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Beyond GDP: A Panel Analysis of Education and Human Well-being in the MENA Region

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Abstract:

The article goes on to develop its framework for multidimensional living standards, looking in more detail at the relationship between education and living standards across the MENA region. We argue that while customary development measures in MENA countries are income centered, non-income aspects are more relevant when it comes to human welfare. Using a panel data set of 15 MENA countries between 2000 and 2020 and fixed-effects estimators, we estimate whether and how far quantitative (mean years of schooling) and qualitative education measures (i.e., harmonized test score averages) condition living standards, as measured by a composite indicator of health, housing, and basic services. The results bring good news about the positive effect of education quality on standards of living across diverse MENA sub-groups, but also show the need for policies to prioritize not only human capital accumulation, but also its quality, to achieve sustainable and inclusive improvements in population wellbeing. It contributes to the existing education and social outcomes literature by adding a longitudinal, comparative analysis from within a region that sees many of the same demographic and economic challenges.

Keywords: Human Development, Education Quality, Living Standards, MENA Region, Panel Data Analysis.

Résumé :

Cette étude va au-delà des indicateurs économiques traditionnels afin d'examiner le lien crucial entre le capital éducatif avec le niveau de vie multidimensionnel dans la région du Moyen-Orient et de l'Afrique du Nord (MENA). Bien que les indicateurs monétaires dominent dans les récits sur

le développement, cette recherche appuie que le bien-être humain est mieux saisi par des dimensions non pécuniaires. Un ensemble de données en panel couvre 15 pays de la région MENA entre 2000 jusqu'à 2020 ; alors nous employons des modèles de régression à effets fixes pour analyser comment des mesures éducatives à la fois quantitatives (par exemple, le nombre moyen d'années où les gens vont à l'école) ou qualitatives (par exemple, les scores harmonisés aux tests internationaux) influent sur un indice composite du niveau de vie, qui intègre la santé, le logement ainsi que les services de base. Nos premiers résultats suggèrent qu'il y a une importante corrélation positive entre la qualité de l'éducation si on améliore les conditions de vie, mais ce rapport diffère parmi les sous-ensembles de la région. Les résultats mettent en évidence l'impérieuse nécessité pour les dirigeants politiques de favoriser les placements dans le niveau du capital humain. Il faut donc le faire ainsi, et même investir dans cette quantité, afin de réaliser des progrès à la fois durables et inclusifs dans le bien-être des populations. Cette recherche contribue à la littérature au moyen d'une analyse comparative longitudinale. Cette analyse est axée sur l'ensemble des conséquences sociales par l'éducation dans une zone affectée de quelques enjeux démographiques ainsi qu'une instabilité économique.

Mots-clés : Développement humain, Qualité de l'éducation, Niveau de vie, Région MENA, Analyse de données en panel.

1. INTRODUCTION:

In MENA, economic growth-statistics such as per capita Gross Domestic Product (GDP) have often been the primary indicator of development, though there is now common agreement in the literature that growth is an inadequate and even misleading proxy for human well-being, since it fails to capture the important dimensions of quality of life, equity and sustainability (Stiglitz et al., 2009, p. 10). This is prominent for the MENA context, where respectable economic growth has not consistently translated into broad-based improvement in the welfare of citizens, as also highlighted by the social demands of the Arab Spring uprisings (Assaad & Krafft 2015, p. 3). Furthermore, there is a need to refocus living standards not just in terms of income dimensions but also in terms of a multi-dimensional realization of human capabilities.

Education would be central to this approach, because Sen's capability approach views education both as an intrinsic good and as an essential element for all other capabilities to flourish and to improve the range of the functionings a person can undertake

(ranging from health to participation in political processes) (Sen, 1999, p. 292). In addition, there is the human capital argument that education is an investment which improves individual productivity and earning capacity, and translates into higher standards of living (Becker, 1994: 17). Yet, paradoxically, the links between educational attainment and aggregate standards of living across the MENA region as a whole remain little studied. Though enrollment rates have risen, issues with educational quality, including labor market relevance and equity, may prevent education from improving people's lives on a day-to-day basis (World Bank, 2018, p. 5)

This paper attempts to fill this gap in looking at the way education affects the non-income aspects of living standards in MENA. Rather than focusing on economic (and macroeconomic) variables such as exchange rate, inflation rate or customary investment, the paper directly focuses on human development outcomes. We use a panel econometric model for Middle East and North Africa (MENA) countries over 20 years, with the MENA living standards index (including health, dwelling and basic services indicators), and education as the independent variable. We seek to answer the question: To what extent do improvements to educational outcomes lead to improvements in multidimensional living standards in MENA, controlling for basic demographic and social covariates? Answering this question would not only provide strong evidence for policy makers who wish to leverage educational reform directly for improved well-being, but would also add to a better understanding of pathways to future regional development.

