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**STRUCTURAL TRANSFORMATION IN EGYPT, MOROCCO
AND TUNISIA: PATTERNS, DRIVERS AND CONSTRAINTS**

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Abstract

This paper conducts an analysis of the structural transformation in three MENA countries, Tunisia, Morocco and Egypt over a long time span (1960-2010). We examine labor productivity evolution and structural change (SC) contribution to productivity growth over different sub-periods. We analyze the contribution of the different economic sectors to the aggregate SC in the three countries. An econometric analysis is also performed to identify the main factors underlying the intensity and the pattern of structural change. Results suggest that the three countries initiated and achieved some progress in the structural transformation over the 1970's, 1980's and early 1990's. However, this process has stagnated at low levels of income and has remained unfinished. Deindustrialization occurred at an early stage of development in the three countries, in contrast to what has been noticed in developed and emergent countries.

Keywords: structural change, labor productivity, deindustrialization

JEL Classifications: N10, O10, O14, J24

ملخص

تجري هذه الورقة تحليلاً للتحوّل الهيكلي في ثلاثة بلدان في منطقة الشرق الأوسط وشمال أفريقيا، هي تونس والمغرب ومصر على مدى فترة طويلة هي (1960-2010). نحن ندرس تطور إنتاجية العمالة ومساهمة التغيير الهيكلي في نمو الإنتاجية خلال فترات فرعية مختلفة. ونقوم بتحليل مساهمة القطاعات الاقتصادية المختلفة في إجمالي التغيير الهيكلي في البلدان الثلاثة. بالإضافة إلى إجراء تحليل اقتصادي قياسي لتحديد العوامل الرئيسية التي تكمن تدفع كثافة التغيير الهيكلي ونمطه. تشير النتائج إلى أن البلدان الثلاثة بدأت وحقق بعض التقدم في التحوّل الهيكلي خلال السبعينيات والثمانينيات وأوائل التسعينيات من القرن العشرين. ومع ذلك، فإن هذه العملية ظلت عالقة عند مستويات منخفضة من الدخل ولم تستكمل بعد. وحدث التراجع الصناعي في مرحلة مبكرة من التطور في البلدان الثلاثة، على النقيض مما لوحظ في البلدان المتقدمة والناشئة.

1. Introduction

Egypt, Morocco and Tunisia are considered as “Middle income countries” by the World Bank. The GDP per capita⁴ is respectively about 3688.6 \$ in Tunisia, 3477.9 \$ in Egypt and 2832.4 \$ in Morocco. Tunisia is the smallest country in terms of size with close to 11 million people, followed by Morocco (40 million people). Egypt is the largest country with a population of approximately 80 million people.

The economic growth rate in these countries averaged 4% between 1990 and 2010, which represents a good performance with regard to the MENA region. However, it has been decreasing, since the mid 2000's⁵ (see graph 1) which raises a number of concerns.

The contribution of productivity to aggregate economic growth is relatively low for the trio. For instance, the average annual labor productivity growth rate did not exceed 1,5% contributing by only 22% to economic growth in Tunisia over the period 1990-2010 (Mouelhi, 2014)⁶. Besides, young and graduates high unemployment rates have become one of the most challenging issues, especially in Tunisia and Egypt⁷ after the so called Arab Spring.

Six years after the popular uprisings, Tunisia and Egypt are still facing serious political and social constraints as well as delays in the economic transition process. The economic fundamentals have been deteriorating, with a quasi-stagnation of productivity and a decline in the annual economic growth rates (2% in Tunisia, 2%-3% in Egypt). Meanwhile, Morocco has been outperforming its neighbors with an economic growth rate around 4% since 2010⁸.

In the light of these stylized facts, we consider that higher and steadier productivity gains are necessary to set these three economies on a faster growth trajectory to meet the socioeconomic challenges.

These productivity gains could result from capital accumulation, technical change and innovation as well as from **structural change** through a reallocation of production factors from low-productivity sectors to higher productivity sectors. It implies a transformation of the economy towards heavy and sophisticated industries, as well as modern and technology-intensive services (El Haddad (2013), FEMISE report (2013)). The structural transformation contributes to close the productivity gap with developed countries, which might support faster growth, skilled jobs creation and unemployment⁹ decline.

Based on a large empirical and theoretical literature review, Attiyas, Jalal et al. (FEMISE report, 2013) conclude that: « structural transformation is essential for economic development, a process which may involve benefits from movements of factors of production across sectors, product upgrading, penetration of new markets and/or acquiring new know-how».

Many studies have addressed the structural change issue by exploring its intensity, path and determinants in OECD countries as well as in Latin American, Asian and African countries (McMillan and Rodrick, 2011 ; McMillan and al. 2014). However, few studies have been

⁴In US current dollar. Figures correspond to 2016.

⁵ In contrast with comparable emerging countries achievements

⁶Mouelhi (2014), « Un potentiel productif à libérer pour plus de croissance », Policy Brief 4, Août 2014, NABES, nabesintl.org.

⁷The graduates' unemployment rate exceeded 30% in Tunisia and Egypt, in 2011.

⁸We should notice that Morocco did not experience any major change in political regime.

⁹ Especially, graduates unemployment rate.

focusing on the MENA region, which is partially due to the unavailability of comparable long-term series on sector-level value added and employment. To fill this gap, we intend to carry out a study on structural transformation in three MENA countries over a very long time span. The objective is to analyze labor productivity evolution and structural change contribution to productivity growth in Tunisia, Morocco and Egypt over a long period, since the 1960s. The main questions we are projecting to raise are:

- How are the patterns of structural change in these three MENA countries compared to developed and emerging countries? What are the differences and the similarities?
- Are there any reallocations from low-productivity to high-productivity sectors? Do these reallocations foster (or reduce) productivity and economic growth? What are the main determinants or obstacles to factors reallocation in MENA countries?
- How to unleash the productive potential in MENA countries? How to stimulate resources reallocation in order to generate productivity gains and economic growth?

The methodology will be threefold, based on productivity computations at the sectoral level, productivity growth decomposition as well as econometric regressions to explain the observed patterns of structural change in MENA countries.

2. Literature review

McMillan and Rodrick (2011) and McMillan *et al.* (2014) provide a detailed analysis of structural change in developing and emerging countries (from Latin America, Asian and African regions) with some references to developed countries. They show that “labor flows from low-productivity activities to high-productivity activities are a key driver of development”. They use a decomposition equation of labor productivity growth into within-sectors component and between-sectors component (which is defined as structural change). Their main results suggest that the structural change had a growth increasing effect in the Asian countries during the 90’s (and 2000’s) while it had a growth reducing effect in Latin American and African countries as labor moved from high-productivity sectors to low productivity sectors. This study did not cover the MENA region¹⁰.

A couple of studies have been conducted regarding the Tunisian economy (Marouani and Mouelhi (2015), World Bank (2014)). The contribution of structural change to productivity growth appears to have been low between 1990 and 2010. In some periods, the findings suggest a biased structural change trajectory, i.e factors reallocations from sectors with low productivity to even less productive sectors (for example, from agriculture to construction). This allocative inefficiency has been strengthening the prevalence of weakly productive activities within the Tunisian economy despite the existence of a productive potential illustrated by a large and significant productivity gaps between sectors.

El Haddad (2013) uses Egyptian data to assess the structural change, over a relatively short time period: 1993-2008. Results show that structural change was negative during the 2000’s suggesting a stagnant economic structure (except some movements away from agriculture to less productive activities in services such as trade and informal sector). The study comes to the conclusion that the within-component explains the largest share in productivity growth over the whole considered period.

Morsy and al. (2014) use Egyptian sectoral data to measure the contribution of structural change over a very short period 2000-2010. Considering the decomposition equation of labor

¹⁰ Except Turkey.

productivity growth into within and structural change components, they conclude to a negative contribution of structural change to productivity growth. This is particularly attributed to the mining sector which experienced a decrease in employment despite a very high level of productivity.

In the same vein, using sector-level data for Turkey, Atiyas and Bakış (2013) show that the productivity growth experienced by Turkey in the last decades is explained for 2/3 by labor reallocation from low-productivity sectors to high-productivity sectors with a significant change in exports composition towards greater sophistication.

The FEMISE report (2013) synthesizes the above-mentioned studies in order to provide an overview of the industrial policy and the structural transformation process in four countries: Egypt, Tunisia, Morocco and Turkey. The report concludes to a weak structural change in the first three countries, in comparison to Turkey, due to the ineffectiveness of industrial policies. With regard to Morocco, in our knowledge, there is no studies assessing and measuring the contribution of structural change to productivity growth. Achy (2013) simply discusses the evolution of sectoral weights to describe the evolution of the economic structure in Morocco. This study presents the degree of diversification and sophistication of exports linking it to the implemented industrial policy.

Overall, most of the studies cited above regarding Tunisia and Egypt consider different sub-periods. The methods and data used to derive the structural change measures and its contribution to productivity growth are also different. This might raise some benchmark problems. Besides, the previous studies were conducted over short time periods which are not appropriate to analyze a long run process such as structural change.

This being said, it seems clear that the patterns and determinants (constraints and drivers) of structural changes in MENA countries have yet to be fully tapped, unlike other regions. We intend to address this knowledge gap by performing an analysis over a very long time span, from 1960 to 2010, and using comparable data and methods, in order to better understand the pattern of structural change process and to identify differences and similarities between the three countries.

