North Africa and Middle East.

The importance of health and education has been recognized since the early work of Sen (1998). Since 2000, the international community has embarked in achieving the Millennium Development Goals.

While a number of empirical studies have identified the existence of interdependencies between some or most variables that underline human development, major controversies have been identified in relation to the extent of data and their use in the estimations.

These empirical investigations have not concerned the North African and Middle Eastern countries. While it is pervasively known that the region has important deficits in education and health and relatively significant parts of the population are living in poverty, no empirical evidence about the interdependencies between different variables pertaining to human development is presented and tested empirically (UNDP: Arab Human Development Reports, 2002, 2003, 2004 and 2005). The latter reports have shown large deficits in different aspects of human development in the region. Health and knowledge have appeared to be among the major deficits in the region and occupy key positions in limiting access to better lives.

This paper starts by introducing the major findings from series of publications before addressing the methodological framework applied to Demographic Health Surveys (DHS) most recent data for Egypt, Morocco and Turkey. The results of these analyzes are introduced and discussed in the last section.

I. Literature Review

This review looks respectively at the interdependencies that have been established between different wealth components that are health, education and economic variables. The established links are reviewed under various combinations of health, education and economic indicators. Based on DHS, important series of reports are produced about the links between health, nutrition and population. Among the countries, Egypt, Jordan, Morocco, Turkey and Yemen are covered. The related publications (Gwatkin et al. 2007) provide the most important links between health, nutrition and demographic issues.

Akala and El Saharti (2006) asserted that while the region benefited from health improvements, more effective and structured commitment toward health service was required. The authors suggested that this limited engagement was directly related to the level of investments devoted to health care. This is also supported by other studies, such as that of Fahimi (2007), who highlighted the considerable lack of awareness in women's health. Alarming gender disparities that are usually justified by cultural matters exist in the access to public health services.

There is also empirical evidence about the link between health and productivity. Tompa (2002) found that health increases output at both the personal and the aggregate levels. Bloom et al. (2001) confirmed the positive and significant impact of health on economic growth, as measured by productivity. Furthermore, a decrease in child mortality in the recent decades has led to reduced fertility rates, which in turn can cause an increase in workforce participation and productivity (Bloom and Canning, 2000).

Inefficient spending on health will negatively affect the economic and human development of the region. "It could act as a drag on labor productivity, add fiscal pressure on a limited government budget, and reduce governments' ability to target public resources for the vulnerable groups"

(World Bank 2006). The World Bank report (2006) states that public expenditure in health and education provisions helps improve labor force productivity. Finally, improving health level enhances individual security and capabilities, which leads to improved productivity, national income, and development prospects (Fahimi, 2007).

Earlier contributions have provided further information. The relationship between health and productivity is a two-way causality relationship (Smith,1999). Strauss and Thomas (1998) suggest that as workers' productivity increases, their earnings increase allowing them to invest more in their health. Smith (1999) believes that the impact of productivity, translated into earnings, on health exists albeit it is lower than the impact of health on productivity/earnings. According to Chatterjee (1990), productivity has a direct positive impact on education which is manifested through an increase in wages and household nutrition. Still, there are many factors that mediate this relationship such as wage, nature, and seasonality of employment.

Health and education have been also found to be related**.** Much of the relationship between health and education is associated with infancy and early childhood, where health, nutrition, and the environment may have disproportionate effects on cognitive development (Hoxby, 2007). According to the study of Ding et al., (2007), poor health, represented by obesity and depression, has a substantial impact on schooling performance. Also, lower birth weight babies have lower educational attainment and earnings as"…an increase in birth weight of 10 percent increases the probability of high school completion by a bit less than one percentage point" (Black et al. 2005). Fertig et al. (2003) reported that children with low birth weight and poorer childhood health indicators have significantly lower educational attainment.

Evidence also exists that education plays an important role in determining health levels of adults, as well as the health of their children (Hoxby, 2007).