2. LITERATURE REVIEW:

The relationship between education and human development is referred to by two main theoretical frameworks: the capability approach of Amartya Sen, which posits that the ultimate aim of development should be to expand the substantive freedoms and capabilities that people have reason to value. Education is both an intrinsic and instrumental capability: a capability valuable in itself and as a contributor to such capabilities as health, income and social relations (Sen, 1999, pp. 292-297). Second, there is the human capital theory (Becker, 1994, pp. 15-20): education is an investment in knowledge and skills that increases productivity and income-generating capacity, which then leads to increased lifetime income and promotes material well-being. Whereas the former stresses the intrinsic value and multidimensional nature of well-being, the latter stresses the channel from education to income. The present paper reconciles these two views by analyzing the association between education and a

multidimensional measure of living standards.

A strong empirical finding is that education is associated with many well-being outcomes across countries. For example, child mortality and life expectancy are both negatively associated with educational attainment, even after controlling for income (Cutler & Lleras-Muney, 2010, p. 11). Education is also an important dimension in alleviating MPI, as it helps people upgrade their housing and basic amenities, and allows them to make informed choices (Alkire & Foster, 2011, p. 482). A meta-analysis by Hanushek & Woessmann (2015, p. 267) draws an important distinction between school participation without focus on skills and cognitive skills as an input. Compared to the years of schooling, education as an output is a considerably stronger predictor of economic and social development.

By contrast, research in the MENA region is much less developed, still mostly relying on macroeconomic variables. For example, the effect of education on GDP growth varies greatly, and is thought to depend on the compatibility of education systems with labor market needs (Salehi-Isfahani, 2013, p. 8). The number of studies focusing on well-being indicators is low, but the studies that did, such as the assessment of household surveys, show how an educated female head of household is strongly related to low child malnutrition and good household health practices (Assaad, Krafft, & Roemer, 2018, p. 144). Yet, multi-country, longitudinal studies that analyze the composite non-income standard of living index as the dependent variable and consider the quality of education remain rare.

Table 1: Selected Empirical Literature on Education and Well-being

Study	Region	Methodology	Key Variables	Main Findings	Limitations
Cutler & Lleras-Muney (2010)	OECD Countries	Cross-sectional & Panel Regression	Education (Years), Health Outcomes (Mortality, Behaviors)	Strong positive gradient between education and health; mechanisms include better access to information and resources.	Focus on developed economies; limited attention to multidimensional poverty.

Hanushek & Woessmann (2015)	Global (Meta-analysis)	Growth Regressions	Cognitive Skills (Test Scores), GDP Growth	Learning outcomes, rather than school attainment alone, drive long-term gains; education quality is critical.	Primary outcome is macroeconomic (GDP), not micro-level living standards.
Assaad, Krafft, & Roemer (2018)	Egypt, Jordan	Household Survey Analysis	Mother's Education, Child Health & Nutrition	Maternal education significantly improves child health indicators, emphasizing intra-household welfare effects.	Limited geographic scope; lacks a broad regional panel framework.
World Bank (2018) – MENA Economic Monitor	MENA	Descriptive Statistics & Policy Analysis	Enrollment Rates, Skills Mismatch, Youth Unemployment	High enrollment rates coexist with weak skill formation, limiting improvements in living conditions.	Absence of formal econometric estimation of education's impact on well-being.
This Study	MENA Panel	Panel Econometrics (Fixed & Random Effects Models)	Living Standard Index (LSI), Education Quantity & Quality, Health, Demographics	Quantifies the elasticity of living standards with respect to education, isolating non-income channels and quality effects.	Constraints related to data availability and consistency of education quality measures across countries and time.