3. Structure of Economy in Egypt, Morocco and Tunisia

3.1 Data

Sector-level data from Groningen Growth and Development Centre (GGDC) (Timmer and De Vries, 2014) are used for the purpose of this study. The database covers 9 sectors in Morocco and Egypt observed over a long period. Structural change is a long-term process going along with economic development. Therefore, it is important to observe long time series to fully identify and understand its pattern. We cover the period 1960-2010, capturing major changes in national economic policy and different economic phases: decolonization and nationalization, industrialization in a protectionist context, liberalization and trade openness. This enables us to properly identify the main cycles of structural change and to make meaningful comparisons with the main results obtained by Mc Millan and Rodrick (2011) and Mc Millan and al. (2014) for developed countries as well as Asian, Latin American and African countries. In order to make comparative analysis possible, we choose the same periodicity as that used in the main studies related to structural change: 1960-1975-1990-2010 (Timmer and De Vries, 2014; Mc Millan et al. 2014).

The GGDC data do not cover Tunisia. Data for Tunisia have been, thus, collected from the National Institute of Statistics (INS) and the Tunisian Institute of Competitiveness and

quantitative studies (ITCEQ). For purposes of benchmarking and consistency, we comply with the list of sectors and variables definitions used in the GGDC database and the international standard industrial classification. Therefore, we consider the following sectors: agriculture and fishing, mining, manufacturing, public utilities, construction, trade, hotels and restaurants, transport storage and communication, finance and other private services, as well as government and social services.

The database includes annual data on gross value added at both current and constant¹¹ prices. It also includes data on employment, which allows the computation of labor productivity (value added measured in 2005 constant prices per worker) trends. Employment is defined as ‘all persons employed’, thus including wage-earners, but also self-employed and family workers¹². For the derivation of meaningful productivity measures, the labor input and output measures cover the same activities. These detailed sectoral data are expected to capture the reallocations and the potential misallocations of resources at the economy-wide level¹³.

3.2 Sectoral Value Added and Employment Shares in Egypt, Morocco and Tunisia

Employment and value added shares trends across sectors provide an accurate picture about the structure of the economy and the timing as well as the intensity of structural change in MENA countries during the last five decades.

Tables 1 and 2 report shifts in value added and employment across sectors and MENA countries for the years 1960, 1975, 1990 and 2010. Three important trends arise. First, the selected MENA countries experienced a generalized and important decline in agricultural employment and value added shares that holds particularly for Tunisia (around 60% decline in agriculture value added and employment shares). This pattern has been already documented by Timmer *et al.* (2014) in the case of Africa, Latin America and Asia (see Annex). The second trend is related to the generalized industrialization process particularly active during the 1970s and 1980s in MENA countries (as in Asia and Latin America regions); the share of manufacturing in aggregate GDP and total employment has increased. However, during the 1990s a trend reversal occurred. A fall in the value added and employment shares of manufacturing suggests a de-industrialization path followed at an early stage of development. It is worth noting that Asian countries also experienced a fall in manufacturing weight during the 2000s, as emphasized by Timmer and *al.* (2014). However, this occurred at a high level of development and after high growth episodes, as in most of the developed countries (Herrendorf and *al.*, 2013).

That being said, the manufacturing sector still employ more than 10% of the total workforce in the considered MENA countries (18% in Tunisia) in 2010.

The low-productivity construction sector seems to absorb some of the departing workers from contracting sectors (the corresponding employment share increased from 8% in 1990 to 12% in 2010 in Morocco and Egypt).

¹¹ 2005 prices.

¹² Data on the number of hours worked are not available. The number of hours worked could impact the production and the productivity.

¹³ The World Bank Enterprise Surveys (MENA ES) provided by WB for 8 countries from MENA region includes firm-level data collected through interviews of business owners and top managers. This database covers a broad range of topics including, firms and entrepreneurs’ characteristics, access to finance, corruption, infrastructure, obstacles to growth, and some performance measures. However, it covers only firms from manufacturing and service sectors and one year of observation.

The third trend regards the “tertiarisation” motion which has grown in intensity during the 1980s and 2000s. In sum, a labor reallocation has occurred towards services (60% in Egypt and Tunisia, +95% in Morocco) and away from agriculture and manufacturing. However, no similar pattern of value added increase has supported such a shift. In Morocco and Tunisia, value added shares in services have risen less proportionately to employment (+32% and +3% respectively) while a reduction of about 8% has been registered in Egypt. This suggests that services have become less productive over time. At a disaggregated level, tables 1 and 2 report that government and social services are basically the most expanding sectors at the expense of traditionally high-productivity sectors including finance, transport and communication.

3.3 Sectoral labor productivity in Egypt, Morocco and Tunisia

This section focuses on labor productivity evolution in the three selected MENA countries, at the sector level. We measure sector productivity gaps to assess the productivity growth potential.

Table 3 presents relative labor productivity¹⁴, by country, year and sector. Agriculture is among the less productive sectors with a productivity rate 50% lower than aggregate productivity in the considered MENA countries. The construction sector is even less productive than agriculture in Tunisia and Egypt¹⁵. In Egypt, the “government and social services” sector is less productive than agriculture and construction. This is due to the saturation of the public services in terms of job opportunities as the state is the biggest employer in Egypt, particularly for graduates.

Manufacturing remains a low-labor productivity sector in Tunisia¹⁶, registering a productivity level 10% lower than the aggregate productivity. However, it is among the most productive sectors in Egypt (48% higher than the average productivity in 2010), though resources-based. Finance is among the most productive sectors, particularly in Morocco. However, it depicts a downward trend unlike the sectors of transport and communication.

The sector of trade, hotels and restaurants shows labor productivity close to the aggregate productivity rate, yet, decreasing over time.

As emphasized by Marouani and Mouelhi (2015), labor productivity is high in public utilities and in the mining¹⁷ sectors, which are highly capital-intensive. Productivity in the mining sector is particularly high in Egypt, which converges with the results of previous studies. As indicated in Morsy (2014) « mining is an outlier for labor productivity given the very low share of labor employed in the sector, which stagnated in terms of overall employment share over the last decade ».

The coefficient of variation of labor productivity measures the dispersion of productivity between sectors for a given year, due notably to technological and capitalistic intensity differences. As shown in table 3, the productivity gap is characterized by a downward trend in Tunisia and Morocco while it has been increasing in Egypt from 2.51 in 1990 to 2.73 in 2010. Overall, the sectoral productivity dispersion is still high in MENA countries relatively to

¹⁴ As the share of aggregate labor productivity.

¹⁵ Yet, the relative productivity of the construction sector in Morocco shows a declining trend.

¹⁶ Mouelhi (2014) points out that, in Tunisia, the productivity in some manufacturing sectors such as “textile, clothing, footwear and leather” is comparable to that in agriculture.

¹⁷ Mining includes crude oil, gas and other mining.

emergent and developed countries, as reported by Mc Millan and Rodrik (2011). This suggests that there is still room for factors reallocation.

Graph 2 presents sectors according to relative productivity in 2010 versus employment shares changes between 1990 and 2010. The agriculture sector, which is among the least productive, experienced the largest loss in employment shares. Agriculture workforce appears to have moved towards sectors with comparable productivity as construction, trade, hotels and restaurants. In fact, construction, trade, hotels and restaurants sectors experienced high and positive change in employment shares while they are among the least productive sectors.

The transport and communication sector, which is one of the most productive sectors, have observed relatively high changes in employment shares in the three countries. However, the finance sector which is the most productive in Morocco and Egypt (apart from the mining sector) has experienced a low increase in its employment share. The manufacturing sector, low-productive over the last period¹⁸, has been shrinking.

4. The Pattern of Structural Change in Egypt, Morocco and Tunisia

To provide a detailed analysis of the structural change over time periods and by sectors, we use the decomposition equation of labor productivity growth suggested by McMillan and Rodrick (2011) to calculate the within and between components:

$$\Delta P_t = \sum_{i=1}^n \theta_{it-k} \Delta p_{it} + \sum_{i=1}^n p_{it} \Delta \theta_{it}$$

Where P_t and P_{it} refer to economy-wide and sectoral labor productivity levels, respectively, and θ_{it} is the share of employment in sector i at time t . Δ refers to changes between $(t-k)$ and t . The between-sector component of productivity growth (by sector and for the whole economy) is a measure of structural change contribution. This decomposition method is a convenient method because it only requires few data (related to value added and employment) while it allows for a comparison of structural change pattern across different countries and regions. It also makes it possible to perform meaningful benchmark comparisons with the results of Mc Millan and Rodrick (2011), Mc Millan and *al.* (2014) as well as Timmer and *al.* (2014).

4.1 Overall productivity decomposition

We compute the within and the SC contributions to productivity growth over different sub-periods from 1961 to 2010 (see graph 3) in order to understand their pattern over a long period of time.

Overall, the structural change's most significant contribution occurred during the sub-period 1975-90 in Egypt, Morocco and Tunisia. The most achieved transformations were made before 1990. The within component has taken over after 1990.

During the period 1975-1990, Morocco was the best performer in terms of SC as this component accounts for 61% of the productivity growth¹⁹. Labor productivity in Tunisia grew at an annual average rate of 1.02%, with a SC contribution of about 56%. However, in Egypt, over the same period, the structural change only contributed by 24% to the labor productivity growth rate of 4.68%.

