Dynamic Specialization and Convergence of MENA Countries

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Specialization plays an important role in economic performances. Theories of international change predict that countries tend to specialize in the product where they have a relative advantage. In this case, developing countries cannot catch-up the developed ones. However, some growth theories predict that developing economies converge toward the developed ones since they realize a higher growth rate. That has been the ultimate object of some Mediterranean countries when they have signed an association agreement with the European Union. The aim of this paper is to verify if that has been a convergence of the per capita income of four Mediterranean countries (Egypt, Morocco, Tunisia, and Turkey) toward the one of the two richest European Union (Germany and France). The results issues from an empirical investigation denote that there is a divergence of per capita income and this one is the result of a bad specialization of the south Mediterranean countries.

Keywords: trade liberalization, specialization, income convergence, panel model

Introduction

A whole economic literature is devoted to analyze the effect of trade liberalization on the economic growth. The subjacent challenge of these studies is the economic convergence question. Thus, the effect of openness on economic growth and patterns of inequalities among participating countries is still a matter of controversy among economists. Until the end of 1980s, the debate on the linkage between openness and growth was dominated by neo-classical theories, based on perfect competition and constant returns to scale, predicting that economic integration leads to convergence of income per capita and growth rates among the participating countries and regions. Thus, this “static theory” predicts a favorable effect of the commercial liberalization on the economic convergence.

The traditional trade models explain trade patterns and specialization through differences in relative production costs termed “comparative advantages” resulting from differences in productivity (technology) (Ricardo, 1817) or endowments (Heckscher, 1919; Ohlin, 1933) between countries and regions. Free trade is predicted to increase the efficiency of resources allocation, competition, and thus result in higher growth and income per capita. Thus they predict that factor prices will be equalized and income per capita will converge in the long term.

This prediction is defended by neo-classical growth models (Solow, 1956) which suppose that poor economies have higher capital returns and will therefore grow faster than the rich economies generating thus convergence of income per capita across countries. Economic integration, in particular the free movement of capital, can reinforce this convergence process because the capital is likely to flow in from richer areas.
However, the demonstration of the trade profit proposed by the “dynamic theory” is more debatable, in spite of that specialization can block the long run growth and convergence. In fact, specialization, which is the base of the reasoning of the classical and neo-classical theory, can justify the gone-up in inequality between industrialized nations and the developing ones. Suppose that the North (developed countries) produces goods with high technological contents and exports them to the South (developing countries), which export manufactured basic goods to the North. Thus, trade flows is relate to a different added-values products. The developing countries export products with weak added-value and import high added-value products. Consequently, a divergence of the incomes will be creating between North and the South after the deterioration of the terms of trade.

In addition, new economic geography models suggest that specialization patterns may be the result of the spatial agglomeration of economic activities (Krugman, 1991a, 1991b; Krugman & Venables, 1995; Fujita, Krugman, & Venables, 1999). Main assumptions of these models are the presence of pecuniary or technological externalities between firms, monopolistic competition, and increasing returns to scale. These new economic geography models imply that the reduction in transport costs associated with increased integration lead to increased specialization and divergence of industrial structures and generate regional differentials in growth and factor accumulation. In these models, greater capital and labor mobility can increase regional economic fluctuations and produce long-run divergent economic growth over time. The main driving mechanism for regional divergence is increasing regional specialization, making regions more vulnerable to random demand shifts and shocks.

The theoretical models reviewed above make different predictions with respect to the impact of economic integration on regional growth differentials. Neo-classical trade and growth models point to increasing specialization, factor price equalization, and convergence of income per capita in the long term in the integrating countries and regions. New growth models and new economic geography models emphasize endogenous processes of factor accumulation, increasing returns to scale, and agglomeration economies that can foster divergence patterns in the context of economic integration. Understanding the nature of the relationship among trade integration, specialization, and income per capita convergence is therefore an empirical question.

The aim of this paper is to study the dynamic specialization of some Middle East and North Africa (MENA) countries (Egypt, Morocco, Tunisia, and Turkey) and its effect on the convergence of per capita incomes towards the average of income level of the European countries.

The remainder of the paper is organized as follows: In the second section, the author proposes an overview of the economic characteristics in some MENA countries. The third section presents the dynamic specialization of MENA countries. The fourth section is preserved to test the hypothesis of convergence. The fifth section is conserved to an empirical application which studies the effect of the specialization on the income convergence. Finally, the conclusion is listed in the sixth section.