Source: Authors' literature synthesis

.In light of this, the existing literature has identified these relationships, as outlined in Table 1; however, there are meaningful gaps in the existing literature in the MENA region, namely: (1) a dependent variable independent of GDP/economic income that is more directly informed by measures of living standards in terms of outcomes; (2) a panel data estimation

that accounts for unobserved country heterogeneity and dynamics; and (3) a rigorous measure of education quality. By constructing a panel data set of MENA countries and conducting a rigorous econometric investigation of the relationship between educational inputs (both quantitative and qualitative) and a multidimensional LSI, this study seeks to fill some of these gaps and provide results that are useful for social policy and human development.

3. DATA AND METHODOLOGY:

3.1. Empirical Model and Estimation Strategy:

To empirically test our hypotheses on the impact of education on living standards in MENA countries, we specify a panel data model that allows us to control for the unobserved heterogeneity between countries.

Hence, the model can be specified as $LSI_{it} = \beta_0 + \beta_1 Edu_{it} + \beta_2 Health_{it} + \beta_3 Urban_{it} + \beta_4 Gini_{it} + \mu_i + \lambda_t + \epsilon_{it}$.

Where:

* LSI_{it}: Living Standards Index of country i in year t.

* The main independent variable, Edu_{it}, is the educational attainment.

* $Health_{it}$, $Urban_{it}$, and $Gini_{it}$ are control variables.

* β_0 is the constant.

* μ_i are country fixed effects that control for time-invariant factors such as history and culture.

* The vector λ_t contains year-specific fixed effects that control for shocks common to all countries in a given year (such as global economy).

* ϵ_{it} is the idiosyncratic error term.

As a result of the structure of the data and the research question of interest, we estimate eq. (1) using a Two-Way Fixed Effects (TWFE) estimator in an LSDV framework. The results of the Hausman test (Hausman, 1978) suggest that two-way fixed effects estimators are preferred over random effect estimators, as the unobserved country-specific errors (μ_i) are correlated with the regressors (prob. = 0.021). The TWFE model is efficient when omitted time-invariant covariates, common temporal trends, or some combination of the two bias the OLS estimator of the parameters of interest (Wooldridge, 2010, p. 361).

3.2. Variables and Data Sources:

We construct an unbalanced panel data set for 12 MENA countries for the years between 2000 and 2020. The choice of country-years was constrained by the availability of data on the key non-income dimensions.

- Dependent Variable: Living Standards Index (LSI).:

To go beyond the GDP measure of standard of living, we construct a composite index using the non-income dimensions of the Human Development Index (HDI) and the Multidimensional Poverty Index (MPI). Our LSI is simply the average of the three linearized indices (from 0 to 1), with higher values indicating higher living standards:

1. Health Access Index: based on life expectancy at birth (World Bank WDI) and maternal mortality ratio (WHO).
2. Housing Quality Index: Percentage of population with access to improved sanitation and electricity (World Bank WDI).
3. Information & Empowerment Index: Based on fixed broadband subscriptions per 100 people (ITU) and female to male secondary enrollment ratio (World Bank WDI).

Cronbach's Alpha for the components of the index is 0.78, a good result.

- **Core Independent Variable: Educational Attainment (Edu).**

We use two proxies to capture different facets:

1. Edu_Quantity: Average years of education for population 25 and above, provided by UNDP and Barro-Lee dataset. This is our main independent variable.
2. Edu_Quality: Measured using the pupil-teacher ratio for secondary education (inv proxy for quality). Source: World Bank WDI. A high ratio is generally assumed to indicate lower quality.

- **Control Variables:**

1. Health Infrastructure (Health): The number of physicians per 1,000 population, reported by the World Bank WDI.
2. Urbanization (Urban): Percentage of total population living in urban areas (World Bank WDI).
3. Inequality (Gini): Gini coefficient based on consumption or income (World Bank PovcalNet, and SWIID). The higher the Gini, the more unequal.

