Structural Change, Productivity and Job Creation: Evidence from Tunisia

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Bringing Rigour and Evidence to Economic Policy Making in Africa

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List of abbreviations and acronyms

AfDB	African Development Bank
APIA	Agence de Promotion des Investissements Agricoles
APII	Agence de Promotion de l'Industrie et de l'Innovation (Tunisian Investment Promotion Agency)
CEPEX	Centre de Promotion des Exportations
CETTEX	Centre Technique du Textile
CNSS	Caisse Nationale de Sécurité Sociale
COVID-19	Corona Virus Disease 2019
CRES	Centre for Research and Social Studies
FIPA	Foreign Investment Promotion Agency
GDP	Gross Domestic Product
IACE	Institut Arabe des Chefs d'Entreprises
ILO	International Labour Organization
IMF	International Monetary Fund
INLCC	Instance Nationale de Lutte Contre la Corruption (National Anti-Corruption Commission)
INS	Institut National de Statistique (National Institute of Statistics)
LTDH	Ligue Tunisienne des Droits de l'Homme (Tunisian Human Rights League)
MENA	Middle East and North Africa
OECD	Organization for Economic Co-operation and Development
ONTT	Office National de Tourisme Tunisien
PMN	Mise à Niveau Programme
RNE	Répertoire National des Entreprises (Tunisian Business Register)
SDP	Strategic Development Plan
SMEs	Small and Medium-sized Enterprises
TFP	Total Factor Productivity

UGTT	Union Générale Tunisienne du Travail (Tunisian General Labour Union)
USAID	United States Agency for International Development
UTICA	Union Tunisienne de l'Industrie, du Commerce et de l'Artisanat (Tunisian Confederation of Industry, Trade and Handicrafts)
WBES	World Bank Enterprise Surveys
WDI	World Development Indicators
ZDR	Zones de Développement Régional (Regional Development Zones)
ZDP	Zones de Développement Prioritaires (Priority Development Zones)

Abstract

This paper combines macro and micro level analysis to identify the main sectors and firms that present the greatest potential to boost productive employment in Tunisia. The macro level analysis uses aggregate data at the sectoral level to understand the main characteristics of structural changes, employment, and productivity growth. The micro or firm-level analysis goes into more details of the process of reallocation by using microdata from the Tunisian Business Register covering the last two decades. The empirical results show that a 1% increase in industry output generates twice as much employment as the services sector for the population in the working age groups 15–64-year-old; while a 1% increase in services output generates twice as much employment as industry sector for youth between 15 and 25 years. In addition, growth in value-added per capita between 2011 and 2018 was "jobless growth". It was driven by increased productivity and participation rate, rather than an increase in the employment rate. Tunisian manufacturing sector is hampered by a waste and a misallocation of resources between firms as capital inputs are directed from their productive uses with too many resources going to less productive firms. Within-firm and between-firm components negatively impact labour productivity growth and slow down efforts aimed at reducing unemployment. This is providing clear evidence of low firm performance as job creators, while entry and exit contributed only negligibly to changes in labour productivity between 2000 and 2020.

Key words: *Job creation; Structural change; Misallocation; Productivity; Youth; Tunisia.*

JEL classification codes: *D24; E24; L11; L16; O41.*

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1. Introduction

Today, over 22% of the Tunisian population is aged between 15 and 29 years, and 47% of the full population is under the age of 30. This significant youth bulge could have been a good opportunity for Tunisia to benefit from an abundant labour supply following the entry of young workers into the labour market. This means that consumption and additional tax revenue would increase leading to an adequate and stable funding of social programmes and public investments. However, this economic dynamic neither worked nor have produced the expected results in terms of economic growth and employment. In fact, Tunisian economy is still a low-income, slow-growth one with limited fiscal resources, high unemployment rates, high levels of informality, and low coverage of social-protection programmes, especially among higher education graduates (28% in 2019). The Tunisian economy grew by an annual average of 1.6% between 2011 and 2019, which is far from the required level to address structurally high levels of unemployment. Since the 2011 revolution, the Tunisian labour market has been able to hire less than half of the 120,000 new annual entrants to the cohort of working age Tunisians, leading to an almost continuous increase in the ranks of the unemployed.[1] Growth prospects remain disappointing, labour market shows lacklustre performance, with low female participation rate and high and persistent informality.

Although Tunisia has developed its higher education to move up the value chain, its economy has not been able to grow beyond low-skilled and low-wage activities. As a result, the newly unemployed have been mainly young and well-educated people, reflecting a structural mismatch between labour market demand for unskilled workers and an increasing supply of skilled labour (World Bank, 2010). The employed population is mainly involved in activities with low added value (such as trade, transport and telecommunications, construction, textiles, and clothing), therefore requiring primary and/or secondary education profiles as a priority. The democratic transition after the 2011 revolutionary thrust has been accompanied by a severe economic recession which accounts for the difficulties experienced by Tunisia today, albeit partly. Ten years after revolution, the country is still experiencing conflicts and repetitive political crisis making the business climate insecure: 13 governments have succeeded one another since 2011. Growth in 2011 fell dramatically to -1.9%, and did not exceed 2.5% from 2011 to 2019 (except for 2012, where it reached 3.9%), a far cry from the required level to address structurally high levels of unemployment.

Successive terrorist attacks and killings and the disruption in Tunisia's phosphate production, which accounts for nearly 15% of the GDP, weakened the governance and have been subject to the downward price correction and growth from 2015 to 2017. The COVID-19 pandemic contributed to worsen the already weak socioeconomic situation. Probably the most telling result of the harmful effect of the crisis is the decline in Real GDP growth rate to -9.2% in 2020 (INS, 2021).[2]

In the light of these serious challenges the country has to overcome, it needs a combination of several tools to ensure increased productivity and employment growth. Particularly, the identification of most productive and profitable sectors and sustainable job-creating firms should ensure investment reorientation towards the productive sectors and thus improve creating jobs and reducing unemployment.

This paper combines macro and micro level analysis to identify the main sectors and firms that present the greatest potential to boost productive employment in Tunisia. The macro level analysis uses aggregate data at the sectoral level to understand the main characteristics of structural changes, employment, and productivity growth in Tunisia. It aims also to study the structure of jobs using the Shapley decomposition method. The micro or firm-level analysis goes into more details of the process of reallocation by using microdata from the Tunisian Business Register (*Répertoire National des Entreprises* - RNE) covering the last two decades (ten years before and ten years after the 2011 revolution). Exploring dynamics at the firm-level (or business dynamics) is critical to strengthening our understanding of the main principles and factors contributing to the economic transformation and the jobs creation. More specifically, we use static and dynamic decompositions (Olley & Pakes, 1996; Foster et al., 2001) to empirically examine the importance of market share reallocation (between firm), improved firm performance (within firm), and the net entry effects in driving aggregate productivity growth. Identifying the determinants of productivity growth is crucial, not only for job creation, but also for the development process in the long run. Several studies have shown the importance of this exercise. For example, Krugman (1997) concludes that "productivity isn't everything, but, in the long run, it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker". Cusolito and Maloney (2018) argue that raising global productivity growth is the pivotal element of an integrated strategy to generate jobs (and good jobs) and reduce poverty.

The paper is structural into six sections. Section 2 provides a brief literature review on the relationship between growth and job creation. Section 3 discusses the challenges of job creation in Tunisia at the macro or sectoral level. Section 4 focuses on the dynamics between productivity growth, employment, and structural change in Tunisia. In Section 5, we explore firm-level dynamics using the RNE data to better understanding of firm, employment, and productivity dynamics. Section 6 identifies the main economic and political constraints to job creation in Tunisia, as well as the political economy. Conclusions and policy implications are provided in Section 7.

2. Growth and job: A brief literature review

The literature on economic growth[3] has largely relied on one-sector models that emphasize the role of factor accumulation and productivity within an economy, where sectors are strongly homogenous (Barro, 1991; Martins, 2019). Therefore, the one-sector growth models, originally conceived with developed economies in mind, have overlooked the large heterogeneity across sectors that are characteristic of developing economies (Martins, 2019; Silva and Teixeira, 2008). Based on these critiques, several studies have been carried out to show that structural (dual sector) models provide a better representation of developing economies (McMillon and Heady, 2014; Martins, 2019). These studies deal with the mechanisms by which developing countries are transforming their economic structures from a basically agricultural economy to a modern economy based on industry and services. They attribute the low level of job creation in developing countries to the slowness of their structural changes and low private investment in sectors with the greatest growth potential to create good jobs for new entrants into the labour force.

Lewis' (1954) dualist model formalized by Fei and Ranis (1964) was the first model of structural change. It highlights the importance of considering the differences between a traditional and rural sector with zero marginal labour productivity that would explain the overall progress of the economy and a modern industrial sector. This model shows that the move of labour to modern industry would be beneficial at the aggregate level, as low-productivity workers would be used for more productive activities, and growth would continue until the modern sector has used up all labour stocks in the subsistence sector. Nurkse (1953), in turn, emphasized sectoral differences as a condition for balanced growth. To ensure balanced growth, governments can, not only use a cumulative process of expansion by carrying out investment programmes with synchronized and simultaneous diffusion of capital across industries, but also use the international assistance and foreign capital to make up for the lack of domestic capital.

The empirical work of Kuznets (1971) confirms the link between productivity growth and the rate of change in the production structure of the economy. Based on these contributions, McMillan and Rodrik (2011) consider structural change as the process by which labour and other resources move from traditional sectors to modern, high-productivity ones. This reallocation of resources can lead to overall productivity growth, even if there is no productivity growth within sectors. The speed of structural change is identified as the key factor in the success of development strategies.