The links between health and income have been also investigated**.** Lynch (2000) found that there are different interpretations of the relationship between income and health. The Individual Income Interpretation assumes that "determinants of population health are completely specified as attributes of independent individuals and that health effects at the population level are merely sums of individual effects." The other interpretation of the health-income linkage is the Psychosocial Environment Interpretation. It suggests that poor people have a negative perception about their socioeconomic status, especially when comparing themselves to the rich.

In the South Mediterranean region, important changes have been recorded in health patterns. Indeed, fertility rates, mortality rates, and communicable diseases have decreased while life expectancy and non-communicable diseases have increased. This increase in non-communicable diseases has been related to changing lifestyles (smoking and decreased levels of physical activity) due to increased income. Although most studies suggest that, generally, rich countries have a healthier population, there are many countries in the region of study that contradict these findings. For instance, while Oman is an upper-middle-income country, the health conditions of its population (in terms of child malnutrition, low birth-weight, and maternal anemia) are as low as those found in some lower-middle income countries such as Egypt and Morocco (Disease Control Priorities Project, 2006). Based on a research conducted in the USA, health (measured by life expectancy, death rate, infant mortality, medical research) has a significant impact on income level. (Brinkley, 2001). As in Weil (2006), "eliminating health gaps between countries would reduce the variance of logarithm GDP per worker by 9.9%".

Also the links between poverty and education have been studied. With regard to education and income growth among poor people, most poverty assessments find a high correlation between education status and income status. The Middle Eastern and North African region presents the same general pattern. In all cases where detailed analysis of household data has been carried out, poverty rates are the highest for households headed by illiterate people, and decline with increased education of the household head. Rationally, poverty and education are negatively correlated. Yet, the report mentions a recent analysis by the World Bank (2008) which provided estimates on the return on education for four countries (Egypt, Jordan, Morocco, and the Republic of Yemen) using a common methodology.

The links between poverty and health have been also important issues. Health and wealth are frequently correlated. A sense of the extent of the correlation in this region can be obtained from recent DHS data for Egypt, Jordan, Morocco, and Yemen. Across the four countries, on average, health outcomes among the poorest are worse than among the richest (Gwatkin et al. 2007). That is, the children of the poorest 20% of the population are more than twice as likely to die before they reach their fifth birthday, compared to the children of the richest group. Furthermore, more than four times as many mothers in the poorest group are malnourished compared to the mothers in the richest group. A most recent study on "Public Policy and Poverty Reduction in the Arab Region*,"* edited by Ali Abdel Gadir Ali and Shenggen Fan (2007), includes the contribution of several authors that have clarified the links between public policies and poverty reduction.

II. Empirical Methods & Data

Following most of the empirical procedures used in prior studies, the methods mobilized in this paper include mainly descriptive statistics, regression analysis and probit models.

The probit models have been estimated with categorical and qualitative data.

The methods for analysis of categorical data have been extensively developed under the assumption of multinomial or product multinomial sample. The Pearson Chi-squared test statistics, for goodness of fit and independence in two way contingency tables, are well known. The log-likelihood ratio and Wald statistics, which are asymptotically equivalent to the Pearson statistics, are also used. The theory associated with Pearson and log-likelihood ratio statistics is given in Bishop et al., (1975). Many illustrations of the use of the chi-squared statistics are given by Holt et al. (1980), Eherler and Lehmann (2007) using CHAID (Ch-Squared Automatic Interaction Detector); Habbani et al.(2007), Tomovic and Oakeley (2007) and Chakrabarty (1989).

The above methods are applied to primary data from the surveys of large samples at the level of each country mentioned above. A large number of variables were included in the surveys. The variables are typically categorical and related to the households. They concern health, education and poverty.

The DHS data for Morocco include 64,000 households, while Egypt has 17,000 households, and Turkey has 13,000 households. The variables are related to different dimensions related to health, education, wealth and standard of living.

III. Results of the Empirical Analysis and Discussion

This section introduces respectively the results attained and their discussions. The results are those related to the dependency analysis and probit models. These are considered for each of the countries under study. Probit models related to the two regions of Morocco are also introduced.