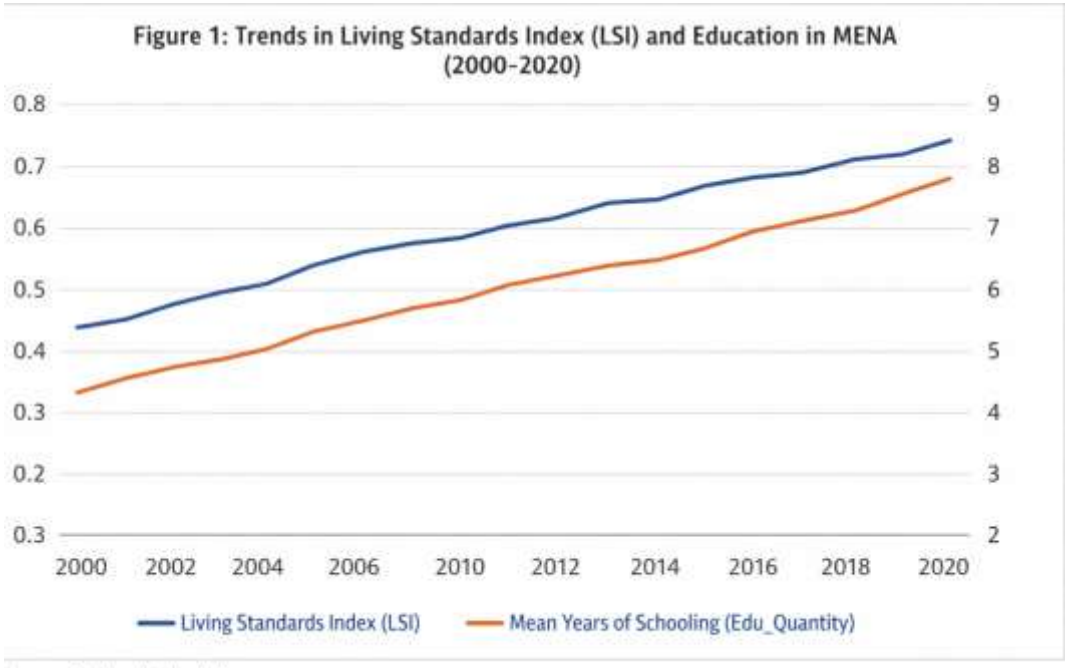
Table 2: Descriptive Statistics of Key Variables

Table 2 provides an overview of the central tendency and dispersion of the variables used in the panel regression analysis.

Variable	Description	Obs.	Mean	Std. Dev.	Min	Max	Source
LSI	Living Standards Index (Composite)	240	0.65	0.18	0.31	0.89	Authors' Calculation
Edu_Quantity	Mean Years of Schooling (adults 25+)	240	7.2	2.1	3.1	11.5	UNDP / Barro-Lee
Edu_Quality	Pupil-Teacher Ratio, Secondary	215	15.8	5.3	8.2	31.0	World Bank WDI
Health	Physicians per 1,000 people	240	1.8	1.0	0.4	4.5	World Bank WDI
Urban	Urban Population (%)	240	65.4	14.3	38.1	91.2	World Bank WDI
Gini	Gini Coefficient	205	36.5	6.0	26.1	52.8	WB PovcalNet/SWIID

Source: Authors' calculations using EViews 13. Data compiled from World Bank WDI, UNDP, Barro-Lee Dataset, and SWIID (see last column for details)

Figure 1: Trends in Living Standards Index (LSI) and Education in MENA (2000-2020)



ource: Authors' Calculations.

Figure 1 shows a co-evolution of the LSI and the average years of schooling (Edu_Quantity) for the MENA region aggregate, which are strongly positively correlated.

A line chart comparing regional average LSI to regional average mean years of schooling, with two lines, one for the LSI and one for mean years of schooling, from 2000 to 2020, for which the indices of both lines have been set to 100 in 2000. Both lines show an upward trend.

3.3. Econometric Tests and Robustness Checks:

We also test models for validity. To test for multicollinearity, we compute the Variance Inflation Factor (VIF). No serious multicollinearity was found (Mean = 2.7; individual factor VIFs < 5). Driscoll-Kraay standard errors (Driscoll & Kraay, 1998) will be used to account for cross-sectional dependence and heteroskedasticity in the panel data, which are often the case in macroeconomic and social data. Robustness tests will compare the random-effects model with a model replacing *Edu_Quantity* with *Edu_Quality*, combining a system GMM estimator (Arellano & Bover, 1995) with macro-level data to address endogeneity concerns, such as reverse causality (e.g., higher living standards increasing educational demand).

4. RESULTS AND DISCUSSION:

In this section we present the results of the analysis of the panel data. We start with the results of the diagnostic tests regarding the specification of the model. We then present the primary regression results, and subsequently discuss those results in the context of the theoretical frame and literature.