**Economic Characteristics**

As reported in Table 1, the four Mediterranean countries are characterized by different economic levels. The growth rate of the global domestic product (GDP) reached 9% in Turkey in 2010 so be the double of the world average. The resumption of Turkey, after one difficult year in the 2009, was returned to the domestic demand and supported by the rise of the foreign assets flows and an adapted monetary and tax policy. This rate
has not exceeded 4% in Morocco and Tunisia and is established to 5.5% in the case of Egypt. These rates must improve to reduce unemployment and upgrade the welfare of citizens.

Moreover, the attractively of foreign direct investment (FDI) varies much from one country to another. In Tunisia, average annual flows of IDE amounted to 2.2% of the GDP between 1996 and 2000; amounted to 2.6% of the GDP between 2002 and 2005; and amounted to 5% of the BDP between 2006 and 2008.

The Mediterranean countries suffer from a higher unemployment rate which varies, according to the countries from 9% to 14% with an important part of young. The problem of inflation is controlled in Morocco and Tunisia. However, in Egypt and Turkey, this rate remains higher and exceeds sometimes the growth rate. The ratio investment/GDP varies between 19% in the case of Egypt and 31% in Morocco. These later are high but remain insufficient to absorb unemployment.

Table 1

| Some Characteristics of Mediterranean Countries | Population (millions) | GDP/capita (USD) | Average growth rate of GDP | Average inflation rate | Unemployment rate |
|-------------------------------------------------|-----------------------|------------------|---------------------------|-----------------------|------------------|
| 2010                                            | 2010                  | 1990-1999 2000-2008 2009 | 2010 | 1990-1999 2000-2008 2009 | 2010 |
| Egypt                                           | 81.2                  | 1990.5           | 4.3 | 6.2 | 4.7 | 5.5 | 10.5 | 10.9 | 11.8 | 11.3 | 9.4 |
| Morocco                                         | 31.9                  | 2768.7           | 2.8 | 4.4 | 4.8 | 3.7 | 4.4 | 2.5 | 1.0 | 1.0 | 10.0 |
| Tunisia                                         | 10.5                  | 3903.0           | 5.1 | 5.1 | 3.1 | 3.7 | 4.9 | 3.6 | 3.5 | 4.4 | 14.2 |
| Turkey                                          | 72.7                  | 9942.0           | 4.0 | 3.6 | -4.8 | 9.0 | 77.2 | 16.4 | 6.3 | 8.6 | 14.0 |

Concerning the export structure, Mediterranean countries represent some transformation. On the one hand, textile has been the first export sector in the case of Morocco, Tunisia and Turkey, experienced a decline during the last few years. On the other hand, these countries know an emerged of other sectors like electric and mechanic.

Egyptian exports are more dominated by energetic sector. It contributes with 45% in the total of export during the first decade of 2000 years. The share of textile sector in the total export has experienced a decline of 10 points while passing from 18.9% in 1995 to 8.5% in 2008. Agro-alimentary exports contribute with 10% in the total of exports. In addition, exports of the chemical sector knew a considerable increase during the 20 last years. It rises from 3% in 1990 to 14% in 2008.

The textile represents more than the 1/3 of Moroccan exports during the 1990s and 23.4% in 2008, thus recording a fall of 10 points. The share of exports of the agro-alimentary products which was around 25% during the period 1990-2005, knew a fall to be established in at 20.4% in 2008. Exports of chemical products passed from 25.5% in 1990 to 17% in 2005 and 30.7% in 2008. The exports of electric sector carried out a considerable rise while passing from 1.25% in 1990 to 8.6% in 2008.

Exports of Tunisia are dominated by textile in spite of a decline registered since 1995. The share of this sector has dropped from 52.4% in 1995 to 29% in 2008. Chemical exports have growing up by six points, passing from 11.8% in 2005 to 17.3% in 2008. Electric sector has succeeded to realize important performances which resulted in amplification in amplification of its share which climbed from 4% in 1990 to 13.1% in 2008.

Exports of Turkey also knew a considerable transformation. Indeed, the share of the sector likes the agro-alimentary and textile experienced a continuous fall during the period 1990-2008. They have decreased from 24.7% to 8.1% and 37.4% to 17.9%, respectively. In addition, export of vehicles and mechanical sectors carried out remarkable successes during the same period while increase from 0.95% to 14% and 3.4% to 12.3%.
Dynamic Specialization in Mediterranean Countries

Table 2 shows that the four Mediterranean countries have not experienced a profound change in the structure of their revealed comparative advantage (RCA) in the 11 sectors. These countries have a RCA in products which do not require a high qualified labor such as textile, agro-alimentary products, and energy.