¹⁸ The productivity gap between the manufacturing sector and the agriculture sector has been decreasing.

¹⁹ The annual average rate of productivity growth is 1.43% over 1975-1990.

The pace of structural transformation in Morocco, Tunisia and Egypt has slowed down in the last period (1990-2010), too early, at a low level of development and before catching-up the emerging countries²⁰. Egypt experienced even a growth-decreasing²¹ SC such as many African countries as pointed out in Mc Millan and Rodrik (2011)²². Structural changes have been facing more delays in Egypt than in Tunisia and Morocco. At the same time, the contribution of the within sectors component to productivity growth increased.

Further details and explanations are going to be provided in the following sections.

4.2 Regional Benchmark over the period 1990-2005

The regional comparison is only possible starting from 1990 depending on the availability of productivity decomposition for different regions from MC Millan and Rodrik (2011) and MC Millan and *al.* (2014). Table 4 shows that SC was growth-increasing in Tunisia and Morocco, similarly to the Asian region²³, though relatively small. Furthermore, in Tunisia and Morocco, productivity increased at a moderate rate between 1990 and 2010, far, however, from the performance of Asian region in terms of productivity growth. The pattern of SC in Egypt is more close to Latin American countries path²⁴ where SC was growth reducing, suggesting a move from highly productive sectors to less productive sectors. Nevertheless, Egypt has done better than Tunisia and Morocco in terms of labor productivity growth despite the fact that the contribution of SC reduced its productivity growth by 1.03%. The better Egyptian performance might be explained by the very fast growth of the highly productive mining sector over this period.

The modest contribution of the structural change component in high-income countries to productivity growth confirms that these countries have already defined their specialization pattern, (Mc Millan and Rodrik, 2011).

To better understand these results, we analyze in what follows the contribution of the different sectors to the aggregate SC.

4.3 Sectoral contribution to Structural Change

As shown in graph 4, the contribution of the agriculture sector to SC in the three countries, over all the considered periods appears to be negative, though, relatively high. The agriculture sector is among the least productive sectors, registering a slow decline in weight over time.

Similarly, the contribution of the mining sector is negative in the three countries and more particularly in Egypt between 1990 and 2010²⁵. In fact, the productivity increased strongly in mining with a decrease in its employment share. Overall, the main transformations observed in Egypt (positive or negative SC) were driven by the mining sector²⁶.

²⁰ Developed countries, which experienced a high growth rate in the past, pulled by structural changes, have been observing a slowdown in the pace of the structural change.

²¹ The contribution of structural change to productivity growth has been negative after 1990 in Egypt.

²² Mc Millan *et al.* (2011) give evidence that SC is growth-enhancing in Asian countries while it is growth-decreasing in African and Latin American countries between 1990 and 2005.

²³ The Asian region is the only region, apart from the MENA region, with a positive contribution of SC between 1990 and 2005.

²⁴ It is close, however to a lesser extent, to the African pattern.

²⁵ The mining sector is the main source of negative SC observed in Egypt over 1990-2010.

²⁶ Exceptionally, the mining sector had a positive and significant contribution to SC in Egypt between 1975 and 1990. This represents the only sub-period of positive SC.

The contribution of the construction sector to SC has been positive (however low), especially in Morocco where the productivity in the construction sector is significantly higher than that in agriculture²⁷. In fact, the construction sector expanded rapidly in Morocco with an increase in value added²⁸ by about 125% between 2000 and 2010 as well as an increase in the employment share from 8% in 1990 to about 12% in 2010. Contributing by 6.2% to economic growth in 2009, the construction sector is one of the most attractive sectors for foreign investors implementing large-scale projects, (Zarouali, 2014).

The contribution of the manufacturing sector to SC was positive in Tunisia and Morocco during the pre-1990²⁹ period, while it turned negative for all the countries between 1990 and 2010 which corresponds to a deindustrialization period. In fact, the manufacturing sector shrunk despite the fact that it is among the most productive sectors (see graph 2).

Finance, transport and communication as well as trade, hotels and restaurants sectors contributed positively and highly to SC in Morocco and Tunisia over the whole period, and to a lesser extent in Egypt.

For a better understanding of the observed patterns of structural change, the next section focuses on the main phases of development process by conducting a country-specific analysis.

4.4 Country-specific analysis of structural change

- The case of Tunisia

After the independence in 1956, the Tunisian economy was an agriculturally-based economy, mainly relying on primary and natural resources (phosphate and oil) due to the boom of energy production. Although considered as a small producer of gas and oil, Tunisia has turned into a net importer since the 2000s. As a resources-constrained economy, Tunisia has been relying on its human capital, investing since the 1960's in education. The first cohorts of graduates were involved in the public sector, which offered many job opportunities during its early stages of development. However, old and unskilled workers remained in agriculture. In the 1970s, Tunisia moved towards an import substitution and industrialization policy, implementing fiscal and financial incentives³⁰ that encouraged the entry of foreign companies and fostered inflows of new investments and foreign capital as well as the development of an « off-shore » sector. Net inflows of FDI increased from 2.4% of GDP in 1976 to 4.2% of GDP in 1982 contributing to technological transfers and playing a crucial role in the private sector development.

Furthermore, an export-oriented strategy has been also implemented boosting the exports of manufactured goods, especially textile, clothing footwear and leather and increasing labor demand in manufacturing. Labor moved out of agriculture to higher-wages and more productive manufacturing activities. This contributed positively to SC between 1975 and 1990 as suggested by graph 4.

Overall, the period between 1975 and 1990 was a period of relatively fast industrialization process, supported by FDI flows as well as a protectionist trade policy. This gives evidence corroborating our results that SC was mainly driven by manufacturing as well as the development of the financial sector.

²⁷ and higher than the productivity of the construction sector in Tunisia and Egypt

²⁸ 2005 price

²⁹ In Egypt, the manufacturing sector only contributed positively to SC over the period 1960-1975.

³⁰ The Law of 1972.

In 1986, Tunisia adopted a structural adjustment program with a stronger market-economy orientation, signed the EU agreement and became member of WTO in 1995. Consequently, the last period considered in our analysis, i.e.: 1990-2010, has been characterized by a more intensive liberalization process. An upgrading program has been implemented in order to support firms in their modernization plan, helping them moving to more sophisticated activities. However, this program appears to have had a limited impact (Ghali and Rezgui, 2013). The exposure to international competition led to the downsizing of some manufacturing activities such as ITHC³¹ as well as other import-competing activities due to the lack of compensation mechanisms including export expansion. Tunisian exports remain labor intensive with a low degree of diversification³². According to Diop and Ghali (2012), high-tech products account for 5.4% of total exports between 2007 and 2009, which is low in comparison to emerging countries. The manufacturing specialization has barely improved (Ghali and Rezgui, 2013) despite the development of the electrical and electronics industry which mainly involves Low-Tech outsourcing-based activities. Overall, Tunisia tends to specialize in products and industries that exhibit weak linkages and spillovers as well as a limited potential for productivity.

The expansion of labor supply and the increase of unemployment have driven workers toward relatively low-productivity services (such as trade) dominated by the overwhelming informal sector. The unskilled labor released from agriculture in rural zones moved towards the low-productive and highly-informal construction sector in urban zones as well as some low-productive manufacturing activities (such as textile, clothing and leather industry). This contributed negatively to SC, exacerbating the deindustrialization process.

At the same time, institutional and non-institutional barriers to entry into modern and profitable activities, reserved to those closest to the former regime, prevented the services sector development. Modern services were reserved for the family and friends of the former regime. The increase in the weight of the services sector (as shown above) was in large part driven by relatively low productivity services such as trade and government services and to a lesser extent by modern and highly productive activities as transport and communication.

- **The case of Egypt**

According to our results, which converge with previous studies, the main driver of productivity growth in Egypt over the whole observed period is by far the within component. Structural change has been delayed, going sometimes in the wrong side³³. Egypt is a relatively resource-rich country, highly dependent on oil. In 2000, the oil sector accounted for about 7% in GDP. Agriculture was the main employer until the end of 1970's (cotton, rice...) despite the large productivity-gap between agriculture and non-agriculture sectors. As shown in graph 4, agriculture contributed negatively to SC over the whole period.

Until the early 1970's, the Egyptian economy was dominated by the public sector as the state was a big employer, particularly for graduates, while the private sector was quasi absent. An import substitution policy took place resulting in a strengthening of the industrialization

³¹ After the dismantling of the multifibre agreements.

³² The textile products have been dominating the exports. The textile sector is a subcontracting-based sector facing a strong competition from the Asian countries, (EMNES report, 2017).

³³ i.e. labor has moved out of the productive sectors towards less productive ones.

process. This contributed positively to the structural change. However, the contraction of the highly-productive mining sector worked in the opposite direction (see graph 4).

Largely weakened by the 1967 war, the Egyptian economy experienced a slowdown between 1967 and 1973.

The second period (1975-90) was marked by a recovery, mainly driven by the increase in oil prices since 1973 as well as oil exports. Egypt experienced high growth rates between 1975 and 80. However, a slowdown in GDP growth has been recorded since the decrease in oil prices starting from the mid 1980's. Unlike before, this second period was characterized by a greater liberalization and FDI attractiveness (FEMISE report, 2013) as well as more incentives towards the private sector. This contributed to the development of some manufacturing industries (Textile, clothing and leather, Cotton...) together with the tourism sector. However, these sectors had a low and even negative impact on the SC. The manufacturing weight has declined since 1985. The public sector has remained the dominant sector.