3. The challenges of job creation in Tunisia: Macroeconomic analysis

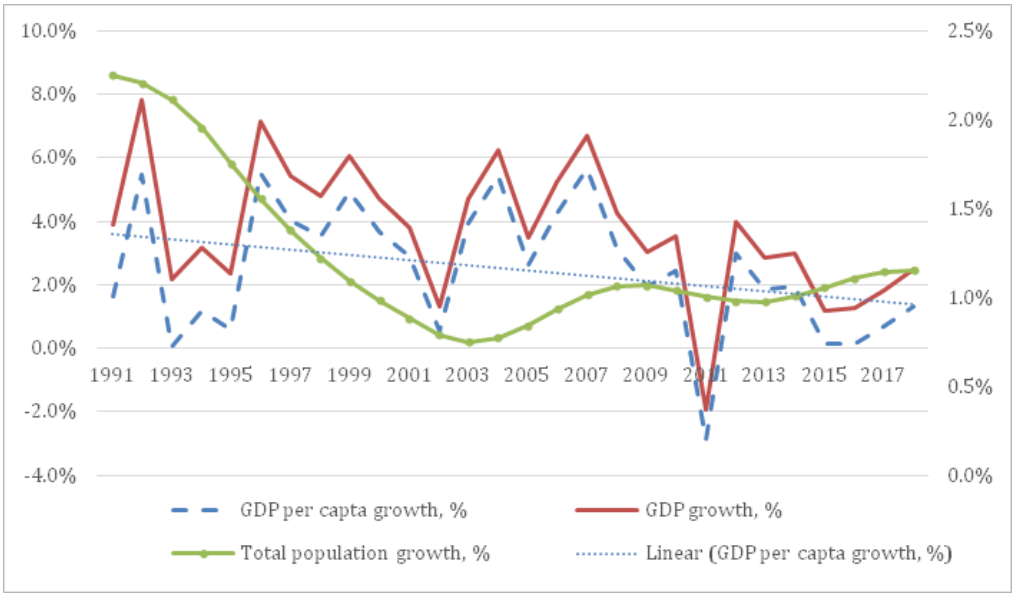
There is a conventional link between economic growth and employment growth, which is commonly called the employment effect of economic growth. Kapsos (2006) and Döpke (2001) have shown that there is a positive relationship between economic growth and employment, which implies that economic growth generates new jobs, but at different intensities, depending on the period and the country, reflecting the different responses of the labour market to economic growth. Thus, economic growth is a prerequisite for increasing productive employment.

Economic growth is a prerequisite for increased productive employment; it is the result of increased employment and labour productivity. But, while the rate of economic growth remains critical to employment and labour productivity growth, the characteristics or nature of growth are also important. The impact of economic growth on productive employment creation depends, not only on the rate of growth, but also on how effectively growth is translated into productive employment. In Tunisia, after two decades of the introduction of extensive macroeconomic stabilization programmes and trade, fiscal and financial market reforms, growth prospects remain disappointing from an international perspective, and labour markets are performing poorly. This section examines in depth the labour market trends in Tunisia over the past two decades and assesses the role that labour demand and supply factors have played in shaping these outcomes.

Poor growth performance

Between 2000 and 2018, economic growth has not been sustained. It has experienced accelerated phases, but also periods of slowing down and even falls. During this period, the Tunisian economy grew in real terms at an average annual rate of 3%, while the population grew by 0.93% annually (Figure 1). Since 2011, the economic activity has slowed down because of the worsening of the security situation and persistent socio-political tensions following the revolution. The average annual growth rate of the Tunisian economy has decreased from 3.8% during the period 2000–2010 to only 2.1% during the period 2011–2018. The GDP per capita was US$3,002 in 2000 (in constant 2010 dollars), and US$4,402 in 2018, representing an annual growth rate of almost 2%, which is below the economic growth rate. The GDP per capita has gotten worse particularly during the post-revolution period (it grew at only an annual rate of 1.1% during the period 2011–2018).

Figure 1: Population (first axis) and growth (second axis) in Tunisia, 2000□2018

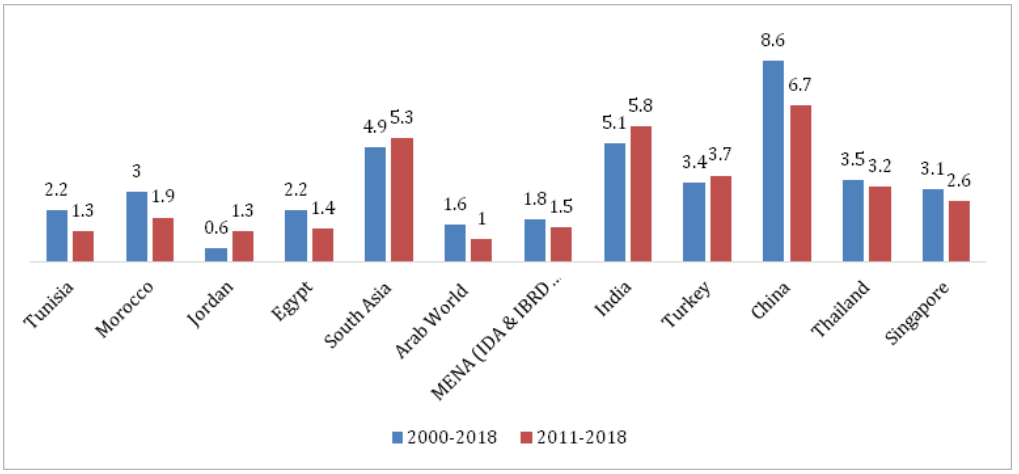


Note: Authors' elaboration using data from the World Development Indicators (WDI).

Slow growth and lack of convergence with other countries

Since the 2000s, growth in Tunisia has been weak compared to other countries (those that had similar per capita growth rates as Tunisia in the 1960s) and regions of the world. The recorded growth gap worsened after the 2011 revolution. Indeed, the average annual growth rate in Tunisia was around 1.3%, compared to more than 1.9% in Morocco, 1.5% in the Middle East and North Africa (MENA) region and 3.7% in Turkey. Average income growth in South Asia was more than 5% per year, which is much higher than in Tunisia. In the Arab world region, Egypt and Jordan were the only two countries to experience growth rates similar to Tunisia's (Figure 2).

Figure 2: Yearly growth per capita value-added



Sectoral composition of growth

Two findings can be drawn from the examination of changes in the relative sectoral shares of value-added over the period 2000–2019 (Figure 3). The first one concerns the dominance of the tertiary sector (wholesale trade, transport and telecommunications, and other services) that accounts for more than 60% of value-added in the Tunisian economy. The second finding concerns the lack of real changes in the sectoral composition of value-added during the study period. Manufacturing's share of total value-added has declined over time, from 18% in the 2000–2010 decade to 16% in the 2011–2019 decade.

In terms of contributions of major sectors to economic growth rate, it appears mainly that the industrial contribution has fallen off a cliff after the 2011 revolution from 21% to 7% (Table 1). The services sector records the largest contribution to the national economy, which contributed 80% of the overall GDP growth. As for the contribution of agriculture, it remains fluctuating depending on climatic conditions.

Figure 3: Sectoral composition of value-added in Tunisia, 2000□2019

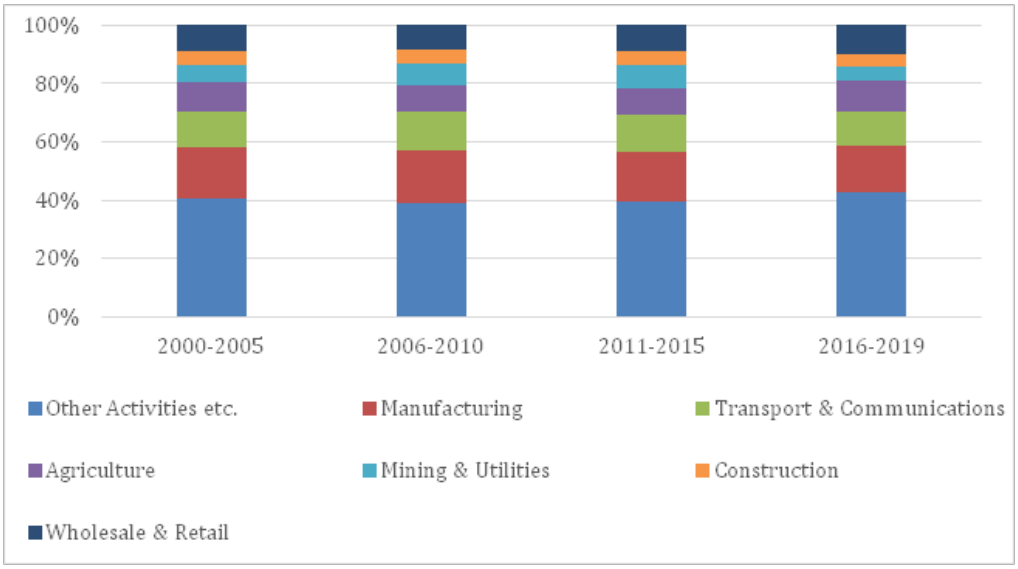


Table 1: Sector contribution to GDP growth (%)

Period	2000-2010	2011-2018
Agriculture	-3%	6%
Industry	21%	7%
Services	82%	87%
Total	100%	100%

Weak job creation in Tunisia

According to the most recent estimates of the National Institute of Statistics, Tunisia had a population of around 11.72 million in 2019, of which almost two-thirds lived in urban areas. The urbanization rate increased from 61% in 1994 to 68% in 2014. Historically, the total annual population growth rate has increased rapidly between 1960 and 1983, rising from 1.3% to 2.9%. Since 2000, it has declined to less than 1%, reaching its lowest level in 2003 (0.75%), and increased again to 1.2% in 2018. The population aged 15-29 years accounts for almost 22% of the country's total population, making it one of the youngest in the world. This was a significant youth bulge in Tunisia's demographic transition between 1980 and 2000, owing to the high fertility rates of that period.

