

Sources of Economic Growth in MENA Countries: A Harrod- Neutral Technological Progress Identification Framework

Responses to Comments from the Editor

The authors thank the editor for giving us the opportunity to address in details each reviewers' comments.

Responses to Comments from Reviewer 1

We appreciate the time and effort that you have devoted to critically review our manuscript and for making several useful suggestions that have significantly improved our study. Below are the details on how we have addressed the concerns you have in the previous version of this paper. For your convenience, we highlighted the edited and added parts in red in the revised version of the manuscript.

Comment #1:

The paper studies the sources of economic growth in MENA countries. In particular, following a growth accounting framework, it aims at measuring the contribution of human and physical capital accumulation and of technological progress to economic growth. The question addressed in the paper is potentially interesting, especially for the focus on MENA countries that have been under-investigated in the literature so far. However, I think that the paper has several flows. The paper is poorly crafted and edited and the empirical analysis is not properly explained and discussed. Moreover, it not clear how the paper relates to the existing literature.

Response:

We edited and improved the literature review by relating it more to the existing literature and extended the empirical analysis. The revised version now include all these changes and improvements. We also crafted the paper. Moreover, the paper has been sent to Elsevier to be edited for the English language.

Comment #2:

Regarding the empirical analysis, authors use an Autoregressive Distributed Lag (ARDL)-Bounds testing approach to examine the long-run relationship between physical capital stock per worker, real GDP per worker, and human capital per worker. This approach is not standard in this filed and the authors do not motivate the choice of this methodology and do not mention other papers that used this method in a growth accounting framework.

Response:

We detailed the related literature both theoretically and empirically. We give these details below.

Traditional sources of growth studies generally assume that the nature of technological progress is Hicks-neutral (Solow 1957: 312; Barger 1969: 144; Nishimizu and Hulten 1978: 352; de Gregorio 1992: 64; Senhadji 2000: 132; Altug, Filiztekin and Pamuk 2008: 403; Fuentes, Larrain and Schmidt- Hebbel 2006: 121; Abu-Qarn and Abu-Bader 2007: 753; van der Eng 2010: 295). Sources of growth analysis has mostly been conducted with time series data for samples of countries. These empirical studies firstly tried to find whether there are long-run equilibrium relationships among the variables in the sources of growth's equation. The authors of these papers implicitly or explicitly assume that there are steady state conditions even if they assuming that the nature of the technological progress is Hicks-neutral that does not have steady-state (Senhadji 2000; Abu-Qarn and Abu-Bader 2007). Thus, if there are steady state conditions, the nature of technological progress should be assumed to be Harrod-neutral (see Uzawa 1961).

Granger (1993: 307) summarizes argues that “*if macro theories are about equilibria (or steady-state), econometric techniques are not, it becomes difficult for these theorems to be tested on actual data*”. The argument of this recent paper show that the nature of the technological progress should be Harrod-neutral if time series analysis is used in studies on the sources of growth, since most of economic time series are generally non-stationary (detailed in Acikgoz and Mert, 2014). In a time series analysis, researchers mostly first test whether these type of series share common trends over time and multivariate time series analysis focuses on finding the cointegration relationships among the series. We employed bounds testing approach of Pesaran, Shin and Smith (2001) in order to determine whether there is a cointegration relationship among the series of Equation (1) that are expected to be non-stationary. Then, consistent elasticity coefficients ($\hat{\alpha}$ and $\hat{\beta}$) of Equation (1) were estimated by using the autoregressive distributed lag (ARDL) approach of the same authors. The ARDL approach have been employing in almost every branch of economics since it has two important advantages as in Pesaran and Shin (1997) and Pesaran, Shin and Smith (2001): (i) it effectively corrects for possible endogeneity of explanatory variables, and (ii) the estimates exhibit desirable small sample properties.

Comment #3:

Also, the data used in the analysis are poorly described: For example, what is the period considered? Do they have the same number of years for all countries? How do countries differ in terms of long run trend in GDP growth? I think that some descriptive statistics are essential.

Response:

We extended data information in the main text by highlighting that the analysis period covers 1970-2011 for each country. We summarized countries the real GDP per worker growth long-run trends in the analysis period. We noticed in the text that more details could be found in Acikgoz, Ben Ali and Mert (2016). We added the following paragraph to Introduction section. We give these details below for your convenient.

Since most economic time series are expected to be nonstationary, we looked at the picture by taking the first differences among the logged values or growth rates of these series. In general, the mean and median values of the growth rates of output per worker, physical capital stock per worker, and human capital per worker of most of the MENA countries in our sample (Egypt, Iran, Jordan, Malta, Morocco, Sudan, Syria, Tunisia, and Turkey) are positive for the period of study. Average growth rate of output per worker in Egypt and Malta are 3.8 and 3.5 percent,

respectively. Egypt and Turkey have the highest averages of physical capital stock per worker growth rate among the 15 MENA countries. Egypt and Turkey also score the highest on the index of human capital per worker growth rate for the duration of the analysis. Details can be found in Acikgoz, Ben Ali and Mert (2016).

Comment #4:

I think that the authors should work more on the discussion of the results and streamline the main findings of the paper. For example, their main conclusion is that economic growth in the region arises from accumulation of capital instead of total factor productivity, but as far as I understand this result comes from six countries out of fifteen. In this case, I think the authors should downplay this statement and try to interpret why this finding holds for some countries and not for others.

Response:

We improved our discussion on the findings of this study by streamlining some of the ambiguous and new findings related to some countries. This discussion is highlighted in red in the revised version. Also, the statement in which we generalize the results for all MENA countries has been removed from the text. It is now clearly stated that the result is reported for six countries out of 15. We also should mention here that we mistakenly used the term total factor productivity instead of labor productivity since we used Harrod-neutral technological progress definition. We corrected this error found in three sentences.

Also,

Finally, I think that a language editor should be employed to go through the paper's exposition and tighten the presentation.

Response:

Regarding the presentation of the paper, we sent it to Elsevier to be edited for the English language.