Overall, Egypt experienced positive, though, low SC over the second period, mainly driven by the productivity-improved mining sector which registered a substantial increase in employment, from 20 to 46 thousands workers over the period.

The period following 1990 was characterized by greater trade openness and investment liberalization as well as stronger incentives to private sector development and export promotion. Many economic reforms have been initiated in this aim (El Haddad et al. 2013), including the structural adjustment program in 1991 as well as the improvement of the business climate. Egypt experienced a high growth rate of about 5% between 2004 and 2011, with a moderate labor productivity growth (Morsy et al., 2014).

However, economic activities remained confined to traditional sectors as the country failed in setting the transition to the modern economy as well as the creation of skilled jobs. The textile sector suffered from the severe and negative impacts of the multifiber-agreements dismantling including exports decline. However, the highly profitable petroleum and resources-based sectors such as mining, have benefited from many advantages as a result of the end of the state and public monopoly, in the late 1990s. Exemptions from taxes and customs duties (El Haddad et al., 2013) contributed to increase the number of actors including big multinationals, though within a non-transparent climate deteriorated by cronyism and bad governance. Exports of basic metals as iron, aluminum and steel experienced high growth rates in the late 1990s, (El Haddad et al., 2013).

Until 2011, exports have been dominated by resource-based products (crude oil, petroleum products, and minerals) ranked among the top 5 exports. In 2011, the petroleum sector contributed to about 40% of total merchandise exports, boosted by the currency devaluation.

However, despite the high growth level of the high-productive mining sector, employment shrank, significantly contributing to the observed negative SC. Furthermore, the low-productive construction sector experienced an increase in its employment share worsening the SC pattern.

Until recently, employment has been confined to low-productivity sectors such as agriculture, construction, government services as well as informal-based trade services (FEMISE report, 2013) while exports remained dominated by resources-based products with low technological content.

- **The Case of Morocco**

Similarly to Tunisia, the import substitution policies implemented in the sixties and seventies led to the development of the manufacturing sector in a protectionist context, characterized by the predominant role of the public sector. As shown in graph 4, the manufacturing sector contributed positively to SC over the period 1960-75.

Since the eighties, Morocco has opted for greater openness as well as private sector development. The manufacturing sector benefitted from foreign investments, though, confined to low capital-intensive subcontracting activities with low technological transfer.

In the late 1990's, Morocco launched a SMEs-oriented upgrading program which had a limited impact (Achy, 2013) due to the mismanagement and the absence of efficiency and productivity-based targets. The market-oriented policies accelerated in the nineties, intensifying trade liberalization and exposure to international competition (Achy, 2013) by a substantial decrease in tariffs and trade barriers as well as the EU agreements ratification in 1996. However, the manufacturing sector contracted over time as it couldn't compete with Asian countries. The manufacturing value-added share shrunk from 19% in 1990 to 15% in 2010 (see table 1). In fact, similarly to the Tunisian and Egyptian cases, the Moroccan manufacturing sector suffered from a specialization in unskilled labor-intensive and low value-added activities involving low-tech contents³⁴. The country has attempted to implement a shift from low-technological content to medium-technological content. This has taken place gradually, due notably to the poor quality of human capital and the low R&D investments.

In the same period, the weight of the services sector grew from 52% in 1990 to 57% in 2010 due to the boom of the financial sector and the telecoms. The highly productive finance sector contributed significantly to the positive SC, over the second period of study (1975-1990).

The third period (1990-2010) was characterized by greater efforts and incentives to develop the private sector through the implementation specific programs and funds (Achy, 2013). Furthermore, the country has been focusing on improving the economy attractiveness with respect to FDI (through tax exemptions, investments-promoting policies, investments in infrastructure, simplification of procedures...). This has led recently to the entry of large foreign industrial groups³⁵ boosting the private sector, especially the sophisticated activities such as: automotive, aircraft, spacecraft, and pharmaceutical industries. However, the specialization of the Moroccan economy in the short term has barely changed (Achy, 2013). The degree of manufacturing diversification and sophistication remained stable over the decades 90s and 2000s. According to Achy (2013), the low value-added traditional industries (agro food, textile and leather, non-metallic mineral) still represent about 60% of manufacturing value-added in 2000's. Therefore, manufacturing had a negative contribution to SC between 1990 and 2010.

Overall, productivity growth was largely driven by the SC component, which has remained significant after 1990, unlike Tunisia and Egypt. This was mainly due to the development of modern services (finance, information and computer services, telecommunication, tourism...). Services exports increased rapidly (Achy, 2013) rising from less than 30% in the 1990s to more than 40% in the 2000s (graph 5).

To sum up, the three countries initiated and achieved some progress in structural transformation over 1970's, 1980's and early 1990's. However, this process stagnated at low levels of income and remained unfinished. The period 75-90 was characterized by a first stage

³⁴ Mainly textile and subcontracting in automotive sector.

³⁵ Such as Renault and Boeing.

of industrialization, contributing positively to SC. In fact, the three countries experienced some industrial diversification, though, in “light industries” such as textile, agro food, and resource-based industries (including chemicals and petroleum sectors in Egypt) under relatively protectionist policies. However, the manufacturing sectors were basically characterized by a lack of sophistication in the three countries (FEMISE 2015). The three countries confined their industries to low technological, assembly and outsourcing activities despite some efforts made to develop the machinery and electrical sector in Morocco and Tunisia. The production has been through decades mainly unskilled-labor intensive (Tunisia and Morocco) and resource-based (Egypt).

Furthermore, the three countries didn’t achieve the transition to the next step of industrialization, i.e. to more sophisticated products and high-technology exports, as it was the case in Korea for example and emergent economies. The comparison with Korea is relevant, as it was at a comparable level of income and economic development in the 1960’s. The significant SC achieved in Korea (and East Asian countries: China, Malaysia...) was particularly driven by the dynamic of the manufacturing sector which grew at a rate of about 17% for two decades (1970’s and 1980’s), tripling its share from 10% in the 1960’s to 30% in the late 1980’s and shifting from light to heavy industries³⁶ (El Haddad 2013). Unlike Korea, the share of high-technology exports in the three studied countries was very low in 2010 (see graph 6): 0.9% in Egypt, 4.9% in Tunisia and 7.7% in Morocco.³⁷

After 1990, the three countries couldn’t compete within the context of trade openness and intensive exposure to international competition. The dismantling of the multifibres-agreement hampered the traditional textile sector in three countries. The deindustrialization process has been observed since the 2000’s. As shown in table 5, the manufacturing sector has been growing more and more slowly over the considered periods. The average annual growth rate of value-added decreased significantly in the three countries, especially in the third period and the employment and value added shares of manufacturing decreased leading to a “premature deindustrialization” as qualified by Rodrick (2016).

Despite the industrial policies carried out through export promotion, upgrading programs, as well as many financial and fiscal incentives, the transformation process stagnated and remained unfinished³⁸. Several common reasons might explain such a result including: low capacity of policy implementation, ineffectiveness of incentives due to mismanagement³⁹, multiple and dispersed programs and actors, absence of a vision and sectors targeting, bad governance, lack of transparency, favoritism, bureaucracy, lack of human capital due to the bad quality of educative system, bad quality of infrastructure and limits on financing innovation (El Haddad 2013, Ghali and Rezgui 2013). Furthermore, institutional and regulatory barriers (rigid regulation, entry and exit costs, labor market rigidity...) seem to alter the transformation process.

However, it is worth noting that Morocco compensated the manufacturing decline by a relatively rapid transition to modern services during the last observed period. This enabled Morocco to boost its services exports and pursue its structural transformation. Meanwhile, the

³⁶ As machinery and transport equipment, electronics.

³⁷ More generally, this is very low in comparison to East Asian countries reaching in average a share of 26.6% of high technology exports in manufactured exports.

³⁸ Especially in Tunisia and Egypt

³⁹ Not associated with performance

dynamic of the tertiary transition has been low in Tunisia which is mainly due to institutional and non-institutional barriers within an authoritarian regime. Tunisia and Egypt experienced a revolution in 2011, further delaying their economic transition.

Besides, the period following 2010⁴⁰ has been more promising for the manufacturing sector in Morocco. In fact, since the late 2000's, within a stable political environment, the Moroccan automotive industry has experienced a strong growth moving from 13.2 per cent of total exports in 2008 to 20 per cent in 2015. This is the result of an industrial policy targeting this sector and attracting foreign direct investment and multinationals (as RENAULT) through fiscal and financial incentives, training actions relevant to the specific needs of the automotive sector, simplification of procedures, infrastructure upgrading, etc... (Vidican and *al.*, 2017). Nevertheless, as highlighted by Vidican and *al.* (2017), "the industry remains dominated by labor-intensive activities such as vehicle assembly and wiring and has just recently started to expand towards activities that create a higher value added, such as engines".

More recent and detailed data are required to analyze the impact of the automotive industry development on Moroccan's structural change after 2010.

5. The determinants of Structural Change

Besides the previous descriptive analysis regarding the technological sophistication of exports, the share of high-tech products in MENA countries and the specialization process, we carry out an econometric analysis to identify and assess more explanatory factors that could impact the intensity and the observed pattern of structural change in MENA countries. We start by a literature review discussing explanatory factors related to the allocative inefficiency. Then, we conduct an empirical analysis.