Theoretically, the strong growth in the number of young people could have been a good opportunity for Tunisia making it benefit from (i) an abundant labour supply following the entry of young workers into the labour market, (ii) new savings, investment, and growth opportunities, (iii) a dynamic of consumption and additional tax collection leading to growth in productive investment, and (iv) a high contribution

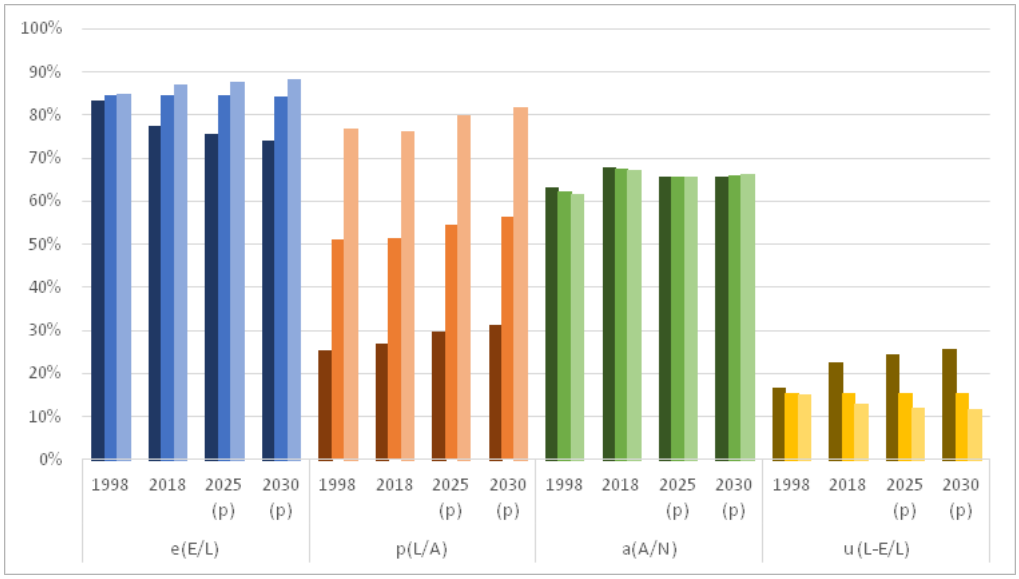
collection to social security funds. Unfortunately, this virtuous dynamic did not take place and did not produce the expected results in terms of growth. On the opposite, young Tunisians continue to suffer from exclusion and marginalization, resulting in a high level of dissatisfaction, frustration, and disappointment regarding their prospects for social mobility and a better quality of life.

Although the exclusion of young people is a multidimensional phenomenon in Tunisia, its economic dimension, which consists of difficulties in accessing the labour market, is probably the most serious issue. Indeed, unemployment and poor quality jobs are two central issues in public debates and are among the priorities of Tunisian Government. This situation was especially pronounced in the two decades from 1990 to 2010, following the Stabilization and Structural Adjustment Programme, and accentuated in the last decade after the 2011 revolution. Growth prospects remain disappointing, labour market shows lacklustre performance, with low female participation rate and high and persistent informality. Women's participation in the labour market remains low, not exceeding 27% (see Figure 4 and Table A 1[in the appendix] for more details on Tunisian labour market by gender). After peaking at 18% following the socio-political upheavals of 2011, the unemployment rate fell slightly to stabilize at around 15.1% in Q1 2020 before rising again to 18% in Q2 2020.[4] Higher education graduates, particularly women, are more affected by unemployment. In 2011, the unemployment rate among higher education graduates was 33.6%. This rate gradually declined but remained high in 2019 at 28%, with a 1.6% increase in the gap between men and women. One possible reason for the high rate of graduate unemployment is that the Tunisian education system is still not able to meet the needs of the private sector (skill mismatch), and the public sector is saturated (650,000 employees in 2012, which represents 22.8% of the labour force). In 2015, the unemployment rate of 15–29-year-olds was estimated to be 31% (48% among young women who, besides, are exposed to longer job search times). In addition to registered unemployment, the quality of jobs is a major concern. For example, employment shares in all types of informal non-agricultural work (including self-employed, domestic workers, and workers employed in micro-firms) are still high and account for 38.3% (INS, 2019).[5]

The COVID-19 unsurprisingly further increased the unemployment rate from 15% to 18% (the second peak) in the second quarter of 2020, returning to the levels seen during the 2011 revolution. In fact, the COVID-19 pandemic has caused a loss of 69,300 jobs due to lockdowns, of which 29,000 people would not have gone back to work even after their employers resumed their activities. The number of unemployed workers among the total labour force in the second quarter of 2020 is estimated at 746,400, compared to 634,800 in the first quarter (INS, 2020).[6]

Regional disparities are also significant: The southern and western regions of the country remain the most affected by unemployment with rates exceeding 20%. With about 26%, the Southwest has the highest unemployment rate of all regions. It is followed by the Southeast with 24%, the Northwest with 17.5% and the Central West with 19%. The Northeast and Central East regions have much lower rates close to 10% (INS 2018).[7]

Figure 4: Tunisian labour market indicators by gender

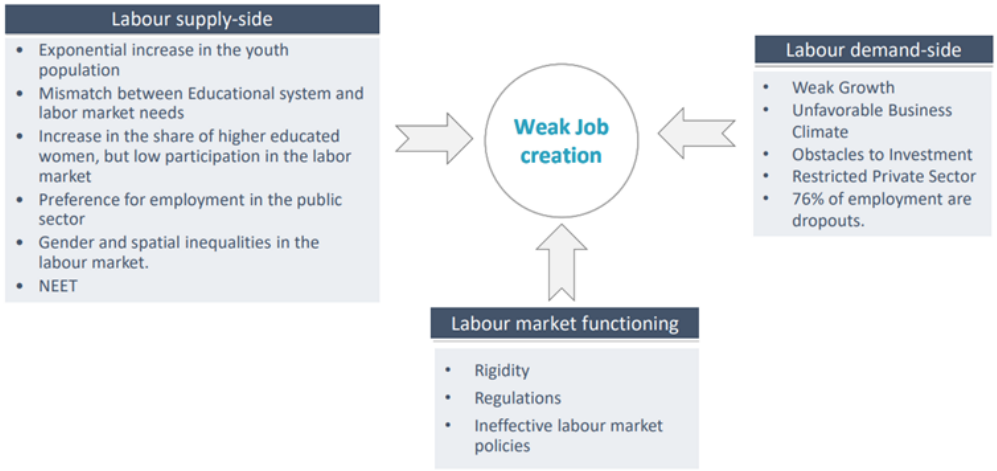


Notes: E: Employment; L: Labour force; A: Working age population 15-64; N: Total population; e: Employment rate = E/L; p: Labour force participation rate = L/A; a: Share of working age population to total population = A/N; u: Unemployment rate = (L-E)/L. Left column: Female | Middle column: Total | Right column: Male. Values for 2025 and 2030 are projections. Data were taken the World Bank's World Development Indicators (WDI).

These Tunisian labour market failures have high economic and social costs. Thus, opinion polls confirm that employment is the main concern of young people (World Bank and Observatoire National de la Jeunesse, 2014). A large majority of respondents do not trust the capacity of the institutions and reforms implemented since the 2011 revolution and are "concerned" or even "very concerned" with this situation and have serious doubts about government's ability to address unemployment.

Various factors could explain the high levels of unemployment and informal work, particularly among young people and women in Tunisia. On the demand-side, there are unattractive conditions for investment and rigid labour market policies that restrict private sector growth and employment creation. Poor access to financing prevents the creation of new dynamic companies. In addition, insufficient economic diversification threatens the creation of high-skilled jobs for educated workers. On the supply-side, the main causes cover the exponential growth of young working age population, the increase of women's labour force participation, the mismatch between educational system and the labour market's need, preference for employment in the public sector, and the persistence of several forms of discriminations (Figure 5).

Figure 5: Main drivers of weak job creation in Tunisia



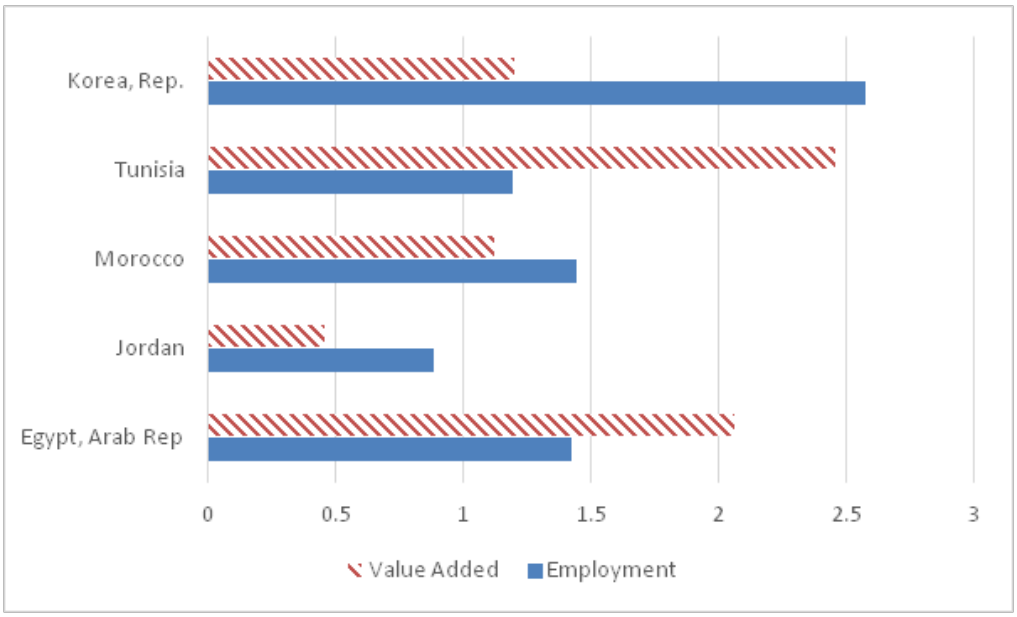
4. Structural changes, employment, and productivity growth: Main patterns

This section highlights the process of economic restructuring in Tunisia by assessing the extent and characteristics of the reallocation of production and labour across sectors over the last two decades. It will address the following questions: How has the structural composition of the Tunisian economy changed over time? Has the reallocation of output and labour across sectors been significant in Tunisia compared to other countries? Have sectors that have shown significant improvements in productivity also expanded in terms of employment? What is the role of factor reallocation on overall productivity growth?