Egypt always specializes in energy-generating products, non-ferrous, and textile products. Morocco specializes in agro-alimentary, textile, chemical, and non-ferrous products. In the same way, Turkey still holds a RCA into agro-alimentary and textile products. Tunisia is the only country which knew a modification on the level of the indices of RCA, although he still specializes in textile. However, we notice that Tunisia east specialized in electric products since 2000.

Table 2
Revealed Comparative Advantage

| Country | Year | Energy | Agro-alimentary | Textile | Wood & papers | Chemical | Iron | Non-ferrous | Mechanic | Automobile | Electric | Electronic |
|---------|------|--------|-----------------|---------|---------------|---------|------|------------|----------|------------|----------|------------|
| Egypt   | 1980 | 75.6   | -20.3           | 6.4     | -1.7          | -15.2   | -6   | 4.1        | -32.9    | -11.9      | -11.2    | -6.9       |
|         | 1990 | -40.8  | -14.9           | 3.3     | -1.3          | -1.1    | -5.7 | 1.4        | -17.8    | -2.7       | -4.6     | -8.1       |
|         | 2000 | 24.7   | -13.4           | 3.9     | -1.5          | -5.9    | -5.1 | 1.3        | -14.8    | -2.1       | -2.3     | -2.2       |
|         | 2008 | 26     | -14.3           | 2.2     | -1.6          | -3.8    | -9.3 | 0          | -16.6    | -7.2       | -2.1     | -3.3       |
| Morocco | 1980 | -5     | 14.1            | 15.2    | 1             | 11.1    | -4.9 | 9.3        | -17.3    | -2.1       | -4.5     | -4.7       |
|         | 1990 | -29.1  | 14.1            | 20.6    | -0.9          | 9.1     | -6.4 | 3.1        | -22.2    | -3.5       | -2.1     | -3.2       |
|         | 2000 | -29    | 0.5             | 17.1    | -1.8          | 10.9    | -4.5 | 4.2        | -15.1    | -3.9       | 0        | -5.3       |
|         | 2008 | -42.2  | 0.8             | 17.5    | -4.6          | 1.6     | -12.4| 0.7        | -31.3    | -18.1      | 1.5      | -4.6       |
| Tunisia | 1980 | 48.1   | -1              | 26.2    | -4.4          | -31.7   | -17.2| 1.2        | -46.8    | -20.8      | -11.1    | -15.4      |
|         | 1990 | 14.7   | -3.9            | 24.4    | -3.9          | -8.9    | -9.1 | -0.8       | -31.3    | -10.8      | -2.1     | -8.2       |
|         | 2000 | -10.9  | -5.7            | 27.6    | -3.4          | -1.4    | -6.6 | -0.2       | -29.9    | -11.3      | 1.6      | -2.9       |
|         | 2008 | -9.3   | -8.5            | 32.2    | -3.9          | -1.4    | -12.3| -4.3       | -27.5    | -12.3      | 11.3     | -5.1       |
| Turkey  | 1980 | -17    | 10.4            | 4.6     | 1             | -5.4    | -1.6 | 1          | -4.8     | 0.9        | -1.1     | 2.2        |
|         | 1990 | -21.3  | 5.7             | 13      | 0             | -4.2    | -0.9 | 0.4        | -8       | -2.1       | -1.5     | -3.4       |
|         | 2000 | -19.8  | 4.4             | 15.7    | -1.2          | -9.4    | -4.8 | -0.4       | -7.4     | -6.1       | -0.3     | -5.3       |
|         | 2008 | -24.3  | 3.2             | 18.4    | -1.2          | -13.1   | -4.5 | -2.7       | -6.9     | 8.4        | 0.8      | -6.9       |

Note. Source: CEPII database (CHELEM), 2010.

Test of Per Capita Income Convergence

Econometric analysis must be based on a formal definition of convergence of the income per capita. In a simple way, when the difference between the incomes per capita of two countries decreases gradually and in statistically significant measurement in the long run that means that there is a convergence.

As discussed by Carmignani (2007) a more rigorous statistical definition of convergence is based on the representation in the form of random variable of the difference between the GDP of two countries. According to this definition, there is a convergence if the difference of the GDP is a stationary process. Indeed, stationarity implies that the difference between the GDP of two countries at the period \( t \) is lower than the one at \( t - 1 \). Thus, the test convergence becomes a unit root test of stochastic process defined as the difference between GDP of the countries. If the assumption of the presence of unit root is rejected, we conclude that both GDP converge.

