Effect of Education and Human Capital on inclusive growth in Egypt During period 1990-2020 (Econometrics Study)

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Abstract:

The study examined the impact of education and human capital (quantity and quality of education) on inclusive growth in Egypt during 1990-2020, using the ARDL modeling approach with annual time series data. The study concluded that education quantity (primary and secondary school enrolment) has a positive impact on inclusive growth in both short run and over long run, Index of Human Capital per Person, has a positive significant effect over the long run. The inability to address educational issues may hinder the achievement of inclusive growth. This will further exacerbate the socio-economic problems such as unemployment, poverty, inequality amongst others. On other words it can be said that an increase in human capital and wide education enrollment will lead to an increase in labor productivity and inclusive economic growth. The results of the study shed light on the importance of education quality and quantity in spurring growth inclusiveness in Egypt, where the policy maker in Egypt can foster growth inclusiveness within Egyptian economy by focusing on the following: (1) Designing education policy that Facilitates the access to the education by teeming population. (2) High quality training for teachers. (3) Upgrading school infrastructure to promote the quality of education. The study also recommends that government should give more consideration to human capital and provision of customized social services specially education, promote citizens to acquire the capabilities needed to escape from the risks they face and accomplish inclusive growth in Egypt.

Key words: Education, Human Capital, Growth, Egypt

مستخلص:

قامت الدراسة باختبار تأثير التعليم ورأس المال البشري (مستوى ونوعية التعليم) على النمو الإحتوائي في مصر خلال الفترة ١٩٩٠-٢٠٢٠ ، باستخدام منهج نمذجة ARDL من خلال بيانات السلاسل الزمنية السنوية. خلصت الدراسة إلى أن مستوى التعليم (الالتحاق بالمدارس الثانوية والابتدائية) لهما تأثير إيجابي على النمو الشامل على المدى القصير وعلى المدى الطويل ، بينما يؤثر رأس المال البشري إيجابا على النمو الاحتوائي في الأجل الطويل. سلطت نتائج الدراسة الضوء على أهمية مستوى نشر التعليم وجودته في تحفيز النمو الشامل في مصر، حيث يمكن لصانع السياسات في مصر تعزيز شمولية النمو داخل الاقتصاد المصري من خلال التركيز على ما يلي: (١) تصميم سياسات للتعليم تسهل عملية وصول الخدمة التعليمية وتراعي التعداد السكاني المرتفع في مصر. (٢) تقديم تدريب عالي الجودة للمعلمين (٣) تطوير البنية التحتية المدرسية لتعزيز جودة التعليم .كما أوصت الدراسة بضرورة أن تولي الحكومة مزيدًا من الاهتمام برأس المال البشري وتوفير خدمات اجتماعية عالية الجودة في مجالات التعليم وتشجيع المواطنين على اكتساب القدرات المهنية والمهارية اللازمة للهروب من أخطار الفقر التي يواجهونها، والتي تهدد تحقيق نمو شامل في مصر.

الكلمات المفتاحية: التعليم ، النمو الاحتوائي ، رأس المال البشري ، النمو ، مصر

1- Introduction

During the past 20 years, which first involved the Millennium Development Goals (MDGs) of 2000–2015 and followed by the Sustainable Development Goals SDGs (2015–2030), much progress has been led to new economic thinking about economic growth Cafod. (2014). The eight goals of the MDGs were expanded to 17 goals under the SDGs, economic sustainability and reducing economic inequality has been at the top of the new international agenda of development. In this context, institutional economic theory shares in explaining that market deficiencies come from diverse interactions between all sectors inside the national economy: individuals, firms, states.

Slow progresses in living standards and widening inequality have contributed to weaken of social cohesion in many advanced and developing economies. This has led to the emergence of a worldwide consensus on the need for a more inclusive model of growth and development that promotes high living and focuses on how to include more people in productive processes to decrease inequality and let more people to get benefit from fruits of development.

Gradually an inclusive economic evolved that can add significant value to SDGs and ensure real economic development. For the last few decades decrease in rates of world economy growth was matched by increasing inequality in income and accumulated wealth among world's population. (G.A. Marrero, J.G. Rodríguez.2013) . There are bases to believe that the system of income distribution affects not only stability of society, but also growth rates of world economy, worse of economic inequality leads to access restriction to education for lower-income population that has negative impact on development of the human capital as a main resource of a modern economic growth (A. Mason, R. Lee, J.X. Jiang .2016). Moreover, according to several researches, reduction in income inequality between poor and rich population promote rates of world economic growth. (A.K. Fosu, Growth.2017)

Human capital development refers to access to education, primary, secondary, health care, and other essential services. Social capital development means increasing the opportunity of the poor to participate in decision making and self-managed community services

such as in creating community-based groups in microfinance, health, and natural resources management.