Structural changes in Tunisia

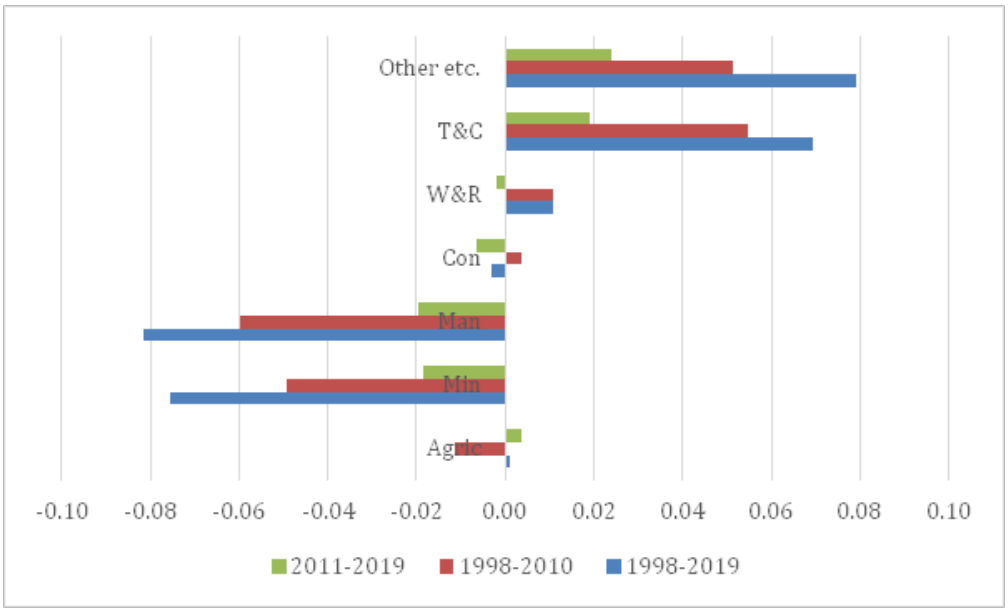
A commonly used method to assess the extent of reallocation processes of output and input is based on the Lilien index. This index measures the degree of dispersion of the growth rate across sectors. It reaches its lowest value of zero in the case of no reallocation between sectors. Figure 6 suggests that the magnitude of labour reallocation in Tunisia has been smaller than that of value-added. Compared to the South Korea, Figure 6 shows that during the period 2000–2018, the process of employment reallocation was much weaker. This is also true if we compare Tunisia with MENA countries such as Morocco and Egypt. In contrast, the reallocation of output across sectors was relatively large.

Figure 6: Reallocation of employment and output across sectors: Lilien Index, 2000-2018



The absence of real sectoral changes can be seen in the sectoral composition of the Tunisian economy. Indeed, Figure 7 shows that the share of manufacturing industry in total value-added has deteriorated during the period 1998–2019. Changes in the structure of the economy during the same period show a decline in manufacturing and an explosion of service sectors (Figure 7).

Figure 7: Changes in sectoral composition of Tunisian economy, 1998□2019



These changes in the structure of the economy led to similar results in changes in the structure of employment over the same period (Figure 8).

Figure 8: Changes in structure of sectorial employment, 1998-2019

As shown in Table 2, the services sector have together accounted for 70% of Tunisia's overall employment growth over the past two decades. Although all major service industries have grown, those with relatively low productivity, for example, (a) community, social, and personal services, and (b) wholesale and retail trade have been the most dynamic. However, industrial activities contribute weakly to job creation. This change in job creation has led to the share of manufacturing industry in the total value-added not increasing.

Table 2: Sectoral contribution to annual employment growth rates

	2000–2010	2011–2020	2000–2020
Annual employment growth rate (%)	28	8	33
Sectoral contribution (%)			
Agriculture	11.40	-6.29	-0.29
Mining & utilities	0.03	2.19	0.48
Manufacturing	10.94	14.09	11.32
Construction	17.20	4.70	15.95
Wholesale & retail	18.62	16.18	20.23
Transport & communications	7.05	1.25	4.16
Other activities	34.76	67.88	48.14
Total sector contribution	100	100	100

Note: The contribution of each sector is computed as the employment growth times the employment share at the beginning of the period.

Jobless growth or growthless Jobs?

In this section, we try to provide an overview of the main trends that characterized the creation of value-added and employment in Tunisia over the last two decades. Otherwise, we try to see whether the growth of value-added by sector is accompanied by job creation or rather the opposite. We start with a simple presentation of the sectoral contribution to employment and value-added in 2000, 2010 and 2019 (Figure 9). After that, we extend the analysis to calculate the employment to output elasticities for each sector (Table 3). Figure 9 shows that the agriculture sector is the only sector that recruits less (from 20% in 2000 to 14% in 2019), with a constant share in value-added of about 10%. On the other hand, other services contribute more to productivity and real earnings growth with a long growth in value-added from 37% in 2000 to around 43% in 2019. The relative share of the transport & communication sector has shown a climb from 11% to 17% between 2000 and 2019 against stagnation in its share of total employment, which remains relatively constant around 6%. During this period, thus, services sector (transport & communication, commerce, and other services) generated an increasing share of value-added from 56% in 2000 to 69% in 2019, suggesting that it would result in a crucial contribution to employment generation. But against all expectations, increase in job creation did not have better records. Indeed, the sector's contribution to total employment increased only by 6 percentage points from 46% to 52% between the two dates. Given these results, it would seem that jobless growth is a stubborn feature of the services sector (that is, sector companies need structural challenges and efficient public policies).

The share of manufacturing sector in total value-added has declined from 20% in 2000 to 14% in 2019 with a decrease of two percentage points in its contribution to total employment (from 20% in 2000 to 18% in 2019). Workers moving out of agriculture and manufacturing sectors have been absorbed mainly by the commerce (a gain of two percentage points), the construction (a gain of four percentage points), and the other services sectors (a gain of two percentage points). The mining & utilities sector has experienced the most significant decrease in total value-added contribution and relatively slower growth in employment of seven percentage points, dropping from 10% in 2000 to 3% in 2019 as a result of the slowdown, delays and disruptions in the production of phosphate because of employees complaints and protests against the worsening of their economic and social situation; and higher level of unemployment, poverty and social exclusion during the last decade after the revolution.

Figure 9: Sectoral contributions to employment and value-added (2000, 2010, and 2019)

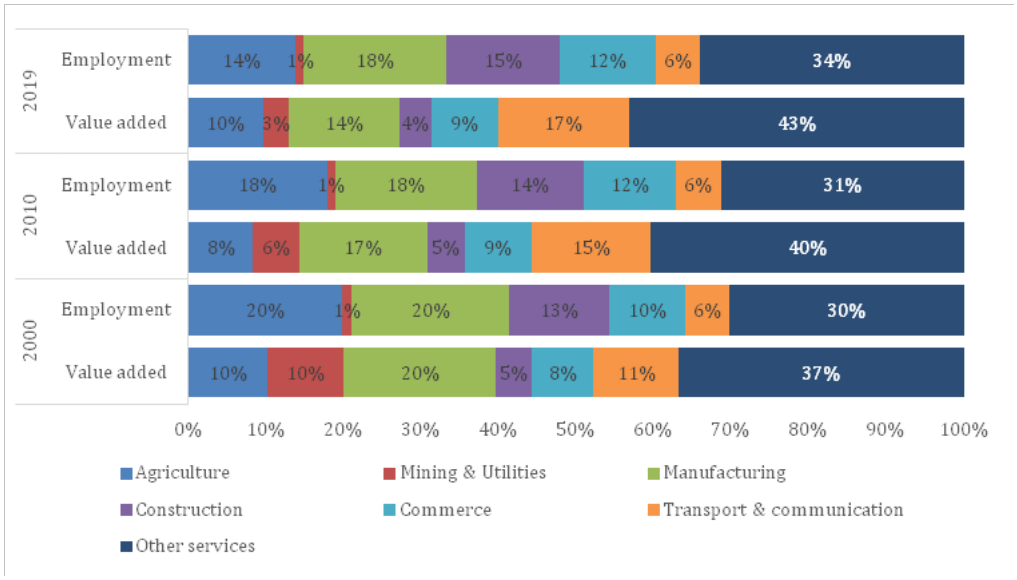


Table 3 reports the results of employment to output elasticities for major sectors (agriculture, industry, and services) for Tunisia, as well as for three other MENA countries (Egypt, Morocco, and Jordan). We also distinguish between total employment and employment of youth aged 15-25 by gender. For all sectors of the Tunisian economy, the results show that an increase of 1% in value-added has been accompanied by a lower increase of 0.19% in employment for the population aged 15-64 years. A similar increase in the output only generates an increase of 0.11% in employment for young people aged 15-25 years with a significant gap between the two sexes (0.16% for males against only an increase of 0.04% for females). The growth of the output of the services sector generates more employment for young people, especially males (an increase of 1% in value-added produces a 0.20% increase in employment for males and only 0.06% for females). For the population between 15 and 64 years, a 1% increase in industry output generates twice as much employment as the services sector (0.23% vs. 0.11%). Moreover, rather than promoting sustainable development, services sector creates few jobs considering its contribution to the growth of total value-added. It is totally different for younger population aged between 15 and 25 years, where a 1% increase in services output leads to twice as much employment as industry (0.15% vs. 0.08%). Employment creation due to output growth in the agricultural sector remains low, especially for young people (see Figure A1, Figure A2, Figure A3, and Figure A4 [in the appendix] for the arc-elasticity results). For more technical details on employment-output elasticities, see Kapsos (2006).