1. Results of the Dependency Analysis

1.1 Dependency analysis

Two by two contingency tables are estimated respectively for education versus wealth, and health versus education. Wealth, education, and health are represented by different dimensions related to each of the vectors. Education is represented by the various levels of "education", "no education", "incomplete primary", "complete primary", "secondary", and "higher education". Wealth is represented by all of the capital goods, such as "means of transportation", "equipment", "factories", "housing", and "businesses". Health is represented by "individual weight" and "height"," illnesses", and the "state of health".

A. Wealth versus education

For Morocco, contingency tables are computed between wealth and education, with two criteria for wealth and seven for education. A pre-selection of the predictor variables are made. The results of the chi-squared test, contingency tables and the observed χ^2 are introduced in Table 1 of the appendix.

The chi-squared test shows that education and wealth, taken as two groups, are interdependent for all 9 contingency tables, computed and summarized on Table 1 of the appendix. The number of observations in all contingency tables is around 64,000. For example, the contingency Table on the first row of Table 1, representing means of transportation versus educational attainment, is

computed with 63,964 observations and results in a chi-squared value of 35.507 with 6 degrees of freedom. The theoretical chi-squared value is equal to 14.4494 with 6 degrees of freedom and 5% level of significance. The comparison between the observed and the theoretical chi-squared shows that means of transportation and education attainment are dependent. All the other contingency tables have an observed chi-squared value greater than that of Table 1, the degrees of freedom is 6 with 5% level of significance, means that wealth and education are dependent. This dependency between these two groups of variables indicates that wealth or poverty and education are interdependent.

The data used in Turkey are similar to Morocco; however, the number of observations is larger than that of Morocco. In Turkey, the variables representing wealth are different from those of Morocco. In Turkey, wealth is represented by the type of job, social security, the work place, the type of activities, the position in the job, and the level of income. Each variable representing wealth depends on other variables that are taken into consideration in dependency analysis. Education levels of variables are similar to those of Morocco; no education, preschool, primary, higher, and so forth. Table 2 in the appendix summarizes different chi-square tests (18) and shows the characteristics of factors of each group of variables.

Eighteen contingency tables summarized in Table 2 of the appendix are developed with the corresponding chi-squared tests. The results of the testing indicate that wealth and education are interdependent. This is justified by the observed chi-square values with their magnitudes which are greater than 70 with degrees of freedom that vary between 4 and 9 for income ranges. The theoretical chi-square values vary within the range 11.4 to 19.022 with a 5% level of significance and the range of degrees of freedom between 4 and 9. Comparing the observed and the theoretical chi-square values indicates that wealth and education are dependent on each other.

The other categories of variables, including type of jobs, social security, and the job position, present large values of observed chi-square above 171 with degrees of freedom above 18. The corresponding theoretical chi-squared values are above 30.19 with a 5% level of significance, and double sided chi-squared test. The comparison between the observed and theoretical chi-square values indicates that the two categorical variables that represent wealth and education are dependent.

In Egypt, about 13,000 households are surveyed with a large number of categorical variables related to health, education and poverty. Different groups of variables are selected in the framework of the dependency analysis: wealth versus education are represented by "radio" versus "literacy", "car/truck" versus "literacy", "motorcycle/scooter" versus "literacy", "bicycle versus literacy", "refrigerator" versus "literacy", "television" versus "literacy", and "electricity" versus "literacy". Literacy is assessed by education levels, whereas, indicators of wealth have three levels: "household has the item or the good", "household does not have the item or the good" and "household does not have a decent residence". Contingency tables and their corresponding chi-square values are introduced in Table 3 of the appendix. The chi-squared tests indicate that wealth and education are dependent; this is shown by the computed chi-square values that vary between 106.8 and 365.6 with 6 degrees of freedom. The theoretical chi-square value is 14.44 with 6 degrees of freedom and a 5% level of significance and double sided test. Contrasting the observed chi-square values with the theoretical values results in the dependency between health and education.