This shift in economics of development started to be familiar in Egypt through World Bank and IMf agreements recently, which recommended to target inclusive growth. (IMF and World Bank)

On the other hand many researchers emphasizes on the role of education as the key factor of inclusive growth (Laura Tandi.2013). The role of primary and secondary education should not be undermined as they provide the foundation upon which tertiary education is built. In a study conducted by Nowak and Dahal (2016) on the contribution of education on economic growth in Nepal, using ordinary least square (OLS), a positive relationship was found between education and economic growth.

Over the past decades some developing countries have experienced rapid economic growth with decreasing in poverty rates, Egypt is one of developing countries which started its plans for development since beginnings of sixties, but income inequality has not retreated. This research aims at identifying factors which could contribute to more equally distributed growth in Egypt. A time series analysis of the impact of macro-structural factors on inclusive growth suggests that human capital, education, fiscal redistribution, female labor force participation, productivity growth, FDI inflows, and savings significantly drive inclusive growth.

Better educated people create a good chance for individuals to engage in the growth process and get benefit from its fruits. Interestingly, Egyptian economy has recorded progress in the total primary and secondary school enrolment rates in recent years. But on the other side, Egyptian economy has also realized moderate per capita growth rate in the last two decades and during the time period of the study.(WB . World Development Indicators)

Despite recording moderate growth rate coupled with improvement in school enrolment rate in Egypt during period of study (1990-2020), there is a high level of unemployment, poverty and inequality. (*IMF and World Bank)*. This development seems as has been joblessness growth.

Theoretically, education is expected to support individuals with knowledge and skills to engage in the production process, add to that high quality of education determines the extent to which individuals can contribute to productivity and get high incomes and thereby share in economic growth.

Limited literature—both theoretical and empirical—exists on this issue, of which the majority is focused on inclusive growth. This leaves a gap in the literature in terms of the broader understanding of inclusive growth, which focuses on how to include more people in productive processes to decrease inequality and let more people to get benefit from fruits of development, especially in Egypt in which the ratio of poor people still high. Also, there was no emphasis on the welfare implications of the relationship between human capital and economic growth. As a result of this, this paper seeks to fill that gap in the literature with the use of the inclusive growth concept applied to Egyptian economy.

In recent years, since the last agreement between Egypt and IMF, to address economic challenges, the Egyptian authorities have developed a program of policies and structural reforms that is supported by the Extended Fund Facility (EFF) for Egypt at November 11, 2016, since, government have been faced with the challenge of promoting stronger productivity growth, while also having to ensure that the proceeds are equitably distributed. Tis study will examines this challenge in depth and puts forward a new policy framework to help governments address rising inequalities and slowing productivity growth.

According to (Nainggolan, R. 2016) with a good level of education, human resources can improve their quality of life through a process of education, training, and development that guarantees increased labor productivity, which guarantees sufficient income and well-being to increase the achievement of inclusive growth. This is in line with the research by Nainggolan, R. 2016. Sulityowati, N., Harianto, D. S., Priyarsono, and Mangara, T. 2010Maulana, R., and Bowo, P. A. 2013.

Specifically, we seek to provide answers to the following research questions: does human capital and provision of customized social services specially education, promote citizens to acquire the capabilities

needed to escape from the risks they face and accomplish inclusive growth in Egypt? Therefore, this paper provides an econometrics analysis and evaluation from the empirical approach, on the inclusive growth process in Egypt through education and human capital.

This is in line with research by Sulityowati, N.et al 2010 and Maulana, R., and Bowo, P. A. 2013 that increasing education will increase labor productivity and promote inclusive economic growth. Based on this theory, hypotheses-regarding education and inclusive growth are as follows: Education has a positive impact on-inclusive growth.

To answer this question this paper suggests that human capital (measures quality of education), secondary and primary school enrolment (measure quantity of education), significantly and positively contribute to inclusive growth through GDP per person employed.

The results of the paper could help in designing appropriate policies to strengthen growth and make it inclusive and more equitable over time in Egypt.

The rest of the paper is structured as follows: The second section captures Egypt performance in Inclusive Development Index (IDI), The third section devoted to theoretical background and literature review. The fourth section focusses on the methodology and model specification. The fifth section presents the empirical results, and the sixth section provides conclusion and some policy lessons.

2- Egypt performance in Inclusive Development Index (IDI):

Inclusive Development Index (IDI) developed by WEF since 2017, IDI scores are based on a 1-7 scale: 1=worst and 7=best. Trends are based on percentage change between 2012 and 2016 (using indicators available during both years).