Table 3: Employment-output elasticities, 1990-2018

	Agriculture Elasticity, 1990–2018	Industry Elasticity, 1990–2018	Services Elasticity, 1990–2018	All Economy, 1990–2018
Employment 15-64 years				
Tunisia	0.051	0.225	0.113	0.194
Egypt	0.370	0.011	0.162	0.568
Jordan	0.058	0.258	0.274	0.232
Morocco	-0.014	0.329	0.111	-0.151
All	0.036	0.141	0.141	0.162
Youth Employment 15-25 years				
Tunisia	0.018	0.080	0.152	0.118
Egypt	-0.882	-0.221	-0.185	0.096
Jordan	-0.056	0.107	0.246	0.205
Morocco	0.015	-0.172	-0.453	-0.286
All	-0.012	0.110	0.021	0.184
Youth Employment 15-25 years (Male)				
Tunisia	0.024	0.100	0.198	0.157
Egypt	-0.828	-0.248	-0.318	0.078
Jordan	-0.044	0.115	0.207	0.204
Morocco	-0.012	-0.139	-0.269	-0.297
All	-0.015	0.102	0.037	0.184
Youth Employment 15-25 years (Female)				
Tunisia	0.005	0.038	0.063	0.039
Egypt	-0.576	1.390	0.296	1.412
Jordan	-0.266	0.004	0.768	0.167
Morocco	0.062	-0.225	-0.931	-0.402
All	-0.079	0.244	0.127	0.369

Notes: Employment-output (value-added) elasticities are estimated using times-series regressions. For each country, and for the three sectors (agriculture, industry, services), the following equation is estimated: $ln(l_t) = \alpha_0 + \alpha_1 ln(l_{t-1}) + \beta_1 ln(y_t) + \beta_2 year + \varepsilon_t$ where l_t is the level of employment at time t, y_t is the level of value-added at time t (constant 2010 US$), and year is the time trend. The same equation was also used to estimate the employment-output elasticities for all economy of each country. The estimation of elasticities in the last row of the table includes, in addition to the variables already mentioned, country dummy variables. Data on total employment, employment by sector, value-added, and value-added by sector were taken from the World Bank's World Development Indicators (WDI). Data on youth employment by sex are taken from the International Labour Organization (ILO).

Job structure in Tunisia

To understand the job structure in Tunisia, we use the Shapley method (see Box 1 for more details) to decompose the growth rate between two dates (Shorrocks 1999; McMillan et al.. 2014, McMillan & Harttgen, 2014).

Box 1: Shapely decomposition[8]

1. Decomposition of aggregate growth

To identify the drivers of growth in Tunisia and understand how this growth has translated into increases in productivity and employment at the aggregate level and by sectors, the Shapely decomposition was used to decompose the value-added per capita ($y = Y/N$) as:

$$\frac{Y}{N} = \frac{Y}{E} \times \frac{E}{L} \times \frac{L}{A} \times \frac{A}{N}$$

Or

$$y = w * e * p * a$$

Where: Y is total value-added, E is total employment, L is the labour force, A is total working age population (15-64 years), and N is total population (for more details on the formulas for the Shapely decomposition, see Shorrocks, 1999; McMillan et al., 2014, McMillan & Harttgen, 2014. In this way $w = Y/E$ is the value-added per worker, $e = E/L$ is the employment rate, $p = L/A$ is labour force participation rate, and $a = A/N$ is the share of working age population to total population.

2. Decomposition of changes in value-added per worker by sector

It is possible to measure the contribution of each sector i ($i = 1, \dots, n$) to the aggregate productivity change, using the following decomposition (World Bank, 2009):

$$\frac{Y}{E} = \sum_{i=1}^{n} \frac{Y_i}{E_i} * \frac{E_i}{E}, \qquad \text{or } w = \sum_{i=1}^{n} w_i\, \theta_i$$

Where: Y_i and E_i are, respectively, the value-added and the employment in sector i. w_i is the value-added per worker in sector i, and θ_i is the share of sector i in total employment. Using the Canonical method[9] (De Vries et al., 2015; McMillon & Rodrik, 2011), the changes in aggregate value-added per worker between periods t_0 and t_1 (Δw), can be decomposed as :

$$\Delta w = \sum_{i=1}^{n} \Delta w_i * \theta_{i,t_0} + \sum_{i=1}^{n} \Delta \theta_i * w_{i,t_1}$$

Where: Δw_i and $\Delta \theta_i$ are, respectively, the change in value-added per worker and the change in the share of employment in sector i between periods t_0 and t_1. w_{i,t_1} is the value-added per worker in sector i at t_1, and θ_{i,t_0} the share of employment in sector i in total employment at t_0. The first term of the decomposition represents the sum of changes in the value-added per worker in sector i, while the second term is the change in the value-added per worker due to the inter-sectoral employment changes. De Vries et al. (2015) decompose the structural change (inter-sectoral reallocation) into a static and dynamic reallocation as follows:

$$\Delta w = \underbrace{\sum_{i=1}^{n} (w_{i,t_1} - w_{i,t_0}) * \theta_{i,t_0}}_{\text{within sector}} + \underbrace{\sum_{i=1}^{n} (\theta_{i,t_1} - \theta_{i,t_0}) * w_{i,t_0}}_{\text{static reallocation}} + \underbrace{\sum_{i=1}^{n} (w_{i,t_1} - w_{i,t_0}) * (\theta_{i,t_1} - \theta_{i,t_0})}_{\text{dynamic reallocation}}$$

3. Decomposition of changes in employment rate by sector

In order capture the contribution of each sector to the global changes in employment rate ($e = E/L$), the following decomposition can be used (World Bank, 2009):

$$\frac{E}{L} = \sum_{i=1}^{n} \frac{E_i}{L}, \text{or } e = \sum_{i=1}^{n} e_i$$

Where: e_i is the employment rate in sector i. Changes in aggregate employment rate (Δe) can be decomposed as the sum of changes in the employment rate of all sectors:

$$\Delta e = \sum_{i=1}^{n} \Delta e_i$$

Where: Δe_i is the change in employment rate in sector i.

Growth can be measured either by GDP or by value-added value, which, relative to GDP, excludes subsidies and taxes. Since we are going to perform sectoral decomposition, we will use data on value-added. The employment data come from Tunisian labour surveys of the National Institute of Statistics. All data cover the period 2000–2019.

Table 4 and Figure 10 show the results for the Shapely decomposition of per capita value-added into its main components at the aggregate level (all combined sectors). Throughout the 2000–2018 period, Tunisia faced modest average growth rate of 2.15% per year in per capita value-added, with greater disparities before and after the revolution (3.27% per year during 2000–2010 and only 0.76% per year after 2011). Labour productivity growth contributes to 81% of the total growth, while the increase in the share of working age population (demographic change) explains only 15%. The contribution of the changes in participation rate to the growth in per capita value-added remains positive but low and does not exceed 5%. The employment rate fell by 0.4% per year, explaining the 2% of the contribution to the value-added per capita growth between 2000 and 2018.

The results by sub-periods show that, over the decade before the revolution (2000–2010), the growth in per capita value-added was driven by increased productivity (67%) and by demographic change (26%). The contributions of employment and participation rates remain relatively low at around 7% and 1%, respectively. After 2011, the value-added per capita has decreased considerably (0.76% per year) owing to the negative contribution of employment (-47%) and demographic change (-40%). The observed per capita value-added growth over 2011–-2018 did not create sufficient jobs and did not absorb the growing workforce into the labour market. Value-added per capita growth over this period was driven by increased productivity and by participation rate, rather by an increase in the employment rate. This poor performance could be attributable to political instability that made the private sector unable to generate employment, new job opportunities, and to reduce unemployment. In fact, private firms were led to reduce their workforce to manage the shock of the revolution and the resulting economic turmoil. Some companies went out of business and have closed their production units and thus some people were unemployed for a period. On the other side, the massive hiring in the public sector between 2011 and 2013 was neither productive nor efficient and did not influence the growth performance, but instead had caused inflation and monetary instability, which in turn negatively impacts growth and employment.[10] When -40% of the total change in value-added per capita can be explained by changes in the share of working age population (demographic change), the increase in the dependency ratio will negatively impact the per capita growth. However, adults have a significant value-added per capita effect, since their participation rate made a positive contribution of 26%.

Table 4: Decomposition of growth in per capita value-added

	2000–2010			2011–2018			2000–2018		
Constant 2010 USD per person	**Change**	**% Yearly Contribution to Growth**	**% of total change**	**Change**	**% Yearly Contribution to Growth**	**% of total change**	**Change**	**% Yearly Contribution to Growth**	**% of total change**
Change in per capita value added	1 140.20	3.27	100%	260.05	0.76	100%	1 400.25	2.15	100%
due to changes in productivity of which:	758.34	2.18	67%	416.99	1.23	160%	1 139.43	1.75	81%
Within-sector	724.07	2.08	64%	322.74	0.95	124%	1 028.32	1.58	73%
Inter-sectoral reallocation of which:	34.28	0.1	3%	94.25	0.28	36%	111.1	0.17	8%
Static reallocation	23.81	0.07	2%	102.04	0.3	39%	76.54	0.12	5%
Dynamic reallocation due to changes in	10.46	0.03	1%	-7.78	-0.02	-3%	34.56	0.05	2%
employment rate due to changes in	78.17	0.22	7%	-121.13	-0.36	-47%	-23.41	-0.04	-2%
participation rate due to changes in share of	11.77	0.03	1%	68.43	0.2	26%	71.2	0.11	5%
working age population	291.92	0.84	26%	-104.24	-0.31	-40%	213.03	0.33	15%

Source: Authors' calculations using WDI data and the Job Structure Tool of the World Bank.