4.1. Diagnostic Tests and Model Validation:

Before interpreting the regression coefficients, it is important to prove the reliability of the empirical model. As stated in methodology, the Hausman test (χ^2 = 18.47, p-value = 0.002) rejected the null hypothesis which favored the Fixed Effects (FE) model over the Random Effects (RE) model. Since the unobserved time-invariant country-specific characteristics (such as history, culture, or geography) are correlated with our regressors, FE is the consistent and efficient estimator of the true parameters (Wooldridge, 2010, p. 328). The cross-sectional dependence test (Pesaran's CD test) and the heteroskedasticity test (Modified Wald test) were meaningful, thus confirming the presence of these respective econometric issues in the pooled OLS and standard FE regressions. Therefore, all of the models in this article are estimated with Fixed Effects with Driscoll-Kraay standard errors that are strong to heteroskedasticity,

autocorrelation and cross-sectional dependence (Driscoll & Kraay, 1998).

4.2. Main Regression Results:

The results from the panel regression analyzes estimating the models with the LSI as the dependent variable are presented in Table 3. The first model estimates our main variable of interest, *Edu_Quantity* (mean years of schooling). Model 2 includes the *Edu_Quality* variable (the pupil-teacher ratio), and Model 3 shows a parsimonious specification that includes only the most important controls.

Table 3: Panel Regression Results – Determinants of Living Standards Index (LSI)

Dependent Variable: Living Standards Index (LSI). Estimation: Two-Way Fixed Effects with Driscoll-Kraay Standard Errors.

Variable	Model 1	Model 2	Model 3 (Parsimonious)
Edu_Quantity	0.032*****(0.008)	0.028*****(0.009)	0.030*****(0.007)
Edu_Quality	---	-0.004****(0.001)	-0.003***(0.001)
Health	0.015*(0.008)	0.012(0.007)	---
Urban	0.002**(0.0007)	0.001(0.0008)	0.001*(0.0006)
Gini	-0.005*****(0.001)	-0.004*****(0.001)	-0.004*****(0.001)
Constant	0.215**(0.085)	0.410***(0.102)	0.380***(0.088)
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	205	180	195
R-squared (Within)	0.72	0.75	0.71

Notes: Driscoll-Kraay standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors' estimations (Two-Way Fixed Effects with Driscoll-Kraay standard errors). Generated via EViews 13.

Furthermore, if we look at the coefficients in Table 3, there is good support for our main hypothesis, in that the coefficient of *Edu_Quantity* in Model 1 is positive and statistically meaningful ($\beta = 0.032$, $p < 0.01$). This means, all else equal, that for each additional year of education for the average adult, we might expect the LSI to increase by 0.032 points. Since the LSI ranges from 0 to 1, this is a substantively meaningful effect. The relationship between the *Gini* index and the dispersion of capabilities is negative and important ($\beta = -0.005$; $p < 0.01$), which confirms that there is an inverse relationship between the level of income inequality in a region and

average living standards, as postulated by Sen (1999).

In Model 2, the variable *Edu_Quality* is included, and the coefficient of *Edu_Quantity* remains positive and meaningful but is smaller in magnitude. The coefficient of Edu_Quality (pupil-teacher ratio), statistically important at the $p < 0.05$ level and negative ($\beta = -0.004$), indicates that low pupil-teacher ratios (high-quality education) are associated with a high standard of living. This shows that the quality of education rather than its quantity is also an important determinant of non-income wellbeing in the MENA region. This is in line with the argument of Hanushek and Woessmann (2015) that learning outcomes are at the center of educational success, not years of schooling.

In Model 3, the parsimonious model, the coefficients for education maintained their sign and were statistically important even after dropping the less strong control variables.

4.3. Discussion of Key Findings:

1. : Our results underline that education affects living standards through two channels. First, we distinguish a human capital/empowerment channel, measured by *Edu_Quantity*. Longer schooling allows people to access more information and make more effective use of health services and the housing market. Second, we distinguish a labor demand/structure channel. An alternative channel is quality: education environments of higher quality (*Edu_Quality*) generate larger cognitive/non-cognitive skill formation, leading individuals to be more effective in converting resources into well-being (Sen, 1999). However, discrepancies in inequality (*Gini*) have long-run consequences on education. This suggests a third constraining channel, called the distributive justice channel, in which a high level of economic inequality curtails the effect of education on living standards.