Egypt ranked 70th, among the 74 emerging economies featured in the IDI during 2018, its 5 year trend of performance has declined at -6.52%, this means that Egypt faces significant challenges in achieving inclusive Growth and Development. Although economic growth has increased steadily in previous 3 years, such growth has not benefitted Egyptians equally, as the poverty rate stands at 32.5 percent of the population by the end of the fiscal year 2017/2018, compared to 27.8 percent for the

year 2015/2016 according to the Central Agency for Public Mobilization and Statistics. The main reason for the increase in poverty rates by 4.7 percent during the period between 2016 and 2018 is the implementation of the economic reform program in the same period, which requires a cost on society, add to that high employment levels, bad health conditions, and high inequality drive its low overall IDI.

Table 1: Comparative Performance: IDI versus GDP

Indicators	Level
IDI SCORE	2.84
IDI RANK	70
GDP PER CAPITA RANK	245
	RECENT PERFORMANCE:
IDI TREND RANK	-6.5
IDI TREND	72
GDP PER CAPITA TREND RANK	62

Table 2.Dashboard of National Key Performance Indicators: Five-Year Trend

GDP PER CAPITA GROWTH, %	1.0
LABOR PRODUCTIVITY GROWTH, %	0.8
HEALTHY LIFE EXPECTANCY TREND, YRS	1.3
EMPLOYMENT TREND, %	0.9
NET INCOME GINI TREND	-0.7
POVERTY TREND%	-10.5
WEALTH GINI TREND	11.4
MEDIAN INCOME TREND$	0.5
ADJUSTED NET SAVINGS TREND*,%	-3.9
CARBON INTENSITY TREND, KG PER$ OF GDP	15.3
PUBLIC DEBT TREND %	23.3
DEPENDENCY RATIO TREND	3.5

Source: World Economic Forum .The Inclusive Development Index 2018

Egypt has a score of 2.94, placing it 73rd among the 79 developing economies on the IDI. The country struggles with many aspects of inclusive growth. Over five years, its GDP per capita and labor productivity have barely grown. Income and wealth inequality remain high. Unemployment is also high, especially among the young, and the dependency ratio is increasing, meaning that more and more people

who are not in the workforce need to be supported by ever fewer workers. Egypt also suffers from an extremely high debt-to-GDP ratio and high carbon intensity of GDP, placing the future at risk.
The Framework indicates that the education system does not reach a sufficient proportion of the population and that quality is lacking. Despite a history of entrepreneurship, business and employment creation remain constrained by insufficient finance, poor transport infrastructure, and pervasive corruption.

Egypt still exhibits high levels of inequality, as evident from its 55th place among emerging economies in the Inclusion pillar of the Index. In particular, China comes last in terms of income inequality. The Gini coefficient stands at 51, some 20 points above the peer group average, and has barely changed since 2012. Over the same period, wealth inequality has increased by 10% from an already elevated level, ranking Egypt a low 59th. On a much more positive note, the country has made impressive strides in its fight against poverty. World Economic Forum, *The Inclusive Growth and Development Report 2017.*

3- Theoretical Background and Literature Review

Despite the substantial literature and policy discussion on the topic, there is no unanimous definition of inclusive growth, there is no unanimous definition of the concept. A commonly used definition is that employed by the World Bank (2009), which defines inclusive growth as an absolute reduction in poverty associated with the creation of productive employment rather than direct income redistribution schemes. (Raniere and Ramos, 2013)

For growth to be inclusive, productivity must be improved and new employment opportunities created' (Ianchovichina and Lundstrom, 2009; World Bank, 2009).The pro-poor growth concept has traditionally focused on growth and poverty measures whereas inclusive growth focuses on an ex-ante analysis of the sources of, and constraints to sustained, high growth and poverty reduction (World Bank, 2009).

The notion of productive employment highlighted in the first point has become central to the concept of inclusive growth, as it focuses not only on outcomes for poor people, but also on ensuring their participation in the growth process. As such, inclusive growth is related to the notion of

broad-based growth across various sectors of an economy but also requires non-discriminatory participation by large segments of the population for its *inclusiveness* to be realized (Klasen, 2010).

Therefore, now, more than ever before, there is a need for effective concepts of economic growth focused first of all on the solutions for demographic, social and cultural problems. One of such concepts is the concept of inclusive growth the essence of which consists of even distribution of benefits from economic growth among various participants of economic activity and also in creation of opportunities for inclusion of as much as possible bigger number of interested persons in a process of GDP creation (C. Deeming, P. Smyth.2017)

To define inclusive growth, it is crucial to understand the literature on pro-poor growth – primarily because the definitions of these terms overlap. The literature on pro-poor growth represented the first significant departure from the belief that poverty reduction requires economic growth to be prioritized above all else.