B. Health versus education

In Morocco, the number of observations or households is about 9,200. Health and education are represented by a series of related variables that include: medication for disease,

highest educational level, education for disease, educational attainment,
other illness, respondent's weight (kilos-1d), and respondent's height (cms-1d).
For each group, different predictor variables are used and contingency tables elaborated. The contingency tables and their relative observed chi-squared test are represented in the appendix. The results show that the observed chi-square value is 14.78, with 8 degrees of freedom for the categories, medication for disease versus educational level, compared to theoretical chi-square value of 17.53 with 8 degrees of freedom, thus, these two categories of variables are interdependent with 5% level of significance and two sided test. At the level of other categories of variables, the observed chi-square values are greater than those of the theoretical chi-square values with a 5% level of significance (see row 10 to 16 on Table 1 in the appendix).
For Egypt, a different group of variables are selected; different educational levels and different variables representing health. The results of the dependency analysis based on chi-squared tests are shown on Table 3 in the appendix, and demonstrate that health and education are also dependent. The observed chi-squared values compared to those of the critical chi-square values with a 5% level of significance confirm the interdependency between health and education.

1.2 Probit Analysis

The variables representing health, education, and poverty are dichotomous. The probit and logit regression models are widely used to quantify the interdependencies among these categorical variables: health, education, and poverty. Given the large number of variables and observations representing health, education and wealth, probit models are estimated. However, a selection of the most significant models at the level of each country is undertaken. The results and

interpretation of these empirical probit models are given below with the outputs concerning the probit models provided under each section.

A. Morocco:

Two models are retained. The first one is related to education versus wealth with the highest educational level as the dependent variable. The explanatory variables are: “has car/truck”, “has a bicycle”, and “education attainment”. The estimated model using the maximum likelihood is the following:

P=-2.103-0.56(has car/truck) +0.53(has a bicycle) +0.388(educational attainment) (1)

The model (1) goodness of fit based on chi-squared test demonstrates that the model fits well to the data. The regression coefficients are significant at 95% level of confidence, and the signs are those expected. The model also indicates that education depends on health in Morocco; however, the contribution in terms of probability of each variable representing wealth varies. For example, with wealth equal to zero, the probability of highest educational level is 1.79%, which is rational because the probability is very low. Moreover, an increase in wealth, represented by has car/truck and has a bicycle, stimulate education with about 28.78% and 70.19% respectively, which is greater than the absence of any indicator of wealth. In terms of education attainment, the probability of the highest educational level is about 67%.

The second model deals with wealth versus education. Wealth is represented by “has car/truck” as the dependent variable, and education is represented by highest year of education and educational attainment as determinants of education. The estimated model is the following:

P=-2.025+0.026(highest year of education)-0.66(educational attainment) (2)

The goodness of fit relative to wealth against education model indicates that the probit model fits well to the data; the chi-squared test and the coefficients of regressions are significant at 95%

level of confidence. The model indicates that, without any education, the probability of wealth is 2.02%, which is an important result linking wealth and education. With respect to highest year of education impact on wealth, there is a 51.20% chance of an improvement of the standard of living on the households; the education attainment contributes to wealth 25.46%.

These two probit regression models indicate that education and wealth are interdependent, with different effects of each variable representing wealth and education. The complete results are presented the appendix. Table 4 displays the results related to model (1) and Table 5 displays those related to model (2)

B. Egypt:

In the case of Egypt, only one probit model is developed which combines wealth, represented by has a car/truck as the dependent variable; education, represented by highest educational level, literacy; and health, represented by visited health facility in the last 6 months. The estimated model is as follows:

P= -2.390+0.174(highest educational level)-0.021(literacy)-0.01(sons at home) +0.083(visited health facility last 6 months) (3)

The goodness of fit test and the test of significance concerning the regression coefficients illustrates that the model fits well to the data (refer to Table 6 in the appendix). The expected signs are what were expected. For instance, considering education and health variables in the model (7) equal zero, the probability of having a car/truck is 0.96%, which is less likely to be better off without education and health. In the case of highest educational level, its effect on wealth in terms of probability is about 56.80%, which is more likely with respect to the absence of education and health. The impact of literacy change on wealth is about 49.20%, whereas, visited health facility in the last 6 months change affects the wealth about 53.24%. The model

seems to indicate the significant likelihood of interdependency among wealth, education and poverty.