5.1. A literature review

The determinants of structural change fall into the following five broad categories: globalization and trade openness, the economic structure, the labor regulation and institutional barriers, the quality of human capital, the R&D and innovation activity.

- **Globalization, trade openness, FDI:** the overall effect of greater **openness** on structural change could be positive or negative. On one hand, Melitz (2003) shows that "trade liberalization leads to an exit of less productive firms and a reallocation of output to more productive plants, which contributes to sectoral productivity growth"⁴¹. On the other hand, globalization and trade openness could lead developing countries to specialize in low value-added products. According to Herrendorf and *al.* (2013), trading with countries that experience high technological changes and productivity growth in manufacturing might imply a decrease in the developing country manufacturing sector employment and VA shares. Many industrial activities and firms could not compete within the international exposure. This entails a contraction of the manufacturing sector or a deindustrialization process in developing countries. Meanwhile, this involves a reinforcement of the manufacturing sector in countries with comparative advantages in manufactured goods (such as Germany, South Korea...).

Regarding **FDI**, Pelinresco and Radulescu (2009) consider that "only direct foreign investment would allow the re-specialization" of developing economies in order to go beyond the traditional pattern of specialization in food products and raw materials. The authors exemplify

⁴⁰ Uncovered by our data.

⁴¹ This is explained with further details in Mouelhi and Marouani (2015).

this statement with the case of Western Europe countries that witnessed a structural change in 1994-1995, as new EU member states. In the same vein, De Freitas and Mamede (2007) point out that FDI might be seen as “a carrier of structural change in the export specialization of host countries” giving evidence regarding the Portuguese export sector between 1995 and 2015. This effect might transit through the development of new productive capacities in more sophisticated activities (direct effect) as well as through knowledge spillovers and/or the stimulation of specific upgraded services and skills that boost the incentives to invest in promising niches (indirect effect).

- **The economic structure**

- *The share of primary commodities in exports*: the concentration of labor in primary commodities-based sector provides little latitude to move towards the modern sector. The composition of exports is important for SC; a country specialized in primary commodities exports (oil, mining) does not make innovation efforts. However, diversified exports of manufactured goods are evidence of product innovation as well as new activities with high technological content. This consequently yields to productivity improvement.
- *The share of agriculture at the beginning of the period*⁴²: A high weight of the low-productive agriculture sector in the beginning of the period suggests a growth potential through reallocations towards more productive sectors.
- *Gross capital formation*⁴³: it is a measure of capital accumulation, including investment in infrastructure, which is important for the transition from traditional to modern sectors.
- *The share of credit to private sector in GDP*⁴⁴ of a country: this indicates the extent to which an economy is able to finance the private sector, the investment in capital and technology and the development of the modern sector.

- **The labor market rigidity and other institutional barriers**

- *The labor market rigidity*: the mobility of labor across sectors is a long term and costly process (labor mobility costs). A highly regulated labor market with high adjustment costs prevents labor reallocations (Mc Millan and Rodrik, 2011). However, some empirical studies find a positive relationship between rigidity and SC in developing countries (Slim, 2017). This might be explained by the fact that labor market rigidities could reduce labor reallocation in the wrong direction, i.e. from more productive to less productive sectors⁴⁵.
- *Other institutional barriers*: entry barriers make it costly to create a startup and inhibit the development of modern sectors. High exit costs and lengthy delays during the closure process or in case of companies failure makes it hard to exit from less productive activities (Herrendorf et al., 2013).

- **The human capital quality**: the availability of skilled and educated workforce is needed to achieve the transition to the modern and productive sectors, which are basically skill

⁴² This also applies for the weight of other sectors with very low productivity at the beginning of the period.

⁴³ Or, the investment rate.

⁴⁴ Or, the growth in domestic credit to private sector

⁴⁵ For example, from agriculture to construction or even to less productive manufacturing activities such as textile.

intensive. Skilled workers and young graduates are less likely to work in low-productivity sectors and have preferences to non-agricultural and modern sectors with higher productivity and wages. A low educational level prevents the mobility of unskilled workforce towards sectors employing skilled workers. Unskilled workers stay in unskilled jobs such as agriculture and construction.

- **R & D and innovation:** a qualitative and quantitative analysis performed by the European Commission in 2016 using sector-level data for European Union member countries provides empirical evidence on the role of research and development (R&D) as an important determinant of structural change. Sectors with a high level of R&D activity appear to take advantage from “embodied R&D diffusion through value chain reflecting both domestic and international knowledge-intensive trade”. Furthermore, sectors with higher R&D intensities are more likely to have higher tendency to innovate.

5.2. The empirical analysis

The purpose of this section is to assess the determinants of the structural change in the selected set of MENA countries. The dependent variable SC, which is “the structural change term”, is computed, separately for each country, over a one-year period from 1961 to 2010, as defined in equation (1). We attempt to explain the ability of a country to initiate a structural change by using a broad set of explanatory variables derived from the preceding literature review as follows:

$$\sum_{i=1}^n P_{it} \Delta\theta_{it} = \alpha + \beta \sum_{i=1}^n X_{it} + \varepsilon_{it} \quad t = 1, \dots, T \quad (2)$$

X is a vector of country-level covariates that might impact the structural change contribution to productivity growth. ε_i is an error term. The covariates are chosen based on the literature overview conducted previously and are listed in table 7 within five broad categories⁴⁶.

We start by running the Hausman test in order to choose between fixed effects and random effects estimation. Results yield to choose the random effects estimator. Table 8 presents random effects regression results of equation (2). In column (1), trade openness measured by the ratio of imports plus exports relative to country GDP appears to be structural-change enhancing. An increase of 10 percentage points in the trade openness proxy is likely to increase the magnitude of the structural change by 0.1. This result is highly statistically significant in all specifications, which suggests that the gains and opportunities offered to the selected set of MENA countries by trade in terms of boosting market allocative efficiency and providing access to new technologies exceeds its costs (exit of uncompetitive firms and contraction of the least productive sectors).

We also include respectively the share of agriculture and manufacturing in total employment at the beginning of the period. They both exhibit positive and statistically significant coefficients. The higher is the weight of the agriculture sector, the more important is the structural change potential. This result is robust to a change in model specification. Furthermore, as pointed by UNIDO Report (2014), “the manufacturing sector is key to promoting and diffusing technological change, which in turn is a crucial driver of

⁴⁶ For a more detailed presentation of the variables, please see appendix.

competitiveness and economic". We also introduce the fuel exports in percentage of total exports as a proxy of the share of primary commodities in exports. The coefficient associated to this variable appears to be negative and statistically significant (at 1% level), suggesting as expected that a commodity-based economy is less able to initiate a structural transformation, i.e. an economic diversification including the expansion of manufacturing activities and the shift away from enclave-type extractive activities (UN Trade and Development Report, 2016). Furthermore, column (1) includes the ratio of domestic credit to private sector (% of GDP) which turns out to be positively associated to SC component of productivity growth as it might strengthen the private sector, MSMEs and trigger investments in productive capacity which in turn promotes technological advances, (Pavone *et al.*, 2015)). In order to capture the impact of human capital quality, we introduce the average years of schooling for adults aged 25 and above which has a significant and positive effect on the magnitude of the structural change: an increase by 1 year in the average years of schooling leads to an increase by 0.037 in the structural change component, on average.

This converges with Shivardi and Torrini (2010) which indicates that increasing in the educational attainments of the workforce is a key to overcome the phase of stagnating productivity growth. In column (2), besides the trade openness and the economic structure variables, we integrate the gross capital formation (% of GDP) which provides information regarding the extent to which the new value added in the economy is invested rather than consumed. This variable enters with a positive and highly significant coefficient, which is expected by McMillan (2014) considering that investments in the modern and urban parts of the economy, fosters economic duality and thus, structural change. In columns (3) and (4) respectively, we include two proxies for R&D and innovation, namely patent applications and the share of high-tech exports in total manufactured exports. Both have a significant positive impact on the structural change component underlining the centrality of the diffusion of technologically sophisticated methods of production on the structural shift, (Peneder, 2003). Finally, column (5) shows that a unit decrease in the labor market rigidity index implies an increase by 0.453 in the between-sector component of productivity growth. This converges with the prevailing literature view. Facilitating labor mobility from declining to rising occupations, firms, and sectors might faster structural change and reduce its adjustment costs (Medhurst and Henry (2011)). We have tried other specifications including FDI, the cost of resolving business insolvency, the cost of business startup procedures as well as R&D expenditures (% GDP). However, none of these explanatory variables appears to play a significant role, probably due to the low number of related observations.

6. Conclusion and recommendations

This paper carries out an analysis of the structural transformation in three MENA countries, Tunisia, Morocco and Egypt over a long time span (1960-2010). We examine labor productivity evolution and structural change contribution to productivity growth over different sub-periods. We analyze the contribution of the different economic sectors to the aggregate SC in the three countries. We also conduct an econometric analysis to identify the main factors that could impact the intensity and the pattern of structural change.

Results of the descriptive analysis suggest that the three countries initiated and achieved some progress in the structural transformation over the 1970's, 1980's and early 1990's. However, this process stagnated at low levels of income and remained unfinished. Deindustrialization occurred at an early stage of development in the three countries, in contrast to what happened

in developed and emergent countries. None of these countries has moved to the next step of industrialization, i.e. to more sophisticated and technological intensive production and exports.