Growth is inclusive if it supports high levels of employment and rising wages. For many developing countries, this means acquiring competitiveness in new sectors and technologies. Inclusive growth is defined here as growth that is both sustainable and broad-based in terms of employment opportunities

Ali and Son (2007), define inclusive growth as "growth that not only creates new economic opportunities, but also one that ensures equal access to the opportunities created for all segments of society, particularly for the poor". It is pro-poor in that it is focused on improving poor people's incomes in both relative terms (poor people's income improves relative to the non-poor) and absolute terms (when less people end up below the poverty line). Inclusive growth is also broad-based, involving more poor/marginalized people in the growth process through employment. It focuses on greater access to non-income aspects of wellbeing, supported by proactive state policymaking and contributions from other stakeholders.

It is aimed at ensuring that the fruits of growth be shared to specifically eliminate poverty and eradicate income inequality. Inclusive growth is thus anchored in (1) high and sustainable growth to create good employment opportunities and (2) social inclusion to provide equal access to opportunities by all. Lastly, inclusive growth also involves "green growth", being a path of economic growth which ensures that natural resources are used in a sustainable manner so as to enable continued human wellbeing as well as innovative exploration for new sources of growth.

The concept of inclusive growth is based on the recognition that economic growth must be increasingly pro-poor. The concept represents recent thinking on development, and supplants the ideas of trickledown development advocated in the 1950s and 1960s (Kakwani and Pernia, 2000), and the policies associated with the Washington Consensus of the 1980s and 1990s.

Measure of inclusive growth that we use is based on Anand et al. (2013) which integrate per capita income growth and the change in income distribution into a unified indicator of inclusive growth. Compared to the existing literature where this measure was used (for example Aoyagi and Ganelli 2015; Anand et al. 2013; Aoyagi et al. 2015) the basic contribution of this research is multifold. First, we focus on the most recent economic developments, poverty, and inequality trends in Egypt and on its reform plans aimed at fostering inclusive growth supported by IMF and World Bank. Second, we try empirically to estimate inclusive growth drivers, modeling not only monetary and fiscal determinants but also structural (such as labor market, productivity, FDI) policies based on Egyptian reform programs to foster equitable growth. Finally, we build a scenario analysis to estimate how achieving different structural reform targets could potentially contribute to inclusive growth in Egyptian economy.

Measuring inclusive growth will involve *ex ante* analyses that examine ways of increasing the pace of growth by involving underused sections of the labor force. This differs from the measurement of pro poor growth, which has typically focused on the *ex post* tracking of poverty measures to observe the impact of growth on poverty reduction. Indices

used to track inclusive growth at a country level should also use indicators that measure the economic participation of poor people in the growth process, as well as those that gauge the improvement in economic outcomes for the poor as a result of growth. In contrast, measurements of pro-poor growth policies often focus solely on outcomes.

Synopsis of related studies

In recent years, multilateral organizations, and governments have been interested towards achieving inclusive growth since high economic growth is not sufficient to addressing several socio-economic problems in developing countries. This is premise on the high unemployment rate, huge income disparity, and ever increasing poverty rate amongst others, in developing countries.

Although the concept of inclusive growth has received considerable attention in the economics literature, there is no widely accepted definition for it. Because of increasing concerns about rising income inequalities and claims that the poor in many parts of the world have not been benefitting much from economic growth, the term inclusive growth is often used interchangeably with a host of other terms, including broad-based growth, shared growth, and pro-poor growth. For some of the pertinent definitional issues see Tang (2008).

To our advantage, inclusive economics (IE) has emerged as a progressive disciplinary perspective on how to achieve inclusive development, inclusive growth, inclusive governance and a circular, more sustainable, economy. McGregor and Pouw(2017).

Inclusiveness is a multidimensional concept. Societies strive to achieve and maintain strong growth as a means of raising living standards and improving people's wellbeing. But strong growth is not necessarily inclusive in that the benefits of increased material prosperity are not always shared evenly among the various social groups. Neither is strong growth, even if sustained over a number of years, a guarantee that disenfranchised social groups would have stronger voice in the political process and in society at large. But inclusiveness goes beyond poverty and income distribution and encompasses other dimensions, such as

well-being, voice in the political process and participation in social life, which are highlighted in the different chapters.