From the point of view, the application of this approach to a group of more two countries we must identifies the reference level of the GDP towards which the nationals GDP will converge. Then, the difference between nationals GDP and GDP of reference is calculated for each country. The test of stationarity is applied
to these differences. The implementation of this procedure requires the choice of the GDP of reference and methodology for carrying out the unit root test.

The most common solution to choose the GDP of reference is to use the average of the regional GDP. In this case, the procedure tests the existence of unit root in the series equal to the difference between GDP of one country and regional average GDP.

To calculate the convergence index defined as the difference between average GDP per capita of Germany and France and that of country \( i \) \( (i = \text{Egypt, Morocco, Tunisia, and Turkey}) \). We use annual data of GDP per capita, adjusted by purchasing power parity over the period 1980-2008.

The following Table shows the results of the Augmented Dicky-Fuller (ADF) and Phillips-Peron (PP) unit root test. The test confirms the presence of unit root (see Table 3). Thus, it results the absence from convergence of the GDP’s.

Table 3

|       | ADF   | PP    | Critical value |
|-------|-------|-------|----------------|
| Egypt | -0.733| -0.733| 1% -3.689      |
| Morocco| -0.616| -0.616| 5% -2.971      |
| Tunisia| -1.348| -1.348| 10% -2.625     |
| Turkey| -1.085| -0.954|                |

Thus, a fundamental question emerges: Why per capita GDPs of Mediterranean countries did not show any convergence toward the average one of European countries?

The answer which was advanced by the geographical economic theories appears extremely plausible. It supposes that the integration leads to a divergence between the center and the periphery. Indeed, the activities which require a qualified labor and characterized by a high value added concentrates in the center, whereas the standardized activities concentrate in the periphery. Thus, the question can be asked: the divergence that has been recorded is not the result of a bad specialization of the Mediterranean countries.

Specialization—Convergence: Empirical Application

To analyze the effect of specialization on convergence check we consider the following panel:

\[
IC_{it} = \alpha_j + \beta_j X_{ijt} + \varepsilon_{jt}
\]

where:

- \( IC_{it} \): convergence index;
- \( X_{ijt} \): vector variables of index of production specialization for 11 sectors (agro-alimentary, chemical, textile, energy, electric, electronic, mechanic, wood and papers, iron and steel industry, automobile, and non-ferrous).

The Hausman test indicates a random-effect model. The results are reported in Table 4.

According to these results we conclude that chemical, electric, and non-ferrous sectors have a positive effect on the convergence index. However, agro-alimentary, electronic, textile and wood and papers have a negative effect. If we confront these results with those of Table 2, we conclude that generally Mediterranean countries have a RAC in sectors that influenced negatively the convergence like energy, textile, and agro-alimentary. But the sectors where these economies have no RAC influence positively the convergence like chemical and electric. Thus, the assumption that the divergence is due to a no-adequate specialization is confirmed.
Table 4

| Variable            | Estimate | S.E.   | C.R.  | P   |
|---------------------|----------|--------|-------|-----|
| Agro-alimentary     | -0.006   | 0.0015 | -4.11 | *** |
| Automobile          | 0.0013   | 0.0022 | 0.6   | -   |
| Chemical            | 0.005    | 0.0014 | 3.63  | *** |
| Electric            | 0.016    | 0.0041 | 4.02  | *** |
| Electronic          | -0.009   | 0.0028 | -3.19 | *** |
| Energy              | -0.0013  | 0.0007 | -1.87 | *   |
| Iron and steel industry | -0.007   | 0.0057 | -2.47 | *** |
| Mechanic            | -0.0009  | 0.0017 | -0.6  | -   |
| Non-ferrous         | 0.014    | 0.0057 | 2.47  | **  |
| Textile             | -0.005   | 0.0017 | -2.94 | *** |
| Wood and papers     | -0.039   | 0.0072 | -5.41 | *** |

Note. *** means $P < 0.01$, ** means $P < 0.05$, * means $P < 0.1$, "-" means non-significant.

Conclusions

The object of this paper was double. In first phase we check if there is a convergence of the per capita GDP of Mediterranean countries towards the average per capita GDP of the European Union. Being given the result that has released, we tried to see in the second phase if the absence of convergence cannot be due to a bad specialization behalf of Mediterranean countries. Using a random effect model, we managed to show that to a certain extent the divergence of the per capita GDP is due to a no-adequate specialization what confirms the geographical economy theory which supposes that the countries of the center specialize in a high value added product, whereas, the peripheral countries specialize in a low added-value products since the incomes will diverge.

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