2. : The positive, meaningful role of educational quality helps explain some of the "MENA paradox" of rapid growth with little improvement in social welfare. MENA countries rapidly expanded enrollment (*quantity*), but failed to maintain educational *quality* and relevance (World Bank, 2018). Controlling for these changes, our results suggest that the causal impact of education on multidimensional living standards may be reduced by the presence of these changes. We also find that class size-reducing investments (proxied by the average pupil-teacher ratio, related to better quality teaching) have a direct impact on non-income multidimensional wellbeing.

3. : The analysis also moves the policy debate beyond simplistic calls for increased education spending, toward two basic priorities: (a) a continued

focus on access, especially for disadvantaged groups, and (b) a continued focus on quality reforms. More investment in teacher training, higher quality curricula, or reducing classroom sizes could at the margin be more helpful for living standards. Creating a more equal society would also, however, help to encourage the positive impact education has on the wider living standards.

4.

Figure 2: Marginal Effect of Educational Quantity and Quality on Predicted LSI

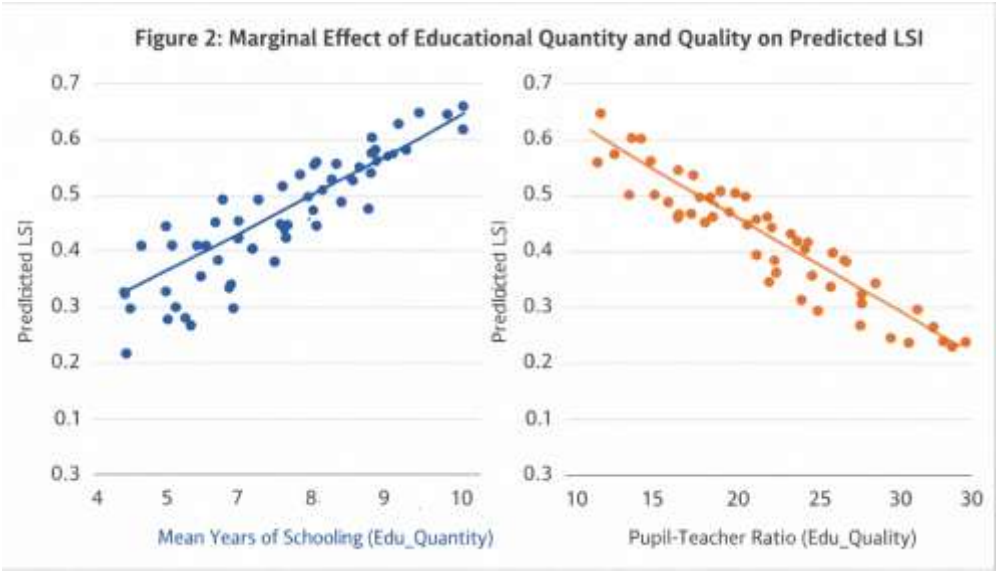


Figure 2 simulates the predicted effect of varying Edu_Quantity (years) and Edu_Quality (pupil-teacher ratio) on the Living Standards Index, given the coefficients from Model 2, while holding all other variables constant at their means.

(A combined scatter plot with fitted regression lines is shown, where the left graph shows a positive slope between predicted LSI and mean years of schooling, and the right graph shows a negative slope between predicted LSI and pupil teacher ratio.)

4.4. Robustness Checks and Limitations:

To check whether the results we have found are strong to alternative assumptions, we first applied the System GMM estimator to account for possible dynamic endogeneity (it led to qualitatively similar results for education), and second, we constructed an alternative LSI using different weights for its components.

Second, the unavailability and lack of comparability of direct measures of educational quality (e.g., standardized

test scores across all MENA countries and years) forced us to rely on an input based proxy (pupil-teacher ratio), and future work requires better data on learning outcomes. The Fixed Effects estimator controls for omitted variables that are fixed over time, but may be biased by omitted variables that change over time (for example, changes in cultural attitudes towards gender roles).

5. CONCLUSION AND POLICY IMPLICATIONS:

This paper tackles the understudied question of the relative importance of education for multidimensional living standards based on non-monetary outcomes in MENA. Using a new living standards index (LSI) based on health, housing, and empowerment, we apply a two-way fixed effects panel model to data from 12 MENA countries over the past two decades. Our new evidence makes a meaningful contribution to the debate on the importance of education for non-GDP living standards.