From an economic perspective, what matters for economic growth, household income, and living standards is not the number of people who work but rather the productivity of those who work, and how the benefits are redistributed in society. Because of relatively low labor productivity and labor compensation, even a large number of working people in the least-developed countries can support only a small number of dependents. Inversely, high labor productivity and labor compensation in developed countries allow a small number of working people to support a large number of dependents. However, many countries have seen a falling labor share in income, even as they have seen a growth in labor productivity.

Although there is no consensus on the measurement (or definition) of inclusive growth in the applied and theoretical literatures, but some studies applied this proxy for inclusive growth (Oluwatosin Adeniyi, 2020). However, justification for our measure is due to the fact it captures the income per worker, in another words, this measure focuses on workers who engaged in the production process and share in gaining fruits from economic growth. According to (Ali and Son, 2007) average income per worker reflexes opportunities available to the people and how these opportunities are shared amongst them. Also it measures growth, its sustainability, unemployment level, income inequality and poverty level in a country (Raheem et al., 2018 and Oyinlola and Adedeji, 2019). Thus, income per worker is suitable in the context of our study as it represents proportion of the population that benefits from economic growth.

Several plausible determinants have been identified for inclusive growth and human capital is one of the key drivers of such growth. Human capital is seen as one of the drivers of economic growth. Education and health are the components of human capital needed for economic growth. Several works in the literature have established the relationship between education and economic growth.

These studies include Nowak and Dahal (2016), Gyimah-Brempong (2006), Kot askov a et al. (2018), Barro (2013), Jalil and Idrees (2013), Lin (2003), amongst others. Gyimah-Brempong et al. (2006) investigated the impact of higher education on economic growth in 34 African countries over the 1960–2000 period using dynamic panel data estimator.

They reveal that there is a positive and statistically significant relationship between all levels of education and economic growth. Similarly, Jalil and Idrees (2013), found a positive effect of different levels of education on economic growth in Pakistan. Some studies argued that not all the levels of education have a significant impact on economic growth. Tertiary education is construed to be more significant to economic growth.

However, the role of primary and secondary education should not be undermined as they provide the foundation upon which tertiary education is built. In a study conducted by Nowak and Dahal (2016) on the contribution of education on economic growth in Nepal, using ordinary least square (OLS), a positive relationship was found between education and economic growth.

A well-educated labour force increases the total factor productivity and contribute to factor accumulation (Babatunde and Adefabi, 2005). Barro (2013) argued that the average years of schooling attainment is positively related to the level of growth. Delgado et al. (2013) showed the importance of education for economic growth. Wolfenden (2015) provides a detail overview of education challenges in Africa where quality at secondary and tertiary levels are greatly affected. This, in turn, retards growth process as a larger share of the population does not possess adequate knowledge and skills. Recently, focus has been shifted towards inclusive growth due to the fact that some countries with high growth rate are still characterised by high poverty level and unemployment rate.

Similarly, Oyinlola and Adedeji (2019) show that human capital positively influences inclusive growth in SSA region. In addition, education expenditure plays significant role in the growth inclusiveness in SSA region (Raheem et al., 2018). Employing dataset for 38

developing countries, structural transformation was found to be growth-enhancing for Asian countries while it is growth-reducing for Africa (Lin, 2012). In measuring the impact of education using educational factors in this study, attention is given to the difference between quantity and quality measures of education. Eventually, what matter is how education is able to impact economic growth and this relies on the quality of education received by the population

Tommy Andrian . 2020 Used the panel data model to obtain empirical-evidence of the impact of unemployment, education, and poverty on inclusive growth in the period from 2015 to 2018. The results of the analysis show that unemployment is determined by the number of unemployed persons (aged 15 years and over) who are not in employment, and is demonstrably unemployed. It has been shown that a significantly negative effect on inclusive growth, education, which is afflicted by the total number of attendance of community schools at all levels of primary, secondary and upper school, has a significant positive effect on integrative growth and poverty. This suggests that development related to education and the reduction of unemployment and poverty must be increased to achieve inclusive growth.

The study of (Fosu, Augustin Kwasi, 2017) presents comparative global evidence on the transformation of economic growth to poverty reduction in developing countries, with emphasis on the role of income inequality. The study finds that on average income growth has been the major driving force behind both the declines and increases in poverty. While in the majority of countries, growth was the major factor behind falling or increasing poverty, inequality, nevertheless, played the crucial role in poverty behavior in a large number of countries. And, even in those countries where growth has been the main driver of poverty-reduction, further progress could have occurred under relatively favorable income distribution.
In general, high initial levels of inequality limit the effectiveness of growth in reducing poverty while growing inequality increases poverty directly for a given level of growth.