Figure 10 shows that whatever the period, growth in Tunisian's GDP per capita was mainly due to productivity growth within sectors (in agriculture, industry, and services), rather than to inter-sectoral shifts (structural change).

Figure 10: Decomposition of growth in per capita value-added

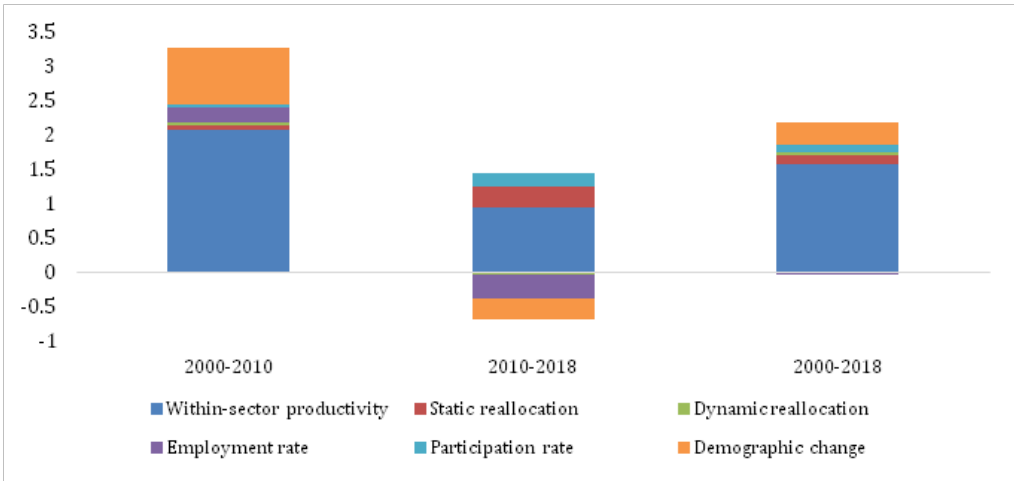


Table 5 shows the contribution of the change in employment rate of each sector (agriculture, industry, and services) to the per capita value-added growth. The results by sub-periods show that between 2000 and 2010, the contribution of employment changes to the growth in per capita value-added (estimated at 7%) was driven by an increase in employment in the two sectors of services and industry (5% and 4%, respectively), against a decrease of 3% in employment in agriculture sector: a shift from agricultural employment to the two sectors of industry and services. During the last decade (2011–2018), only employment changes in services showed a positive contribution (34%), the change in employment rate of the two sectors of agriculture and industry are negative, about -55% and -25%, respectively.

Figure 11 shows the contributions of change in productivity by sector to growth in per capita value-added (see Table A2 in the appendix for more details). The contribution of productivity change to the growth in Tunisia's GDP per capita between 2000 and 2018 was mainly due to productivity growth within sectors (1.58 of 1.75, representing 90%). This contribution of within-sector productivity change comes mainly from the services sector (1.35) and the agriculture sector (0.29). The contribution of the industry sector is negative (-0.07). The overall effect of inter-sectoral structure shifts of capital and labour on growth in GDP per capita in the 2000–2018 period represents only 10% of the total change in productivity (0.17 of 1.75). Table A2 (in the appendix) shows that this inter-sectoral structure shifts is the result of reallocation of capital and labour from agriculture (-0.18) to services (0.34). The industry sector did not benefit from this reallocation. The period from 2011 to 2018 is characterized by a decline in the performance (within) of firms in industry and services sectors versus an improvement

in the performance of firms in the agriculture sector. Only services sector has benefited from the reallocation of resources from agriculture sector.

Table 5: Decomposition of growth in per capita value-added with employment rate change by major sector

% Yearly Contribution to Growth	2000–2010		2011–2018		2000–2018	
	Percent	% Contri-bution	Percent	% Contri-bution	Percent	% Contri-bution
Annual Growth per capita Value-Added	3.27	100%	0.76	100%	2.15	100%
Change in Productivity	2.18	67%	1.23	160%	1.75	81%
Change in Employment Rate	0.22	7%	-0.36	-47%	-0.04	-2%
Agriculture	-0.1	-3%	-0.42	-55%	-0.25	-12%
Industry	0.14	4%	-0.19	-25%	-0.01	0%
Services	0.18	5%	0.26	34%	0.22	10%
Change in Participation Rate	0.03	1%	0.2	26%	0.11	5%
Change in Share of Working Age Population	0.84	26%	-0.31	-40%	0.33	15%

Source: Authors' calculations using WDI data and the Job Structure Tool of the World Bank.

Figure 11: Productivity change decomposition: Annual contribution to per capita value-added growth by major sector

5. Productivity growth and efficiency of allocation

This section extends the analysis in the previous section on the relationship between growth in output per capita and job creation at the sectoral level by examining the contribution of firm dynamics (entry, exit, and expansion and contraction of existing firms) to job creation. In fact, macro- and industry-level analyses can hide the heterogeneity of firm characteristics and behaviour, and thus offer only a partial picture of the drivers of growth and job creation (Bartelsman & Doms, 2000, Bartelsman, et al., 2004). A deep analysis at the firm-level is therefore necessary to understand the drivers of growth and job creation in Tunisia. Many new firms are created every year. At the same time, existing firms are expanding, while others are decreasing or even stopping their activities. Labour reallocation is an important driver of productivity growth since less productive firms tend to destroy more jobs and more productive ones create more jobs (OECD, 2010). This creative destruction process, generally attributed to Joseph Schumpeter (Schumpeter, 1934), is important in the creation and development of new processes, products and markets, thus driving economic growth and prosperity (Bartelsman et al., 2004; Baily, 2003, Brandt, 2005).

Several studies have developed formal theoretical framework for the Schumpeterian hypothesis, of which the most influential ones are the passive learning model (Jovanovic, 1982) and the active learning model (Ericson & Pakes, 1995; Hopenhayn, 1992; Pakes & Ericson, 1998). In the passive learning model, a new firm enters a market without prior knowledge of its potential profitability. After entry, and based on information from its own profits, the firm starts to learn about its own profitability potential. By continually updating such learning, the firm decides whether to expand, contract or withdraw from the market. The active learning model is similar, but firm explores its economic environment activity and invests more and more to increase its profitability given those of other competitors in the same market.

Aghion and Howitt (1992) developed a model of endogenous growth that considers growth as a process of creative destruction of new products that replace the older ones. According to Aghion and Howitt's model, growth results exclusively from technological progress, which in turn results from competition between innovative firms. Innovative firms may enjoy monopoly rents from the creation of new intermediate goods that are the results of a successful and patented innovation. These rents will in turn be destroyed by the next innovation, which will make the existing intermediate good obsolete (Aghion & Howitt, 1992). Recently, Bartelsman et al. (2004) developed

another approach to analyse the creative destruction process. They use micro-data (business registers) to calculate the entry and exit rates of firms, as well as the creation, destruction, and reallocation rates of jobs. Using this approach, it would be possible to understand the dynamics of firms and identify the most job-creating ones. It is also possible to identify the sectors with the greatest employment potential. The analysis of this process of creative destruction makes it possible to study the effects of the entry and exit of firms on productivity and the reallocation of resources.

To deal with firm dynamics in Tunisia, we start by using Bartelsman et al. (2004)'s methodology to calculate a set of key indicators (firm entry, firm exit, job creation and job destruction rates, job turnover) to better understand the dynamics of firms in Tunisia. Then, we use firm-level data and the Olley-Pakes decomposition (Olley & Pakes, 1996; Melitz & Polanec, 2015) to assess the importance of resource reallocation for productivity growth and to see how the creative destruction process (the entry of new firms and the exit of obsolete ones) contribute to productivity growth and job creation.

Creative destruction and job creation at sectoral level

The identification of potential sectors for job creation is based on a statistical analysis of the creative destruction process. We use the Bartelsman et al. (2004)'s methodology to calculate the following key indicators for each sector: firm entry, firm exit, job creation and job destruction rates and Job turnover (see Box 2 for the methodology). The measure of these indicators is based on individual data from the Tunisian Business Register (Répertoire National des Entreprises - RNE) covering the period 1996–2019 (see Box 3 for a short presentation of the RNE).

Table 6 shows the distribution of the yearly averages of firms and employment by firm size class and sector during the period 1997–2019. For all sectors combined, we observe that 85% of active firms are self-employment start-ups, 11% are micro-firms (between one and five employees) and only 3% are considered as small and medium-sized firms—SMEs—(between six and 199 employees). The share of large firms does not exceed 0.1%. The results show that self-employment start-ups account for the largest share of employment (34%), followed by small and medium-sized firms (32%) and large firms (27%). The contribution of micro-firms to total employment remains low at around 7%. This first result confirms that the Tunisian private sector remains modest in size and is still mostly composed of self-employment start-ups and micro-firms (96% of all private firms), which together generate 41% of total formal private employment.

Box 2: Firm entry, firm exit, job creation and job destruction rates

The identification of potential sectors for job creation is based on a statistical analysis of the creative destruction process (inputs and outputs) of all formal Tunisian companies between 1996 and 2018. Based on the work of Davis and Haltiwanger (1992) and the one of Pages et al. (2009), the following key indicators are calculated:
The *Entry Rate* is defined as the number of new entering firms divided by the total number of existing (incumbents) and new firms each year.

The *Exit rate* is defined as the number of firms leaving the market each year reported to the original population (i.e., firms of the previous year).