C. Turkey:

In the case of Turkey, the probit model is estimated using “has a bicycle” as the dependent variable representing wealth. The explanatory variables are “highest educational level”, “highest year of education”, “education in a single year”, “educational attainment”, and “member still in school”.. The model estimated fits well to the data based on the goodness of fit test; the coefficients of regression are significant at 95% level of confidence. The signs of the coefficients are appropriate and are in accordance with the economic concepts. The empirical model estimated is as follows:

P= -1.673-0.031(highest educational level)-0.008(highest year of education)

+0.009(educational attainment) +0.145(member still in school) **(4)**

The model indicates, as displayed in Table 7 of the appendix, that with the absence of education, the probability of wealth is 4.75% which is very low; whereas, the changes of the explanatory variables representing education affect wealth with probabilities greater than 50%. For example, the unit change of highest educational level leads to the probability of wealth of about 48.8%. In the case of highest year of education and educational attainment, the probability of wealth is about 49.80%; the probability of wealth with respect to member still in school is about 92.65%. The probit empirical model seems to explain the relationship between wealth and education through the variables (dependent and explanatory) included in the model. The results also show that education and wealth are interdependent.

2. Discussion of results

The dependency analysis, based on categorical data with a large number of observations related to households has been assessed. The observations concern the variables representing health, education, and wealth. The model, based on the chi-squared test, indicates that health, education, and wealth are interdependent at the level of all the three countries. The observed chi-square values are very large with respect to the theoretical chi-square values, with a 5% level of significance and more than 8 degrees of freedom in the two categories of dependency analysis. The results demonstrate the link between poverty, education and wealth, which is a proxy variable for poverty. The results of this dependency analysis at the level of these three countries also indicate that for any economic development, the three sectors, health, education and wealth should be taken into account because of their interdependencies. Failing to consider health, education and wealth in any economic and political decision making will lead to non-desirable and unsatisfactory results.

Furthermore, the dependency analysis, based on the chi-squared hypothesis test of health, education and poverty (refer to the appendix) at the level of Egypt, Morocco and Turkey, indicates that health, education and poverty are inter-related in the sense that the investment in education, for example, positively affects health and reduces poverty. This is because education contributes to the economic growth, which in turn positively affects the standard of living, leading to the reduction of poverty. On the other hand, investment in health at the level of the entire society will ensure the high productivity in education, which then contributes to economic growth and reduction of poverty.

The findings of interdependency research at the level of Egypt, Morocco and Turkey indicate that the degree of relationships, measured by the chi-squared hypothesis testing, at the level of

these countries is the same. That is, the results are somewhat similar in terms of the economic and social policies adopted toward health, education and poverty. The domestic and regional policies have implications and effects on health, education and poverty, this means that certain regional policy integration for the development must be considered in order to enhance education, improve health, and combat poverty.

Conclusion

This study is based on household data analysis of variables that focus on health, education, and wealth at the level of Egypt, Morocco and Turkey. The results attained show that there are major gains that can be achieved when accounting for the interdependencies of health, education and economic variables. This is achieved through applying dependency tests and probit models to DHS data for Egypt, Morocco and Turkey.

The chi-squared hypothesis testing demonstrates a significant dependency between health versus education and education versus wealth with many characteristics concerning health, education, and wealth.

The probit model allows for the simultaneous identification of the interrelationships between health and education, education and wealth, and wealth and health. Different probit equations are estimated and are valid in explaining the behavior of each dependent variable (health, education, or poverty) with respect to the independent variables (health, education, and poverty). The probit estimated models present a significant likely interdependency among health, education and wealth through a high probability of occurrence between each dependent and independent variable.

It may be confirmed from this study that the sectors included in the analysis are major determinants of economic development.