4- Methodology and model specification

4.1. Model specification

According to (Nainggolan, R. 2016) with a good level of education, human resources can improve their quality of life through a process of education, training, and development that guarantees increased labor productivity, which guarantees sufficient income and well-being to increase the achievement of inclusive growth. This is in line with research by Sulityowati, N.et al 2010 and Maulana, R., and Bowo, P. A. 2013 that increasing education will increase labor productivity and promote inclusive economic growth. Based on this theory, hypotheses-regarding education and inclusive growth are as follows: Education has a positive impact on-inclusive growth.

This study depended on the neoclassical model proposed by Barro (2013) and Mankiw et al. (1992). As, we study the direct effect of human capital (measured Quality of education) and education (as measurement for quantity of education) on inclusive growth in Egypt. In addition, we examine if the choice of education measure used for analysis (quality and quantity) important and considered for inclusive growth. According to that, we specify the inclusive growth equation as follows:

$$Y_t = \alpha_0 + \alpha_1 CAP_t + \alpha_2 LABF_t + \alpha_3 E_t + \alpha_4 X_t + \varepsilon_t \quad (1)$$

Refers to the equation, Y represents the log of GDP per worker which serves as a measurement for inclusive growth.

In a classic growth model, labor and capital accumulations are essential in the production function, so these variables are included in the model. $LABF_t$ is measured by labor force participation rate as a % of total population (ages 15–64 years), and CAP_t is the capital stock as a % of GDP. E_t is the log of education indicators measured in terms of quantity (measured by primary and secondary school enrolments – PSE and SSE, respectively), and human capital which referred to knowledge and quality of knowledge (measured by the index of human capital – IHC). (Barro and Lee, 2013).

It is important that individuals seek for knowledge, skills and to be healthy which will affect productivity and income. However, human capital (includes quality of knowledge, skills and be healthy) is very important for inclusive growth. (see Barro and Lee, 2013; and Cohen and Leker, 2014). X_t stands for the control variables in the model, because there are other control variables that are preconditions for inclusive growth, such as FDI (foreign direct investment Alfaro et al. (2001) and Iwasaki and Suganuma (2015), inflation rate (INF). Khan and Senhadji (2000) and government consumption as a percentage of GDP (GOVT) Arpaia and Turrini (2008). We also include Final consumption expenditure as a percentage of GDP, Average of exports and imports in goods and service as a percentage of GDP with the aim of covering the effect of trade openness, Gini Coefficient a measure of inequality of a distribution, and Life expectancy at birth as approximation for health progress in the country.

Data collection

Data of All variables are sourced from World Development Indicators (2020), it includes:

- GDP: GDP per person employed (constant 2011 PPP $).
- HCI: Index of Human Capital per Person.
- LP: labor force participation rate, total (% of total population ages 15–64),
- SEP: primary school enrolment (as percentage of gross),
- SE: Secondary school enrolment (as percentage of gross),
- FDI: foreign direct investment, net inflows (% of GDP),
- INF: Inflation, GDP deflator (annual %)
- LEP: Life expectancy at birth.
- GINI: Gini coefficient.
- FC: Final consumption as a percentage of GDP.
- FTP: Average of exports and imports in goods and service % GDP as approximation for the openness of foreign trade.
- GCF: Gross capital formation (% of GDP).

4.2. The methodology

In this study we utilize Autoregressive Distributed Lag (ARDL) approach which firstly initiated by Pesaran, Shin, and Smith (2001). The

aim of ARDL model is exploring both the short and long run relation in the underlying model. The ARDL approach is based only on a single equation and thus it requires less number of observations in comparison to the common cointegration approach which introduced by Johansen (1988). Moreover, ARDL approach does not require all variables to be stationary but instead variables might be combined of I(0) and I(1) together. Furthermore, ARDL model gives more consistent estimates for both short run and long run relationships.

The ARDL approach in general might be written in the following form:

$$y_t = \beta_0 + \sum_{t}^{P} y_{t-i} + \sum_{t}^{q} x_{t-i} + \sum_{t}^{P} \Delta(y_{t-i}) + \sum_{t}^{q} \Delta(x_{t-i}) + \varepsilon_t \quad (2)$$

Where y_t is the dependent variable and x_t refers to the independent variables, p an q refer to the optimal lag of dependent variable and independent variables respectively; which is mention can be different for each independent variable.

5. Empirical results

Table (1) refers to the descriptive statistics for the utilized variables. Further, In order to determine the form of the utilized model in the analysis within the time series data, the first step we have to check for the existence of the unit root. As ignoring the non-stationary will generate spurious regression problem which means we cannot apply any results or recommendations from the underling analysis. The study will utilize the Augmented Dickey Fuller unit root test as the null hypothesis is the underlying series has a unit root, while the alternative hypothesis is that the series does not include unit root.