Added to that, the transition to the modern services of the tertiary sector has been slow, especially in Tunisia and Egypt, which is mainly due to institutional and non-institutional barriers in a context of autocratic regimes and bad governance.

Besides, results of the econometric analysis suggest a strong and positive association between trade as well as the shares of manufacturing and agriculture in total employment and the structural change component. In fact, trade openness is expected to trigger a reshuffling of resources from non-performing sectors unable to adapt to foreign competition to performing sectors able to benefit from the access to foreign markets, (Fiorini *et al.*, 2013). Furthermore, the higher is the weight of the agriculture sector, the more important is the structural change potential. The ratio of domestic credit to private sector which measures the extent to which the private sector is benefitting from financial assistance and the average years of schooling which provides an assessment of the human capital quality have positive and significant impacts on structural change. Furthermore, the gross capital formation (% GDP) positively impacts structural change as investment increases the future productive capacity and triggers reallocative efficiency. The share of High-Tech exports in total manufactured exports has a significant and positive impact on the structural change component. However, the share of fuel in merchandise exports turns out to be negatively associated to the structural change. This gives evidence on the importance of the transition to technologically sophisticated products for structural transformation. Labor market rigidity is negatively associated to the structural change term. Facilitating labor mobility from declining to rising sectors might faster structural change.

7. Recommendations

Based on the various findings reported in this study regarding the current productive structure in the three observed MENA countries, a number of recommendations could be suggested to unleash the MENA countries productive potential, to boost resources reallocation towards the most productive sectors and to stimulate productivity and economic growth.

As the econometric results showed, the dynamic of the manufacturing sector remains an important driver of structural transformation towards products with higher value added and more sophisticated exports. As reported by Rodrick (2016), “Sustained, rapid convergence on the part of developing economies has historically required industrialization”. Therefore, industry upgrading is a priority in the three countries; the transition from assembly activities to more sophisticated production process should be more effective. This is even more interesting because the manufacturing sector has a high capacity of low and intermediate-skill jobs creation, which dominates in the three observed countries.

Governmental intervention is necessary to direct the changes towards the right direction that is to the most productive and competitive sectors (as digital economy, renewable energy, bio agriculture...). Governments should support, facilitate and accompany the development and the expansion of the private sector, entrepreneurs and start-ups that are the main actors creating innovative and knowledge-intensive activities leading to structural change, (Altenburg *et al.*, 2016). This requires a more competitive business environment with less bureaucracy, easier access to finance, greater respect of intellectual property rights, hard and soft infrastructure investment as well as investments in industrial and technological parks.

Barriers to entry of new and efficient businesses as well as exit barriers for inefficient ones should be removed in order to have smoother factors reallocations. More flexibility in the labor market is also needed. This leads to more attractiveness for local and foreign investors. Governments should support the improvement of technology capabilities of firms and R & D investment. The adoption of new technologies and processes allows the emergence of high-value added products with new markets perspectives. Therefore, the implementation of efficient and well-governed systems of innovation is a priority in MENA region. Governments should play a more active role to facilitate the financing of innovation particularly in MSMEs (Ghazali and Mouelhi, 2018).

At the same time, reforms of the educational and professional training systems need to be effectively implemented in order to increase the quality of labor resources, to improve their technological capabilities and to adapt to the needs of new activities. In the same vein, the anticipation of technological trends, new opportunities as well as the increasing demand for specific skill-types are necessary.

In sum, an effective industrial policy is needed. As reported by Halendorf (2013), « policy may provide the “big push”, promoting and targeting competitive sectors, with high productivity and growth potential that lets the economy escape from its poverty trap and leads to industrialization and self-sustaining economic growth” .

A participatory approach, a strengthened implementation capacity and a good policy monitoring are needed to move forward and to achieve these objectives (Altenburg et al, 2016).

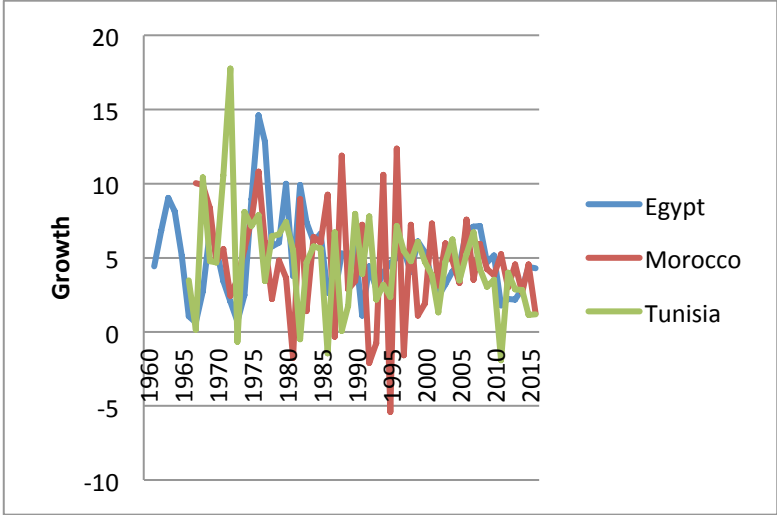
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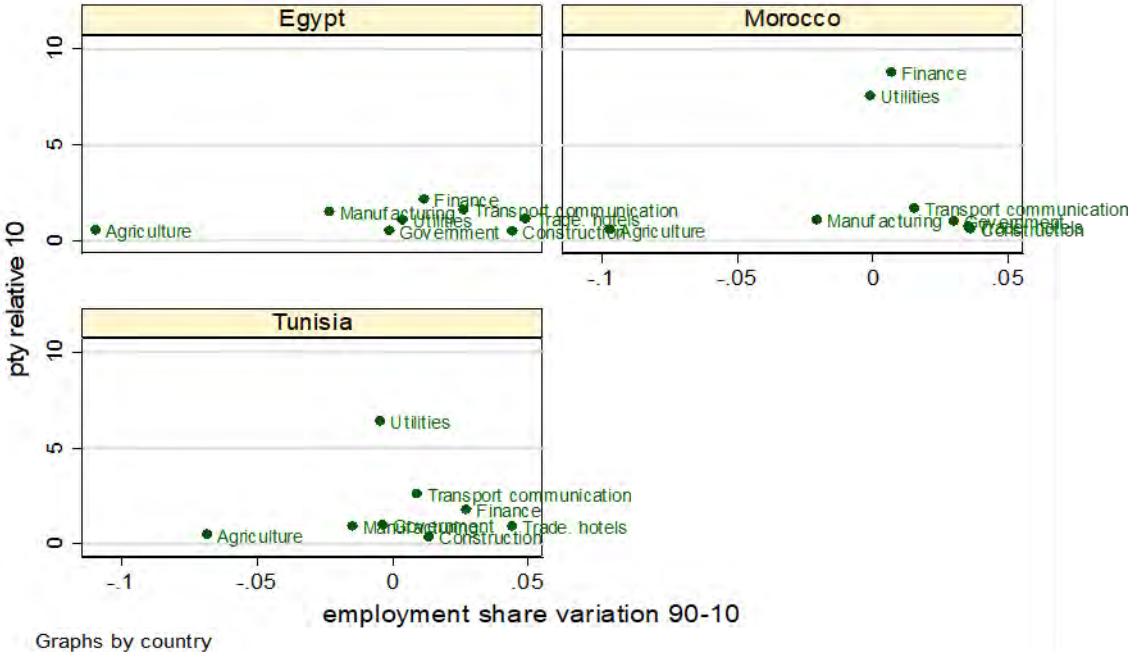
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Figure 1. GDP growth at constant local currency



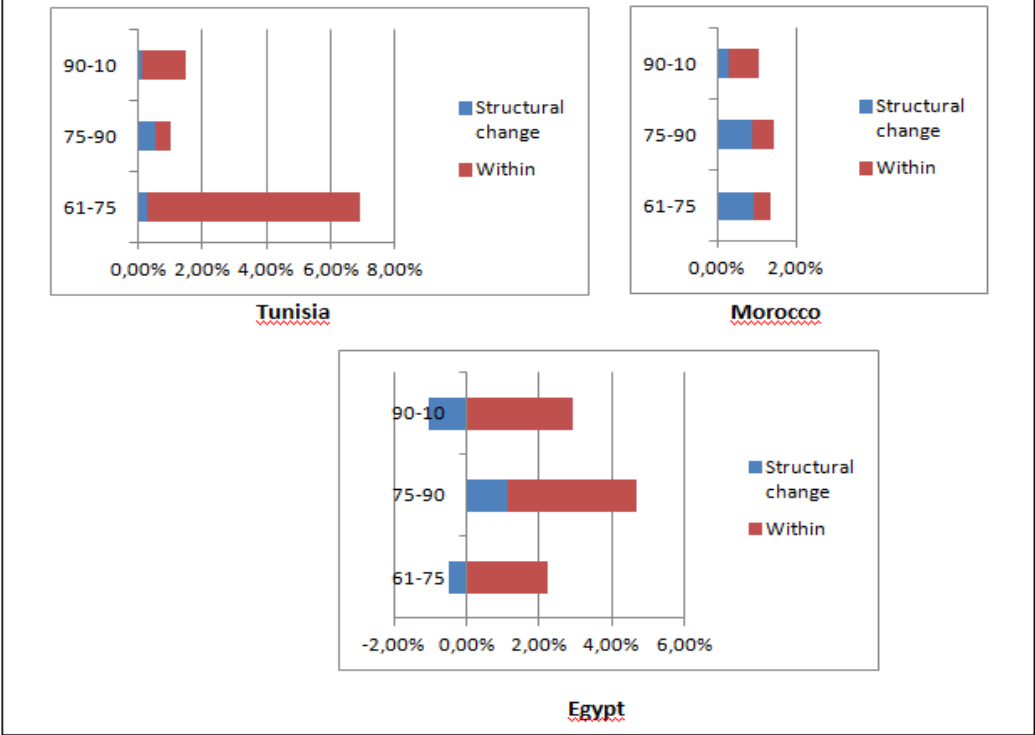
Source: WBI

Figure 2. Relative sector productivity in 2010 versus employment shares changes (1990-2010)