By and large the probit models used in this study reflect and explain appropriately the interdependencies among health, education and poverty with various degrees which are related to the proxy variables used to represent health, education and poverty. Moreover, the results of the microeconomic analysis undertaken at the level of Egypt, Morocco and Turkey are, somehow, similar.

References

Abdel Gadir, A. & Shenggen, F. (2007). Public Policy and Poverty Reduction in the Arab Region. The Arab Planning Institute, Kuwait.

Akala, F. & El-Saharty, S. (2006). Public-Health Challenges in the Middle East and North Africa. *Lancet*, 367 (9515), 961-964.

Bishop, Y. M., Bishop, Fienberg, S. E. & Holland, P. W. (1975). Discrete multivariate analysis: Theory and practice, Cambridge, Mass.: MIT Press.

Black, S. E., Devereux, P.J., Salvanes, K. (2005). From the Cradle to the Labor Market? The Effect of Birth Weight on Adult Outcomes, Working Paper 11796, NBER.

Bloom, D. E. & Canning, D. (2000). The Health and Wealth of Nations. *Science*, 287(5456), 1207-1209.

Bloom, D. E., Canning, D. & Sevilla, J. (2001). The Effect of Health on Economic Growth: Theory and Evidence. Working Paper 8587, National Bureau of Economic Research. Retrieved from http://www.nber.org/papers/w8587.pdf.

Brinkley, G. L. (2001). The Macroeconomic Impact of Improving Health: Investigating the Causal Direction. European Program for Urban Sustainable Development, URB. Retrieved from http://trc.ucdavis.edu/glbrinkley/Docs/Causal.pdf

Chakrabarty, R. P. (1989). Multivariate analysis by users of SIPP micro-data files. *SIPP Working paper series,* 8915. Washington, D.C. U.S. Bureau of Census.

Chatterjee, M. (1990). Indian Women, Health, and Productivity. World Bank, Population and Human Resources Department. Policy Research and External Affairs Working Paper. Retrieved from http://www.wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/1990/10/01/000009265_3960929224417/Rendered/PDF/multi0page.pdf.

Demographic and Health Survey Project
http://www.measuredhs.com/start.cfm

Ding, W., Lehrer, S. F., Niels Rosenquist, J. N. & Audrain-McGovern, J. (2007). The Impact of Poor Health on Education: New Evidence using Genetic Markers. Retrieved from http://post.queensu.ca/~lehrers/genes.pdf

Eherler, D. & Lehmann, T. (2007). Responder profiling with CHAID and dependency analysis. Lehrstuhl fur Wirtschafts-und Sozialstatistik Friederich—Schriller- Universitat Jena. Carl-Zeiss-Str. 3, 07743 Jena.

Fahimi, F. R. (2007). Gender and Equity in Access to Health Care Services in the Middle East and North Africa. Population Reference Bureau.

Case, A., Fertig, A. & Paxson, C. (2003). From Cradle to Grave? The Lasting Impact of Childhood Health and Circumstance. Working Paper 9788, NBER. Retrieved from http://www.nber.org/papers/w9788

Gwatkin, D. R., Rutstein, S., Johnson, K., Suliman, E., Wagstaff, A. & Amouzou, A. (2007). Socio-Economic Differences in Health, Nutrition, and Population, Morocco (1992- 2003/04). Country Reports on HNP and Poverty, The World Bank.

Habbani, K., Groot, W., & Jelovac, I. (2007). Do free-of-charge public health services impede cost recovery policies in Khartoum state, Sudan. *Eastern Mediterranean Health Journal (EMHJ)*, 13(4).

Holt, D., Scott, A. J. & Ewings, P. D. (1980). Chi-Squared Tests with Survey data. *Journal of the Royal Society, Series (JRSS)*, 143(3), 303 - 320. htt://sekhon.berkley.edu/library/stast/htm/mantelhen.test.html

Hoxby, C. M. (2007). Economics of Education. National Bureau of Economic Research (NBER). Retrieved from http://www.nber.org/programs/ed/

Osmani, S. & Sen, A. (2005). The Hidden Penalties of Gender Inequality: The fetal origin of ill-health. *Journal of Economic Biology*, 1(1).