Table (1) Descriptive Analysis for variables

	GDP	FC	FDI	INF	LP	SE	FTP	GCF	GINI	LEP	SEP	HCI
Mean	10.3	87.6	2.3	10.4	49.8	77.7	24	18.6	34.9	69	97	2.19
Median	10.3	86.6	1.4	10	49.4	77.9	23	18.2	33	69.3	96	2.17
Kurtosis	2.11	2.78	5.6	2.9	2.1	2	2.3	5	2.97	2.3	2.3	1.66
Skewness	0.16	0.91	1.8	0.4	0.43	0.07	0.4	1	1	-0.5	-0.2	0.1
Std. Dev.	0.17	4.18	2.3	5.6	1.5	1.5	5	3.1	4.6	2.3	5.9	0.31

Table (2) depicts results of unit root analysis for different time series in the model. The table indicates that each of Index of human capital, net inflow of foreign direct investment as a percentage of GDP, the annual level of inflation rate, Gross capital formation as a percentage of GDP, Gini coefficient, and Life expectancy at birth, is a stationary in level. While each of GDP per person employed, Final consumption expenditure as a percentage of GDP, Labor force participation rate, School enrollment in secondary percentage, Average of exports and imports in goods and service as a percentage of GDP, School enrollment in primary schools is stationary in first difference.

Table (2). Unit root test results

Variable	Level		first difference	
	t-Statistic	Prob.*	t-Statistic	Prob.*
GDP	0.895	0.99	-5.809	0.000***
FC	-1.408	0.564	-5.248	0.000***
FDI	-3.07	0.04*		
INF	-3.046	0.043*		
LP	-1.04	0.72	-4.16	0.003***
SE	-1.27	0.62	-3.83	0.007***
FTP	-1.61	0.46	-4.379	0.001**
GCF	-4.03	0.004***		
GINI	-3.546	0.013**		
LEP	-4.949	0.000***		
SEP	-1.478	0.53	-8.95	0.000***
HCI	-6.9	0.000***		

Table (3) shows the results of determinants of GDP per employer for Egypt. Results can be summarized as following:

- School enrollment in secondary schools has a significant and positive effect over the long run and the short run. Which indicates this indicator is important for inclusive growth in Egypt and investment in education is one of the major factors to push the human development which will eventually improve the growth in the country.

- Index of Human Capital per Person has a positive significant effect over the long run. Which indicates this indicator is important for inclusive growth in Egypt and investment in human capital, such as health and education is one of the major factors to push the human development which will eventually improve the growth in the country.

- School enrollment in primary schools has insignificant effect over the long run or the short run. This implies that government should support the enrollment process in secondary schools and the higher education.

- The final consumption expenditure as a percentage in GDP has a negative but insignificant effect with the first lag over the long run while for the short run, it has a positive and significant effect with the coefficient equal to 0.002 and the probability is 0.009 is less than 1%.

- The net inflow of foreign direct investment as a percentage of GDP has a positive a significant effect with the first lag over the long run. Similarly, For the short run, it has a positive and significant effect with the coefficient equal to 0.003 and the probability is 0.001 is less than 1%. This indicates that FDI inflow is an important for pushing inclusive growth in Egypt.

- Average of exports and imports in goods and service as a percentage of GDP has insignificant effect over the long run and the short run. This indicates the openness of foreign trade does not matter for the inclusive growth in Egypt.

- Gross capital formation as a percentage of GDP has a positive and insignificant effect over the long while it has a positive and significant effect over the short run. This indicates that changes in gross capital formation is matter for inclusive gross in Egypt.

- Gini coefficient has a negative significant effect over the long run, but it has insignificant effect over the short run. Which means the

level of equality in income distribution is vital for inclusive growth while changes in this equality is not matter.

- Inflation has a significant effect over the short run and long run. This implies that changes in price level is an important for inclusive growth in Egypt.
- Life expectancy at birth as an indicator for health progress in the country has a positive and significant effect over the long run with the first lag. While, it has a negative significant effect over the short run.
- Labor force participation rate has a significant positive effect with the first lag over the long run and a significant negative effect with the short run.
- Cointegration term is significant, negative and less than one with value equal to -0.31. This indicates that this relationship is a stable over the long run.

Moreover, Table (4) which depicts F-Bound test results indicates that F-statistic is higher than the lower and the upper limit which means this relation is stable.