Source: Authors' computations

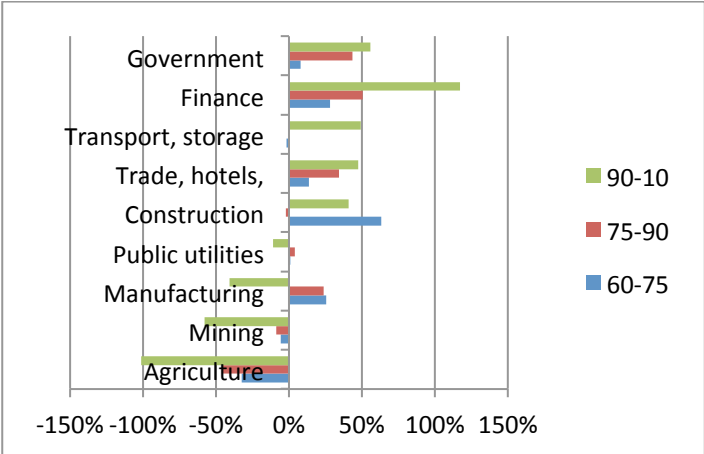
Figure 3. Productivity decomposition, 1961-2010



Source: Authors' computations

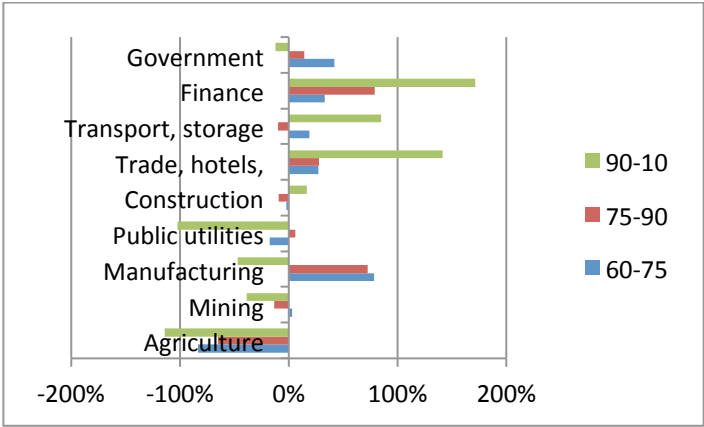
Figure 4. Sectoral contribution to Structural Change

Tunisia



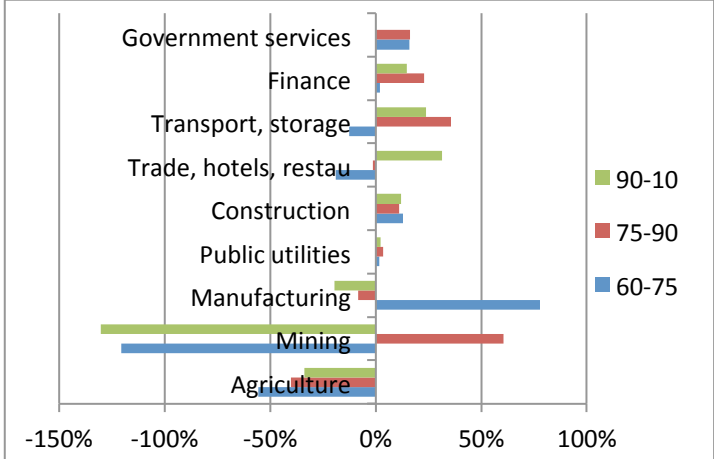
Source: Authors' computations

Morocco



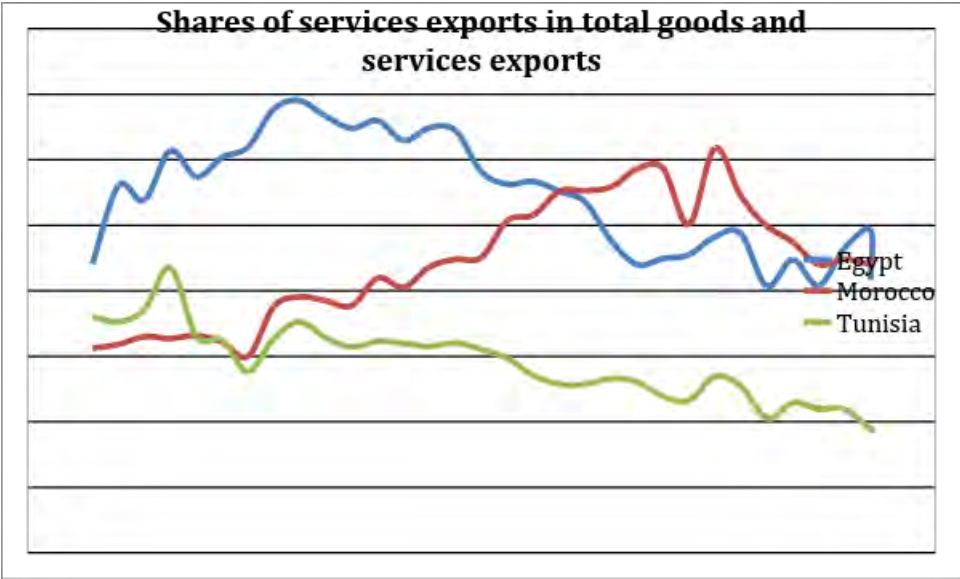
Source: Authors' computation

Egypt



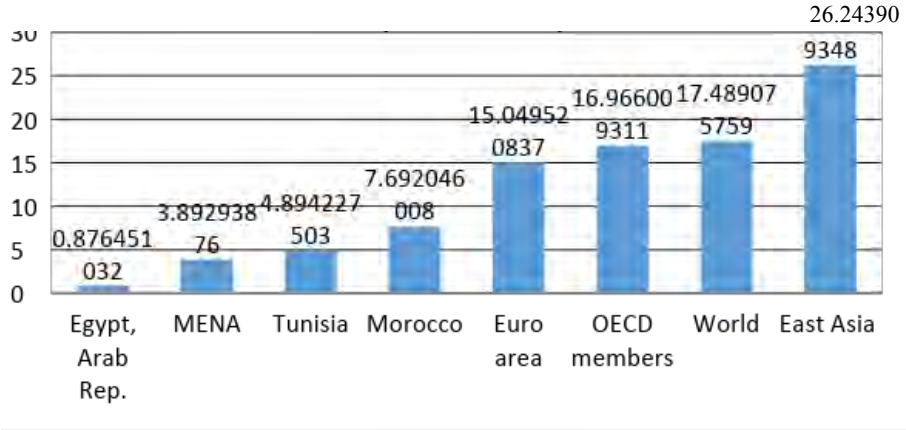
Source: Authors' computations

Figure 5. The share of services export in total goods and services export in Morocco



Source: author’s computation from WBI

Figure 6. High-technology exports (% of manufactured exports in 2010)



Source: Authors’ computations based on WBI database

Table 1. Value Added Shares 1960-2010 (%)

Sectors	Egypt				Morocco				Tunisia			
	1960	1975	1990	2010	1960	1975	1990	2010	1960	1975	1990	2010
Agriculture	25	29	20	14	30	20	20	15	22	17	15	8
Mining	1	2	8	15	4	10	3	4	3	4	1	1
Manufacturing	19	21	23	17	16	17	19	15	10	12	17	18
Utilities	1	1	1	1	1	1	2	3	2	8	8	8
Construction	1	4	5	5	6	6	5	7	5	5	4	5
Trade, restaurants and hotels	8	9	15	15	16	19	15	13	10	12	14	13
Transport, Storage and communication	5	4	11	10	3	5	7	7	11	9	10	14
Finance, insurance, real estate and business services	26	18	4	7	8	7	13	18	21	18	17	17
Government services, social (non market)	13	12	12	16	16	17	17	19	16	13	14	16

Authors' computations

Table 2. Employment shares, 1960-2010 (%)

Sectors	Egypt				Morocco				Tunisia			
	1960	1975	1990	2010	1960	1975	1990	2010	1960	1975	1990	2010
Agriculture	55	46	35	24	64	49	38	29	45	36	25	18
Mining	0	0	0	0	2	1	1	0	1	1	1	0
Manufacturing	10	14	13	11	9	13	15	13	7	12	20	18
Utilities	1	1	1	1	0	0	0	0	1	1	1	1
Construction	2	5	8	12	2	8	8	12	15	15	12	14
Trade, restaurants and hotels	9	9	9	14	9	11	14	18	9	9	11	16
Transport, Storage and communication	4	4	6	9	3	3	3	4	5	5	5	6
Finance, insurance, real estate and business services	1	1	2	4	0	1	1	2	4	4	8	10
Government services, social (non market)	19	21	25	25	11	13	18	21	13	16	18	17