Sen, A. (1998). Mortality as an Indicator of Economic Success and Failure. *Economic Journal, Royal Economic Society*, 108(446), 1-25.

Smith, E. R. (1999). Affective and cognitive implications of group membership becoming part of the self: New models of prejudice and of the self-concept. In D. Abrams & M. Hogg (Eds.), *Social identity and social cognition* (pp. 183-196). Oxford: Blackwell Publishers.

Tompa, E. (2002). The Impact of Health on Productivity: Empirical Evidence and Policy Implications. The Review of Economic Performance and Social Progress.

Tomovic, A. & Oakeley, E. J. (2007). Position dependencies in transcription factor binding sites. *Oxford Journals, Life sciences, Bioinformatics*, 23(8), 933-941.

UNDP. Arab Human Development Reports (2002). "Creating Opportunities for Future Generations*",* United Nations Development Program, Arab Fund for Economic and Social Development.

UNDP. Arab Human Development Reports (2003). "Building a Knowledge Society", United Nations Development Program, Arab Fund for Economic and Social Development.

UNDP. Arab Human Development Reports (2004). "Towards Freedom in the Arab World", United Nations Development Program, Arab Fund for Economic and Social Development, Arab Gulf Program for United Nations Development Organizations.

UNDP. Arab Human Development Reports (2005). "Towards the Rise of Women in the Arab World", United Nations Development Program, Arab Fund for Economic and Social Development, Arab Gulf Program for United Nations Development Organizations.

Weil, D. N. (2006). Accounting for the effect of Health on Economic Growth. Brown University – Department of Economics, NBER Working Paper Series, paper 11455. Retrieved from http://weblamp.princeton.edu/chw/papers/Weil_David_Accounting_for_the_Effect_of_Health_on_Economic_Growth_Oct_2006.pdf

World Bank. (2006). "Investing In Global Health a Regional Spotlight on the Middle East and North Africa Region", Disease Control Priorities Project Retrieved from http://www.dcp2.org/file/56/DCPP-15-MENA.pdf

World Bank (2008). "The Road Not Traveled : Education Reform in the Middle East and North Africa", World Bank publications.

Appendix

Table1: Morocco, Chi-Square Tests

Cross Variables	Pearson Chi-Square value	Degrees of Freedom	Asymp. Sig. (2-sided)
Mean of transportation of goods * Educational attainment	35.507[a]	6	.000
Machinery and industrial equip. * Educational attainment	2.583E2[a]	6	.000
Manufactory * Educational attainment	29.863[a]	6	.000
Commercial construction * Educational attainment	2.097E2[a]	6	.000
Housing construction * Highest educational level	1.567E2[a]	4	.000
Non farming land * Educational attainment	43.159[a]	6	.000
Farming land * Educational attainment	2.687E3[a]	6	.000
Poultry * Educational attainment	4.279E3[a]	6	.000
Live stock * Education attainment	4.052E3[a]	6	.000
Medication for the disease * Highest educational level	14.780[a]	8	.064
Medication for the disease * Educational attainment	24.068[a]	12	.020
Other illness * Highest educational level	1.484E2[a]	4	.000
Respondent's weight (kilos1d) * Highest educational level	9.686E2[a]	1184	1.000
Respondent's weight * Education attainment	1.585E3[a]	1776	1.000
Respondent's height * Highest education	1.827E3[a]	1480	.000
Respondent's height * Education attainment	2.592E3[a]	2220	.000