Using entry and exit rates, we define two additional rates: firm turnover (*entry rate + exit rate*) and the net creation rate of firms (*entry rate – exit rate*).
The rate of employment growth of firm i at time t, is defined as:

$$g_{it} = \frac{(E_{it} - E_{it-1})}{0.5(E_{it} + E_{it-1})} = \frac{\Delta E_{it}}{\bar{E}_{it}}$$

Where: E_{it} and E_{it-1} are, respectively, the total employment of firm i at time t and $t-1$ and $\bar{E}_{it}$ measures the simple average of firm employment at time t and $t-1$.
The Gross Job Creation and destruction rates for sector s at time t are defined as (Davis & Haltiwanger 1992):

$$JCR_{st} = \sum_{i \in s} \left(\frac{\bar{E}_{it}}{\bar{E}_{st}}\right) g_{it}, g_{it} > 0, \qquad \text{and } JDR_{st} = \sum_{i \in s} \left(\frac{\bar{E}_{it}}{\bar{E}_{st}}\right) |g_{it}|, g_{it} < 0$$

The net employment growth and the job reallocation rate for sector s at time t are defined as:

$$NET_{st} = JCR_{st} - JDR_{st}, \text{and } JRR_{st} = JCR_{st} + JDR_{st}$$

Box 3: Tunisian Business Register (RNE)

Created and administrated by the National Institute of Statistics in accordance with the decree No. 94-780 of April 4, 1994, the RNE is an annual census combining information from many different sources such as the social security fund (CNSS), the Tunisian Customs, the Tunisian Ministry of Finance, and the Tunisian Investment Promotion Agency (APII). Data from the Ministry of Finance contain information about opening statements and therefore constitute the most comprehensive source for identifying companies in the country. Data from the CNSS provide information on establishments such as workforce and its characteristics, training level, working conditions and the level of income from work for both employees and employers (INS). The RNE provides information on the employment, age, and main activity of all registered private non-agricultural firms, except cooperatives, as well as information on publicly-owned enterprises. Consequently, it does not document informal employment (Rijkers et al., 2014).

In 2019, the RNE counts 782,115 private firms, 87% of which are self-employed, 10.3% between one and five employees, 2.3% are small enterprises (6-49 employees), 0.34% were medium (50-199 employees), and only 0.12% (956 firms) had 200 or more employees. We focus the analysis on firms belonging to the manufacturing sector.

Source: Répertoire National des Entreprises (RNE).

The results also depict that the distributions of firms and employment differ across sectors. In fact, except for the two sectors of commerce and other services, where self-employed firms generate the largest shares of total employment, small and medium-sized firms are the largest generators of employment in the other sectors. For manufacturing, for example, self-employment start-ups, which account

for 73% of all active firms in that sector, generate only 10% of employment, while 47% and 39% of employment are generated by small and medium-sized firms and large firms, respectively. Large firms (200 and more employees) are concentrated in the manufacturing sector (an annual average of 405 firms out of a total of 755).

Table 6: Distribution of active firms and employment, by firm size class and sector (yearly averages during the period 1997-2019)

	Number of Firms				Employment			
	Self-Employment start-ups	Micro-firms [1-5]	SME-firms [6-199]	Large firms 200 and More	Self-Employment Start-ups	Micro-firms [1-5]	SME-firms [6-199]	Large firms 200 and More
Agriculture	1624	404	492	21	1624	814	13961	9196
Extractive	791	211	199	6	791	425	5627	2532
Manufacturing	48030	10209	6586	405	48030	20031	220435	187656
Construction	21035	3659	1587	57	21035	6746	36972	33717
Commerce	219936	19175	3422	33	219936	32171	55928	17863
Other services	183325	27139	4101	233	183325	39954	100706	117312
All sectors	**474741**	**60796**	**16387**	**755**	**474741**	**100138**	**433615**	**368272**
Shares (%)								
Agriculture	61%	16%	22%	1%	6%	3%	55%	36%
Extractive	65%	18%	17%	1%	8%	5%	60%	27%
Manufacturing	73%	16%	10%	1%	10%	4%	47%	39%
Construction	79%	14%	7%	0%	22%	7%	38%	34%
Commerce	91%	8%	1%	0%	68%	10%	17%	5%
Other services	84%	14%	2%	0%	41%	9%	23%	27%
All sectors	85%	11%	3%	0%	34%	7%	32%	27%

Source: Authors' calculation using data from the RNE.

Table 7 summarizes the main results of the creative destruction process by firm size class at the sectoral level in Tunisia. The first two columns show the average number of entering and exiting firms per year for each sector and by firm size class. Columns (3) and (4) present the entry and exit rates and the last two columns provide, respectively, the turnover rate and the net entry rate. Except for large firms, entry rates are generally higher than exit rates, regardless of the sector of activity. Self-employment start-ups have the highest entry rate (11.1%) compared to an exit rate of 7.3% on average each year (nearly 50,000 self-employment start-ups—all sectors—enter the market each year compared to 33,000 that exit the market). Compared to self-employment start-ups, the number of entering and exiting firms is relatively small. On average, about 3,014 micro-firms enter the market each year (compared to 1,503 exiting). The number of SME firms entering the market does not exceed 314 per year, and only six large firms enter the market each year and six other firms of the same size leave the market. The results show also that the firm net entry rates decrease with firm size from 3.8% for firm self-employment to -0.1% for large firms.

Table 7: Creation and destruction of firms in Tunisia (yearly averages during the period 1997-2019)

	Entering firms	Exiting firms	Entry rate (%)	Exit rate (%)	Firm Turnover (%)	Firm net entry (%)
	(1)	(2)	(3)	(4)	(5) = (3) + (4)	(6) = (3) – (4)
Self-employment start-ups						
Agriculture	265	120	16.3	8.9	25.2	7.4
Extractive	93	68	12.1	9.2	21.3	3.0
Manufacturing	4650	3277	10.0	7.1	17.1	2.9
Construction	2535	1599	12.9	8.5	21.4	4.4
Commerce	23006	16993	10.8	7.8	18.6	3.0
Other services	19197	10734	11.8	6.6	18.4	5.3
All sector	**49746**	**32791**	**11.1**	**7.3**	**18.4**	**3.8**
Micro-firms (between 1 and 5 employees)						
Agriculture	27	8	7.8	2.8	10.6	5.0
Extractive	13	6	6.7	2.8	9.5	3.9
Manufacturing	563	255	5.8	2.4	8.2	3.3
Construction	237	73	6.9	2.3	9.2	4.7
Commerce	803	510	4.4	2.5	6.9	1.9
Other services	1371	651	5.2	2.2	7.4	2.9
All sector	**3014**	**1503**	**5.1**	**2.4**	**7.5**	**2.8**
Small and medium-sized firms - SMEs (between 6 and 199 employees)						
Agriculture	12	12	2.2	2.4	4.6	-0.2
Extractive	3	2	1.4	0.9	2.3	0.6
Manufacturing	148	89	2.3	1.3	3.7	1.0
Construction	29	16	1.8	0.8	2.7	1.0
Commerce	40	40	1.3	1.1	2.4	0.2
Other services	83	47	2.3	1.2	3.5	1.2
All sector	**314**	**206**	**2.1**	**1.2**	**3.3**	**0.8**
Large Firms (with 200 or more employees)						
Agriculture	0	0	1.1	0.9	2.0	0.2
Extractive	0	0	0.0	0.8	0.8	-0.8
Manufacturing	2	3	0.4	0.8	1.2	-0.4
Construction	1	1	0.8	1.0	1.8	-0.3
Commerce	0	0	0.9	1.6	2.6	-0.7
Other services	3	2	1.5	0.9	2.4	0.6
All sector	**6**	**6**	**0.8**	**0.9**	**1.7**	**-0.1**

Source: Authors' calculation using data from the RNE.

The plot in Figure 12 depicts the distribution of entry and exit rates for manufacturing sector by firm size class. Compared to the pre-2011 revolution decade, the entry of firms is characterized by steep decreasing trends, except for firms with less than six employees (self-employment and micro-firms) which show a smooth decreasing trend. Our results confirm the results found by Arouri et al. (2016). Using the same census data (RNE data), for the period 2000–2013, Arouri et al. (2016) show that the Tunisian economic environment is characterized by moderate dynamism, driven mostly by small firms. Using more recent data covering the period 1997–2019 from the RNE, our analysis of entry and exist dynamics show that this downstream decrease of firm entry is accentuated after 2011, especially for firms with more than six employees.

Figure 12: Entry (solid line) and exit (dashed line) rates for manufacturing sector (1997-2019)

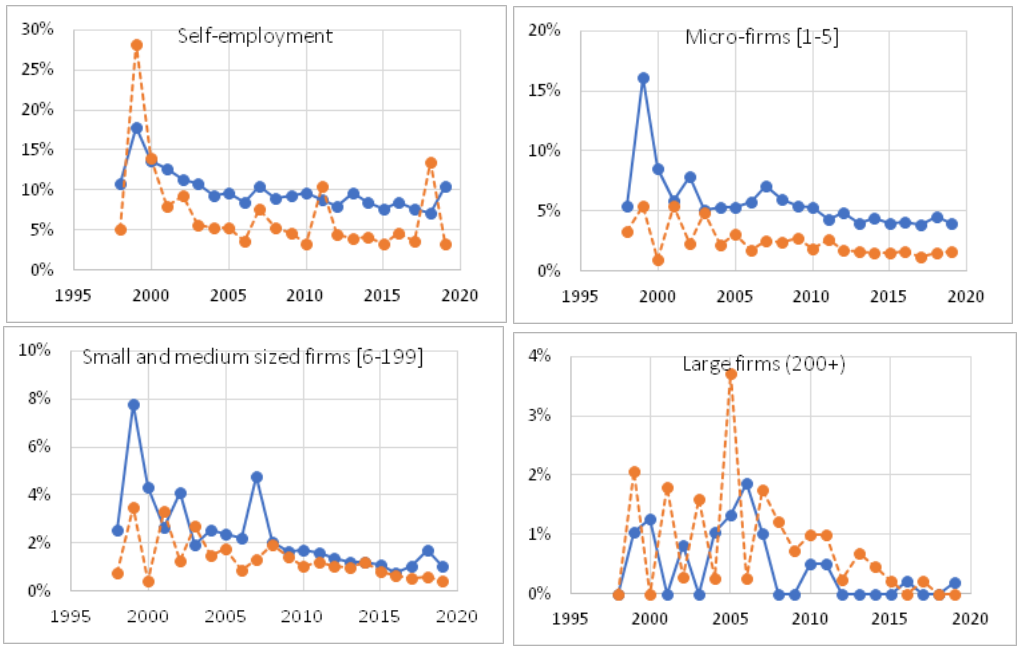


Table 8 presents the job creation and destruction rates, as well as the net job creation rates by firm size class and sector (average values for 1997–2019). The results for all sectors combined show that the net job creation rates by incumbents were positive, and that the bulk of job creation comes from large firms with 200 or more employees. The entry of firms with less than six employees (self-employment and micro-firms) has a positive effect on the net job creation rate, while the exit of large firms has a negative impact on job destruction although the number is small (on average, six large firms leave the market each year [Table 7]). If we compare incumbents and entrants by sector, we find that for manufacturing sector, existing

firms with six or more employees create more jobs, while entrants with fewer than six employees outperform incumbents. For construction sector, the results show that both SME and large incumbents contributed negatively to job creation (net job creation rates are negative by -1.2% and -3%, respectively). Existing large firms in the commerce sector are the most important contributors to net employment growth, followed by large manufacturing sector.