Authors' computations

Table 3. Relative labor productivity (relative to aggregate labor productivity)

	Tunisia			Morocco			Egypt		
	1975	1990	2010	1975	1990	2010	1975	1990	2010
Agriculture	0,39	0,48	0,47	0,42	0,50	0,55	0,57	0,42	0,54
Construction	0,29	0,32	0,35	1,44	0,78	0,60	0,49	0,44	0,47
Finance	2,43	1,97	1,76	14,05	11,98	8,78	3,42	1,87	2,15
Government, social services	0,68	0,77	0,97	1,20	1,13	0,99	0,38	0,42	0,51
Manufacturing	0,71	0,75	0,90	1,34	1,11	1,06	1,55	1,65	1,48
Mining	0,87	1,81	3,20	1,91	2,02	4,96	77,91	55,04	101,12
Trade Hotels	1,56	1,23	0,90	1,50	1,02	0,71	1,65	1,54	1,12
Transport and communication	1,31	1,73	2,60	1,03	1,18	1,68	1,36	1,62	1,58
Utilities	23,21	13,49	6,40	4,38	3,80	7,54	2,37	1,47	1,07
Coefficient of variation	2,12	1,66	0,99	1,41	1,40	1,09	2,56	2,51	2,73

Source: Authors' computations

Table 4. Regional comparison of SC over 1990-2010

	Labor Productivity Growth	Within component	Between component (Structural Change)
Tunisia (90-10)	1,5%	1,33%	0,17%
Morocco (90-10)	1,06%	0,76%	0,3%
Egypt (90-2010)	1,87%	2,9%	-1,03%
Africa (90-2005)	0,86%	2,13%	-1,27%
LAC (90-2005)	1,35%	2,24%	-0,88%
Asia (90-2005)	3,87%	3,31%	0,57%
HI (90-2005)	1,46%	1,54%	-0,09%

Source: Authors' calculations and Mc Millan (2011)

Table 5. Average annual growth rate of manufacturing value added by time period

	1961-1975	1975-1990	1990-2010
Tunisia	6.8%	7.6%	4.7%
Egypt	5.4%	7.4%	3.1%
Morocco	4.9%	4.4%	2.6%

Source: Authors' calculation

Table 6. Development phases, common features (Egypt, Morocco, Tunisia)

1960-1975: Economy- Building	1975-1990: Structural Change	Initiating 1990-2010: (except Morocco)	Structural Stagnation
-Nationalizations, institutions-building	-Export promotion (incentives)	-More trade liberalization and more exposure to international competition (WTO and EU agreement). Market economy orientation.	
-Natural resources availability	-Development of the private sector and the off-shore sectors, FDI flows	-Investment and export promotion, private sector development.	
-Investment in education and infrastructure	-Light industrialization (textile, IAA...)	-Multiple and dispersed programs and actors (without accountability and evaluation).	
-Dominance of public sector	-Increase in the weight of the manufacturing sector and high growth rates.	-Low investment in R&D and innovation.	
-Import substitution policies	-Progress in exports diversification	-The degree of manufacturing diversification and especially the degree of sophistication remained stable and low.	
-Public manufacturing sector	-Contraction of Agriculture, while remaining a big employer	- Dominance of subcontracting and assembly activities, labor intensive, with low technological content.	
-Quasi-absence of private sector	-Expansion of services	- A model facing a strong competition from the Asian countries (textile).	
-Agriculture the dominant sector, main employer	-A protectionist context	- The manufacturing sector grew more and more slowly and shrunk at an early stage of development: "Premature Deindustrialization".	
		-Authoritarian systems: favoritism, corruption: bad governance.	
		- Services expansion in traditional activities (trade, government services...) in Tunisia and Egypt.	
		- Yet, development of highly productive modern services, in Morocco (finance, telecoms...)	
		-Morocco compensates the manufacturing decline by a rapid transition to the tertiary sector (modern services particularly) and an increase in services exports. Morocco is progressing in its structural transformation.	

Table 7. Explanatory variables in brief

Category	Variables	Data source
Globalization, openness, FDI	trade	
	OPENESS: (exports + imports) (% of GDP) FDI: foreign direct investment, net inflows (% of GDP)	World Bank Indicators (WBI) WBI
Economic structure	Gross Capital Formation (% of GDP)	WBI
	Manuf share : share of manufacturing at the beginning of period (% total employment)	GGDC and INS databases
	Agri share : share of agriculture at the beginning of period (% total employment)	GGDC and INS databases
	Fuel exports: fuel exports (% of merchandise exports)	WBI
	Private sector credit: domestic credit to private sector (% of GDP)	WBI
Labor market rigidity and other institutional barriers	LAMRIG: labor market rigidity index	Campos and Nugent (2012) labor market rigidity (LAMRIG) index database
	-Cost of resolving business insolvency (% of estate)	DOING BUSINESS
	-Cost of business startup procedures (% GNI per capita)	
R&D & innovation	Patents: Patent applications	WBI
	High-tech exports: technological content of exports (% of manufactured exports)	WBI
	R&D expenditures (% of GDP)	WBI
Human capital quality	Average years of schooling (25 years and above)	Barro & Lee (2010)

Table 8. Regression results

	Dependent Variable: Structural Change (one-year basis)				
Openness	0.011 (0.004)***	0.010 (0.004)**	0.015 (0.007)**	0.007 (0.002)***	0.011 (0.004)***
L2.Agri share	3.388 (0.441)***	2.987 (0.771)***	4.031 (0.725)***	2.277 (0.799)***	1.837 (0.843)**
L2.Manuf share	1.139 (0.605)*	0.808 (0.494)	1.778 (0.966)*	2.040 (2.282)	-0.850 (0.465)*
Fuel exports	-0.003 (0.001)***	-0.005 (0.001)***	-0.006 (0.001)***		-0.002 (0.000)***
Private sector credit	0.002 (0.001)*	0.003 (0.001)***	0.004 (0.002)**	0.008 (0.004)**	-0.001 (0.003)
Av years schooling	0.037 (0.015)**				
L2.Gross Capital formation		0.007 (0.001)***			
Patents			0.001 (0.000)*		
Hi-tech exports				0.027 (0.003)***	
Labor market rigidity					-0.453 (0.101)***
Constant	-2.049 (0.217)***	-1.844 (0.429)***	-2.620 (0.554)***	-1.901 (0.428)***	-0.315 (0.578)
Within R ²	0.14	0.18	0.16	0.28	0.16
Between R ²	0.99	0.96	0.99	0.99	0.99
Overall R ²	0.32	0.35	0.34	0.45	0.31
Sample Size	139	135	129	62	110

Note: Robust standard errors between parentheses. * p<0.1; ** p<0.05; *** p<0.01. A random effects model is regressed in all columns.

Appendix

Category	Variables	Details
Globalization, trade openness, FDI	OPENESS: (exports + imports) (% of GDP) FDI: foreign direct investment, net inflows (% of GDP)	Imports and exports of goods and services represent respectively the value of all goods and other market services received from and provided to the rest of the world. Net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. Source: World Bank Indicators (WBI)
Economic structure	Gross Capital Formation (% of GDP) Manuf share: share of manufacturing at the beginning of period (% total employment) Agri share: share of agriculture at the beginning of period (% total employment) Fuel exports: fuel exports (% of merchandise exports) Private sector credit: domestic credit to private sector (% of GDP)	Outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Source: (WBI). GGDC and INS databases GGDC and INS databases Fuels comprise the mineral fuels, lubricants and related materials. Source: World Bank Indicators (WBI). Financial resources provided to the private sector by financial corporations (loans, non-equity securities, and trade credits...). Source: World Bank Indicators (WBI)
Labor market rigidity and other institutional barriers	LAMRIG: labor market rigidity index	Campos and Nugent (2012) labor market rigidity (LAMRIG) index database Measured as 5-year averages ranging from 1970-74 through 2000-04 wherever possible. The values of the LAMRIG index range from 0 to 3.5, with higher values reflecting more rigid. The index is computed as a sum of the factor scores of three sub-components; the availability of alternative employment contracts (ex: part-time contracts), the conditions of employment and the extent of job

		security
	-Cost of resolving business insolvency (% of debtor estate)	Cost of insolvency proceedings involving domestic entities as well as the strength of the legal framework applicable to judicial liquidation and reorganization proceedings
	-Cost of business startup procedures (% GNI per capita)	Cost to register a business is normalized by presenting it as a percentage of gross national income (GNI) per capita. Source: DOING BUSINESS and World Bank
R&D & innovation	Patents: Patent applications	Patent applications are worldwide patent applications filed through the Patent Cooperation Treaty procedure or with a national patent office for exclusive rights for an invention. Source: WBI
	High-tech exports: technological content of exports (% of manufactured exports)	Products with high R&D intensity (aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery). Source: WBI
	R&D expenditures (% of GDP)	R&D covers basic research, applied research, and experimental development. Source: WBI
Human capital quality	Average years of schooling (25 years and above)	Barro & Lee (2010)