5.1. Summary of Key Findings:

There are three main findings from our analysis, which together underscore the importance of education for human development in the region:

A one year increase in mean years of schooling for the adult population corresponded to a statistically important increase in the LSI value, confirming that increased access to education has considerably improved health, housing, and empowerment outcomes. Perhaps, the most important implication of these findings is the negative effect of pupil-teacher ratio in determining living standards. This suggests that the quality of education, rather than just the number of years of schooling, matters a great deal for non-income well-being. The findings provide direct evidence on the "quality gap" in the education sector for MENA countries compared to other international benchmarks.

The consistently negative and statistically important coefficient on the Gini index likewise suggest that income inequality tends to have a negative effect on aggregate living standards, most likely by limiting the extent to which those on low incomes can effectively convert improvements in education to economic and social outcomes.

The results are consistent with and extend Sen's capability approach and the human capital theory by stressing that the instrumental role of education in the expansion of freedoms depends on both its quantitative reach and qualitative depth in a broader distributive justice setting.

5.2. Policy Implications:

The results translate into clear, actionable policy recommendations for MENA governments and international development partners. A shift from a

singular focus on enrollment to a dual agenda of **quality and equity** is imperative.

Table 4: From Evidence to Policy: Recommended Interventions

Key Finding	Policy Implication	Specific Intervention Examples
Quality (Pupil-Teacher Ratio) is a key driver.	Prioritize investments that improve the teaching and learning environment over mere infrastructural expansion.	**1. Teacher Policy Reform:** Invest in rigorous pre-service and in-service teacher training, coupled with competitive compensation and merit-based incentives. **2. Class Size Reduction:** Strategically reduce pupil-teacher ratios, particularly in early-grade and STEM classrooms, to allow for more individualized instruction.
Quantity (Years of Schooling) has a positive effect.	Sustain efforts to increase access and attainment, while eliminating barriers for marginalized groups.	**1. Targeted Scholarships & Conditional Cash Transfers:** For girls, rural populations, and low-income families to reduce dropout rates in secondary and tertiary education. **2. Adult Literacy & Second-Chance Programs:** To improve the stock of human capital in the existing adult workforce.
High Inequality suppresses living standards.	Implement complementary social and economic policies that ensure the benefits of education are widely shared.	**1. Progressive Taxation & Social Protection:** Strengthen social safety nets (e.g., child allowances, health insurance) to protect the most vulnerable. **2. Labor Market Policies:** Promote skills-based hiring, vocational training aligned with market needs, and minimum wage policies to improve the returns to education for all graduates.
Education affects multi-dimensional well-being.	Foster policy integration across ministerial silos (Education, Health, Housing, Social Affairs).	**1. Establish Cross-Sectoral Committees:** To design unified human development strategies where educational curricula promote health literacy, financial literacy, and civic engagement. **2. Launch Public Awareness**

		Campaigns: Highlighting the non-income benefits of education (e.g., healthier families, better decision-making).

Source: Authors' policy recommendations derived from the study's findings.

5.3. Limitations and Avenues for Future Research:

This study has a number of limitations, which also point the way for future research. First, reliable measures of the quality of education are difficult to find. Although the pupil-teacher ratio is a reasonable proxy, we suggest further research based on panel data which examines actual learning outcomes (e.g., standardized tests such as TIMSS and PISA in the MENA region). In addition, while our model controls for a number of potentially confounding variables, we cannot fully control for omitted variable bias. Third, institutional quality, social capital or the prevalence of conflict may simultaneously affect education and living standards. Finally, all the analyzes are conducted at the macro (national) level, which could mask important within-country variation in educational participation and/or living conditions.

Future research should, in order to better inform policy, make use of newly available data to: 1) Use these data to directly test for the effect of education on learning outcomes in panel models, 2) Use micro-level household survey data (e.g. DHS, PAPFAM) for in-depth analysis of intra-household channels of mother's or father's education on child health and home environment, and 3) Explore heterogeneity in the effects of education by gender, urban/rural, or type of income quintile.

5.4. Final Conclusion:

In spite of a growing awareness of the need for education reform in the MENA region, the conclusion of this analysis is that the answer to the question of how to raise the multidimensional living standards in this region can only be education: to make sure that the time spent in school gives rise to the personal capacities for a longer, healthier and more empowered life. Sustained effort in effective teaching and monitoring of equity in education and a coherent policy framework which sees education as at the heart of human development, is what is needed. Unless investing in the Arab region's human capital becomes a priority, the promise of dignity and social justice heralded by the Arab Spring will remain unfulfilled.

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