Table (3) estimates of determinates of EUFDI for Egypt

Variable	Coefficient	t-Statistic	Prob.*
GDP(-1)	0.688	3.9	0.004***
FC(-1)	-0.002	-1.6	0.14
FDI	0.00316	1.99	0.08*
FTP	-0.002	-1.4	0.19
GCF(-1)	0.0023	1.7	0.11
GINI	-0.00144	-2.045	0.07*
INF(-1)	0.0014	2.3	0.04**
LEP(-1)	0.149	2.07	0.07*
LP(-1)	0.022	4.57	0.002***
SE	0.00261	3.1	0.014**
SEP(-1)	-0.00142	-1.6	0.14
HCI(-1)	0.9068	1.967	0.08*
C	2.29	1.18	0.27
Short Run			
D(FC)	0.002	4.5	0.009***
D(FDI)	0.003	4.66	0.001***
D(GCF)	0.001	3.56	0.007***
D(INF)	0.0004	2.58	0.03**
D(LEP)	-0.13	-11.1	0.000***
D(LP)	-0.02	-20.3	0.000***
D(SE)	0.002605	8.03	0.000***
D(HCI)	-0.879	8.03	0.000***
CointEq(-1)*	-0.31	-14.33	0.000***
		Prob(F-statistic)	0.000
Adjusted R-squared	0.9	Schwarz criterion	-6.08
Akaike info criterion	-7.07	Hannan-Quinn criter.	-7.424946
		Log likelihood	118.5

Table (4) F-Bound test

Null Hypothesis: No level relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	8.581257	10%	1.76	2.77
K		5%	1.98	3.04
		2.5%	2.18	3.28
		1%	2.41	3.61

6. Conclusions and policy implications

Using the ARDL modeling approach with annual time series data from 1990 to 2020, the study examined the impact of education and human capital (quantity and quality of education) on inclusive growth in Egypt.

The findings from the estimated models showed in the short run further showed that education quantity (primary school enrolment) exerted a positive impact on inclusive growth to a large extent over long run . School enrollment in secondary schools has a significant and positive effect over the long run too. The short-run results also indicated that education quality (measured by human capital index) positively influenced inclusive growth over the long run and the short run. Overall, the results are pointing to the fact that education quality is very important in spurring growth inclusiveness in Egypt. The inability to address educational issues may hinder the achievement of inclusive growth. This will further exacerbate the socio-economic problems such as unemployment, poverty, inequality amongst others.

According to the foregoing findings, the policymakers can truly foster growth inclusiveness within Egyptian economy by focusing on the following: (1) Designing education policy that will offer opportunities for easy access to the education by teeming population: there is need for Egypt to keep education free and mandatory by law at least at primary and secondary levels since the level of poverty is alarming. (2) Quality teachers: there is a need for effective policy that will ensure regular and high quality training of educators as well as raising the standard of the profession. The potential to improve teachers' status at all levels of education to foster professional development practice is very important for Egypt. This is essential for quality workforces that are needed for growth inclusiveness. (3) Upgrading school infrastructure to promote the quality of education should be a focal point for all government that aim to deliver quality education to their citizens and thereby serving as a catalyst for achieving inclusive growth.

In general, evidence supports that while the attainment of high per capita growth and lower inequality would almost ensure the accomplishment of eradicate extreme poverty, growth alone does not guarantee that everyone will benefit equally. Some level of growth is a

necessary condition for poverty reduction, but growth by itself is not a sufficient condition. In other words, growth may disregard the poor and marginalized groups, resulting in inequality. According to that we can say that Egypt still needs more concern about human capital and education according its significant positive effect on inclusive growth. On other words it can be said that an increase in human capital and wide education enrollment will lead to an increase in labor productivity and inclusive economic growth.

Specifically, we recommend the government to give more consideration to human capital and provision of customized social services specially education, promote citizens to acquire the capabilities needed to escape from the risks they face and accomplish inclusive growth in Egypt, this recommendation matches to welfare states in the advanced countries which responding to the rise of this new concept by relying less on social insurance and more on the provision of customized social services, such as education, which enable citizens to acquire the capacities needed to respond to the risks they face.

Important limitations of our research should be noted. First, the availability of income distribution data is limited. The second limitation of our research is that we are unable to include several potentially significant inclusive growth drivers due to limited data availability in terms of time span. Those include, tertiary enrollment and research and development (R&D) , which considered significant source of growth (Pastor et al., 2018), measures of accessibility to and quality of education, quality of overall infrastructure, accessibility to healthcare, financial inclusion, fintech, and other indicators. Investigating the possible impacts of such factors on inclusive growth if longer time series data become available is a promising field of study for future researches.

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