Convergence Development of Middle East Countries in Agricultural Sector

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Abstract: In recent years, there has been a wide of studies on regional convergence. Agriculture has rarely received attention as testing grounds for the hypothesis of economic convergence. The aim of this paper is testing convergence development of Middle East countries in agricultural sector. The data cover the period 1995 to 2010, a sample period that might be considered as somehow short. However, Islam (1995) points out equation (1) is valid for shorter time periods as well, since is based on an approximation around the 'steady-state' and supposed to capture the dynamics to- ward the 'steady-state'. The obtained results are consistent with the presence of a sub-group of regions demonstrating convergence in Middle East.
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1. Introduction

In recent years, there has been a wide of studies on regional convergence. However, the recent explosion of interest in growth and convergence has not followed a uniform path. Instead, several distinct types of convergence have been suggested in the relevant literature, each being analyzed by distinct groups of scholars employing different methods. As part of the aforementioned efforts, economic convergence has been tested across some regions of the world. Agriculture has rarely received attention as testing grounds for the hypothesis of economic convergence. There is, however, an enormous interest from policy-makers at all levels (local, regional and national) about productivity convergence in agriculture. More than ever, policy makers need independent and encompassing studies, which can provide critical new information about the specific pattern that prevails across the Middle East regions. Thus, drawing on theoretical ideas and debates about regional convergence, this paper aims to shed some further light on whether or not there is a pattern of convergence in agricultural productivity across the Middle East regions. This effort is organized in the following manner. Conceptual and empirical approaches to convergence, is discussed in Section II. Section III presents the econometric results. Finally, in Section IV the implications of the results for the debate concerning convergence across the Middle East regions are assessed and we argue that might afford an interesting policy conclusion.

2. Theoretical and Empirical Approach about convergence

Although the early 'seeds' of the convergence question can be found in several contributions of economic historians, such as Kuznets (1955), Rostow (1960), Gerschenkron (1962) and Gomulka (1971), all of which recognize how backward countries tend to grow faster than rich countries, the conceptual apparatus derives from the standard neoclassical theory, as this is formulated by Solow (1956). This model, essentially, describes a mechanism by which regions reach 'steady-state' equilibrium. Despite the restrictive conditions of this model two important conclusions can be drawn. First, regions will converge towards a common 'steady-state' if the growth rate of technology, rate of investment and rate of growth of the labor force are identical across regions. Second, the further a region is 'below' its 'steady-state', the faster this region should grow, which leads to the more general prediction that poorer regions will grow faster than richer regions. Assuming perfect competition, zero transportation costs, full employment, a single homogenous product and constant returns to scale production functions, which are identical across regions, factors are paid the value of their marginal products. Hence, the wage (equal to marginal product of labor) is a direct function of the capital-labor ratio and the marginal product of capital (return to capital) is an inverse function of the capital-labor ratio. Within this model, movements of factors between regions are induced by differences in the returns to factors of production. The assumption of diminishing marginal productivity of capital ensures that regions with a high (low) capital-labor ratio will exhibit low (high) marginal product of capital. Similarly, regions with a high (low) capital labor ratio offer high (low) wages. In such circumstances it is argued that labor will have a propensity to migrate away from low wage regions towards high wage regions while capital will move in the opposite direction, away from the more prosperous regions where its marginal product is low, towards lagging regions where additional capital investment is more profitable. These factor flows will boost growth in output per worker in lagging regions. Thus, capital and labor

migrate in response to interregional differences in factor returns and these factor movements will continue until factor returns are equalized in each region. The overall outcome is, therefore, one in which an interlocking and mutually – reinforcing set of processes (i.e. diminishing returns, labor migration, capital mobility and access to the same level of technology) erode regional economic disparities, leading to regional convergence. It is reasonable to assume that labor and capital can more easily migrate between regions rather than across nations. It might be argued, therefore, that a network of regional economies provides an appropriate 'laboratory' for testing the neoclassical predictions of convergence. Barro and Sala-i-Martin (1995), note that convergence is more likely to occur between regions rather than national economies for precisely this reason. Although recognizing the existence of some structural differences between regions they argue that these differences are likely to be small or even insignificant, compared to differences between nations. Absolute or M-convergence is now used generally to describe the situation of a 'poor' economy exhibiting a tendency to grow faster than a 'rich' economy leading eventually to the equalization of per capita output across economies. This framework not only provides a practical approach to the measurement of convergence but also an expression for the speed at which convergence takes place. The first statistical test of the hypothesis that poor economies will catch up with rich economies is found in Baumol (1986), generally regarded as a major contribution to the convergence debate. Baumol (1986) placed emphasis on the dictum that convergence is identical with a negative relation between an initial level and growth rate of per capita output. A central tenet of Baumol's thesis is that convergence is feasible if 'poor' economies exhibit a tendency to grow faster than 'rich' economies. More formally,

$$g_i = a + by_{i,0} + \varepsilon_i \qquad (1)$$

Where $y_{i,0}$ is the natural logarithm of output per worker at some initial time for the ith region, a is the constant term, b is the convergence coefficient and ε_i is the random error term. If output per worker $Y_{i,T} = e^{gT} Y_{i,0}$, then $g_i = y_{i,T} - y_{i,0}$ grows, where T is the terminal time. The condition for convergence requires that the first derivative of equation (1) is negative. The intuition behind this argument is that regions with relatively low initial output per worker grow faster that those with relatively high output per worker, indicating that 'poor' regions catching up with 'rich' regions. Romer (1996) describes perfect convergence as occurring when b = - 1 while at the other extreme, a value of b = 0 indicates that the regions included in the data set may even exhibit divergence. Alternatively, b = 0 implies $g_i = a$, which can be considered as an indication of an autonomous growth rate that maintains income differences across regions. A distinction is made in the literature between the convergence coefficient b and the speed of convergence β. Following Barro and Sala-i-Martin (1995) the convergence coefficient b may be expressed as follows:

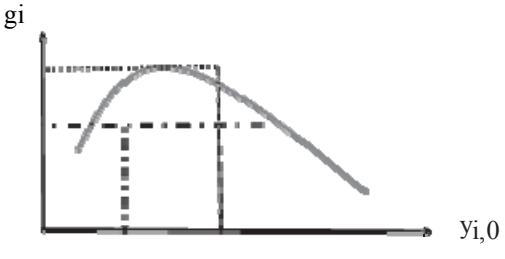
$b = -(1 - e^{-\beta T})$ where T is the number of years included in the period of analysis. The term for β indicates the speed at which regions approach the steady-state value of output per worker over the given time period, i.e. the average rate of convergence. If $b < 0$ then $\beta > 0$, indicating that a higher β corresponds to more rapid convergence.

In his seminal paper Baumol (1986) introduced an alternative concept of conver- gence, that of club convergence, in order to describe a subset of national economies within the world economy, which demonstrate the property of convergence. Analyzing 72 countries between 1950 and 1980, Baumol (1986) concludes that, in fact, 'there is more than one convergence club' (p. 1080) in the sense that income levels converged within the industrialized countries, the centrally planned economies and the middle- income market economies, but not within the group of low-income countries. Moreover, between these groups income levels appeared to diverge. Subsequently, Baumol and Wolff (1988), demonstrate that middle income countries (17 out of 72 countries included in the sample) have grown the fastest and the poorest countries have diverged from the others.

In order to detect club convergence, Baumol and Wolff (1988) reformulate the test for absolute convergence using the following model:

$$g = a + by + cy^2 + \varepsilon$$

This quadratic function is illustrated in Figure 1, and is drawn on the assumption that b is positive and c is negative, which are the conditions required for the existence of a convergence club.



3. Testing Convergence Development of Agricultural Sector in Middle East

In this paper we exploit data per worker in agriculture since this measure is a major component of differences in the economic performance of regions and a direct outcome of the various factors that determine regional 'competitiveness' (Martin, 2001). The data cover the period 1995 to 2010, a sample period that might be considered as somehow short. However, Islam (1995) points out equation (1) is valid for shorter time periods as well, since is based on an approximation around the 'steady-state' and supposed to capture the dynamics to- ward the 'steady-state'. The potential for β-convergence is indicated in Figure 2, which shows a scatterplot of the average annual growth rate against the initial level of RALP. Casual inspection of the data in Figure 2 provides some indication of an inverse relationship between the average annual growth rate and initial level of labor productivity. Regions above an approximate threshold of 2.5 (about 12,000 Euros) for initial labor productivity could be described as exhibiting absolute convergence.

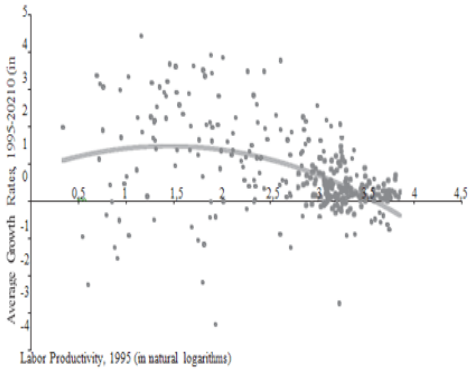


Figure 2: β-convergence, 1995-2010

Table1: Convergence, 1995-2010

Depended Variable: g_i , OLS		
a	0.3016* (5.018)	-0.2997* (-2.341)
b	-0.0527* (-2.569)	0.5115* (4.682)
c		-0.1163* (-5.251)
Implied β		
Implied y^*	0.0054*	2.1982*
LIK	0.7553	31.9193
AIC	2.4893	-55.8386
SBC	9.5952	-41.6267

Notes: Figures in brackets are t-ratios. * indicates statistical significance at 95% level of confidence. AIC and SBC denote the Akaike and the Schwartz-Bayesian information criteria

As a first step in the process of assessing convergence in the EU-25 regions a test for absolute β-convergence across all regions is carried out, using Ordinary Least Squares (hereafter OLS) to estimate equation (1). The results are set out in Table 1 and show that b1> 0, thus indicating some signs of absolute convergence over the period 1995 to 2004. Attention should be drawn to the fact that the rate of convergence is relatively low, estimated at 0.51% per annum. The second step is to test for club-convergence. The obtained results are consistent with the presence of a sub-group of regions demonstrating convergence.

The Akaike and the Schwartz-Bayesian (hereafter AIC and SBC, respectively) infor- mation criteria have been used for the model selection

4. Discussions

In recent years, there has been a wide of studies on regional convergence. However, the recent explosion of interest in growth and convergence has not followed a uniform path. Instead, several distinct types of convergence have been suggested in the relevant literature, each being analyzed by distinct groups of scholars employing different methods. As part of the aforementioned efforts, economic convergence has been tested across some regions of the world. Agriculture has rarely received attention as testing grounds for the hypothesis of economic convergence. In this paper we exploit data per worker in agriculture since this measure is a major component of differences in the economic performance of regions and a direct outcome of the various factors that determine regional 'competitiveness' (Martin, 2001). The data cover the period 1995 to 2010, a sample period that might be considered as somehow short. However, Islam (1995) points out equation (1) is valid for shorter time

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