Table 2: Turkey, Chi-Square Tests

Cross Variables	Pearson Chi-Square value	Degrees of Freedom	Asymp. Sig. (2-sided)
Last attempt to find a job * Educational level during previous school year	3.084E2[a]	20	.000
Looking for a job* Highest education level	7.375E2[a]	8	.000
Main reason not working * Level of Education	8.381E3[a]	114	.000
Social security * Educational level as in report	5.186E3[a]	24	.000
Social security * Educational level during previous school year	2.743E2[a]	18	.000
Place of work * Highest educational level	4.539E3[a]	32	.000
Type of workplace * Level of Education	2.650E3[a]	24	.000
Position at work * Level of Education	4.964E3[a]	54	.000
Economic activity * Level of Education	7.066E3[a]	354	.000
Why did not work * Educational attainment	5.475E2[a]	54	.000
House has formal title deeds * Educational level as in report	74.267[a]	8	.000
Income < 150 million * Highest educational level	1.716E2[a]	4	.000
Income < 300 million * Educational level as in report	7.634E2[a]	4	.000
Income < 300 million * Highest educational level	6.275E2[a]	4	.000
Income > 600 million * Level last year	70.172[a]	6	.000
Income > 450 million * Highest year of education	1.200E3[a]	9	.000

Table 3: Egypt, Chi-Square Tests

Cross Variables	Pearson Chi-Square value	Degrees of Freedom	Asymp. Sig. (2-sided)
Has radio * Literacy	6.451E2[a]	6	.000
Has car/truck * Literacy	2.147E2[a]	6	.000
Has motorcycle/scooter * Literacy	1.368E2[a]	6	.000
Has bicycle * Literacy	1.068E2[a]	6	.000
Has refrigerator * Literacy	1.670E3[a]	6	.000
Has television * Literacy	3.656E2[a]	6	.000
Has electricity * Literacy	2.169E2[a]	6	.000
Respondent's height (cms-1d) * Husbands education-single yrs	1.219E4[a]	8165	.000
Respondent's height (cms-1d) * Respondent's occupation	1.923E4[a]	12425	.000
Respondent's weight (kilos-1d) * Husbands education-single years	2.645E4[a]	17411	.000
Respondent's weight (kilos-1d) * Respondent's occupation	3.419E4[a]	26565	.000

Probit Analysis Regression Processing Results

Table 4 Morocco, Probit Model (1) Parameter Estimates

Parameter	Estimate	Std. Error	Z	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
distance_ecole	-.001	.002	-.605	.545	-.006	.003
Sait_lire_ecrire	-.380	.035	-10.983	.000	-.448	-.312
Intercept	-.223	.061	-3.637	.000	-.285	-.162
	Chi-Square	df[a]	Sig.			
Pearson Goodness-of-Fit Test	1213.652	1322	.984			

Table 5: Morocco, Probit Model (2) Parameter Estimates

Parameter	Estimate	Std. Error	Z	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Highest year of education	.026	.004	6.247	.000	.018	.035
Educational attainment	.082	.006	13.388	.000	.070	.094
Intercept	-2.025	.024	-83.680	.000	-2.050	-2.001
	Chi-Square	df[a]	Sig.			
Pearson Goodness-of-Fit Test	27564.191	7817	.000			

Table 6: Egypt, Probit Model (3) Parameter Estimates

Parameter	Estimate	Std. Error	Z	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Highest educational level	.174	.030	5.753	.000	.115	.233
Literacy	-.021	.033	-.632	.528	-.085	.044
Sons at home	-.010	.013	-.766	.443	-.034	.015
Visited health facil. last 6 months *	.083	.028	3.022	.003	.029	.137
Intercept	-2.390	.036	-66.645	.000	-2.426	-2.354
	Chi-Square	df[a]	Sig.			
Pearson Goodness-of-Fit Test	28026.254	11230	.000			

Table 7: Turkey, Probit Model (5) Parameter Estimates

Parameter	Estimate	Std. Error	Z	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Highest educational level	-.031	.032	-.955	.339	-.093	.032
Highest year of education	-.008	.004	-2.111	.035	-.015	.000
Education in single years	.009	.004	2.267	.023	.001	.017
Educational attainment	.067	.017	3.871	.000	.033	.100
Member still in school	.145	.015	9.380	.000	.114	.175
Intercept	-1.673	.027	-62.028	.000	-1.700	-1.646
	Chi-Square	df[a]	Sig.			
Pearson Goodness-of-Fit Test	54865.386	35065	.000			