Table 8: Job creation and destruction of entering, exiting and incumbent firms in Tunisia (yearly averages during the period 1997-2019)

	Job creation rate by entering firms (1)	Job destruction rate by existing firms (2)	Turnover (%) (3) = (1) + (2)	Net job creation by entering (4) = (1) – (2)	Net job creation by incumbent Firms
Self-employment start-ups					
Agriculture	15.7	9.0	24.7	6.8	4.1
Extractive	12.0	9.5	21.5	2.5	1.3
Manufacturing	9.8	7.1	16.9	2.7	2.2
Construction	12.6	8.5	21.1	4.1	3.6
Commerce	10.7	7.8	18.5	2.9	2.1
Other services	11.5	6.4	17.9	5.1	4.4
All sector	10.9	7.2	18.2	3.7	3.0
Micro-firms: Between 1 and 5 employees					
Agriculture	5.1	2.4	7.5	2.7	5.1
Extractive	4.4	2.2	6.7	2.2	1.7
Manufacturing	4.4	2.2	6.6	2.2	2.0
Construction	4.2	1.7	5.9	2.4	3.5
Commerce	2.8	2.0	4.8	0.8	2.6
Other services	3.4	2.0	5.4	1.5	2.9
All sector	3.5	2.0	5.5	1.5	2.7
SME firms: Between 6 and 199 employees					
Agriculture	1.7	1.9	3.6	-0.2	-0.3
Extractive	0.8	0.8	1.6	0.1	0.5
Manufacturing	1.4	1.1	2.5	0.4	1.3
Construction	1.5	0.7	2.2	0.8	-1.2
Commerce	1.1	0.9	2.0	0.2	3.5
Other services	2.0	1.0	3.0	1.0	3.6
All sector	1.5	1.0	2.5	0.5	1.8

continued next page

Table 8 Continued

	Job creation rate by entering firms (1)	Job destruction rate by existing firms (2)	Turnover (%) (3) = (1) + (2)	Net job creation by entering (4) = (1) – (2)	Net job creation by incumbent Firms
With 200 employees or more					
Agriculture	0.8	0.7	1.5	0.2	0.1
Extractive	0.0	0.4	0.4	-0.4	-0.2
Manufacturing	0.5	1.0	1.5	-0.6	4.4
Construction	0.4	0.5	0.9	-0.1	-3.1
Commerce	0.5	1.3	1.7	-0.8	4.9
Other services	1.0	0.7	1.7	0.3	3.9
All sector	0.7	0.9	1.5	-0.2	3.5

Source: Authors' calculation using data from the RNE.

Static and dynamic decomposition of productivity growth using firm-level data

This section uses firm-level data from the Tunisian Business Register (see Box 3 for a short presentation of the data) and the Olley-Pakes static decomposition to assess the importance of allocation and reallocation of resources for productivity growth and job creation in Tunisia during the last two decades before and after the revolution (2000–2020). It aims to understand the allocative efficiency (which production factors are efficiently allocated across firms) and to identify sectors with the greatest employment potential. The analysis of this process of creative destruction using dynamic decomposition allows us to evaluate the effects of the entry and exit of firms on productivity and resources reallocation.

Olley and Pakes (1996) show that the aggregate logarithm of productivity can be decomposed into two parts: the first one is the change in the unweighted average log of productivity for surviving firms (within-firm productivity component), and the second part is the change in the covariance between the firm's market share and productivity (between-firm productivity component), which indicates the change in the magnitude of allocation efficiency among surviving firms (for the mathematical formula see Box 4). A high and positive value of the covariance term is associated with high allocative efficiency. Exploring allocative efficiency is important because misallocation can have economic effects at the aggregate level.

In a dynamic setting, Foster et al. (2001) decompose aggregate productivity growth to capture the contribution of entering and exiting firms. There are five components in the decomposition that help explain growth (Aterido et al., 2019): (i) a within-firm productivity growth holding firm's output share (employment or sales share) constant;

(ii) a between-firm effect measuring the contribution to aggregate productivity growth of high-productive firms expanding shares and low-productivity firms shrinking shares; (iii) a cross-term capturing the contribution of firms that increase productivity and expand, and firms that decrease productivity and shrink; (iv) an entry effect that contributes positively to productivity growth if entering firms have higher productivity than the average in the base period; and (v) an exit effect that contributes positively to sector productivity growth if exiting firms have lower productivity than sector average in the base period (see Box 4 for the mathematical formula of Foster et al. (2001)'s decomposition).

Box 4: Static and dynamic decomposition of the aggregate productivity

1. Olley-Pakes static decompose productivity (Olley & Pakes, 1996):

$$\underbrace{p_t}_{\text{Aggregate productivity}} = \underbrace{\bar{p}_t}_{\text{Unweighted mean}} + \underbrace{\sum_{i=1}^{N}(p_{it}-\bar{p}_t)*(s_{it}-\bar{s}_t)}_{\text{Co-variance between productivity and share}}$$

2. Dynamic decomposition (Foster et al., 2001):

$$\Delta p_t = \underbrace{\sum_{i\in C}\Delta p_{it}\theta_{it-k}}_{\substack{\text{Within effect}\\ \text{firm change in TFP}\\ \text{without changes in}\\ \text{market shares}}} + \underbrace{\sum_{i\in C}\Delta\theta_{it}(p_{it-k}-P_{t-k})}_{\substack{\text{Between effect}\\ \text{changing shares, weighted}\\ \text{by initial relative TFP}}} + \underbrace{\sum_{i\in C}\Delta p_{it}\Delta\theta_{it}}_{\substack{\text{Cross effect}\\ \text{covariance of changes in}\\ \text{market share and TFP}}}$$

$$+ \underbrace{\sum_{i\in E}\theta_{it}(p_{it-k}-P_{t-k})}_{\substack{\text{Entry effect}\\ \text{TFP growth due to the}\\ \text{entry of new firms}}} - \underbrace{\sum_{i\in X}\theta_{it-k}(p_{it-k}-P_{t-k})}_{\substack{\text{Exit effect}\\ \text{TFP growth due to the}\\ \text{exit of firms}}}$$

Where: C denotes continuing firms at time t, E denotes firms entering at or prior to time t, and X denotes firms with a cohort that exit at or prior to t.

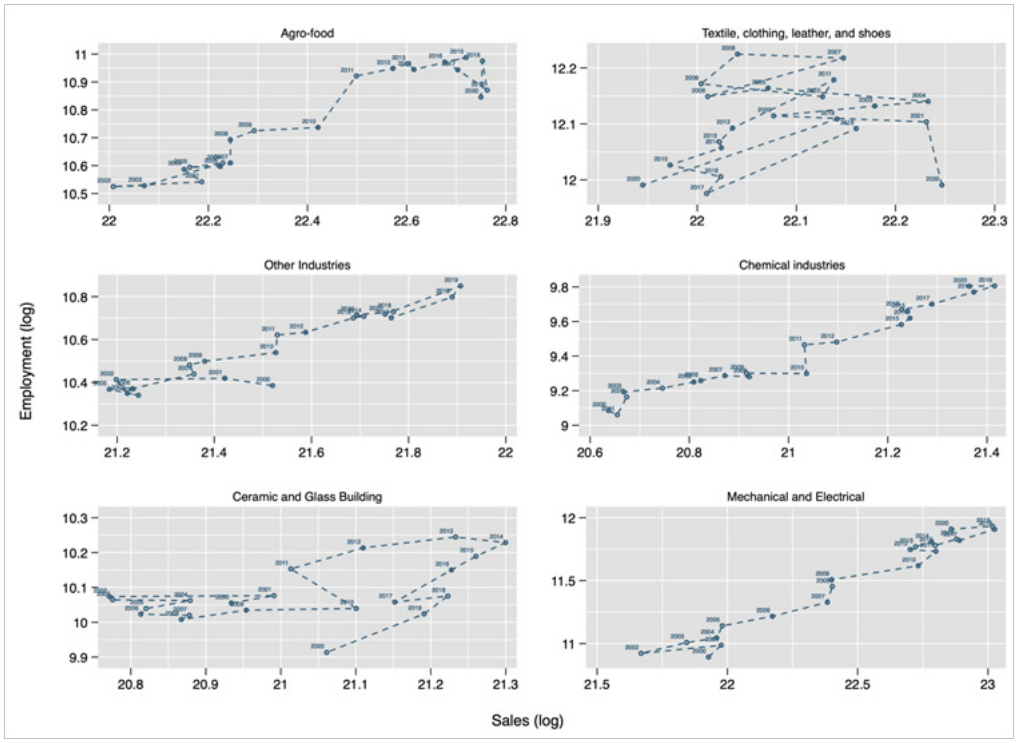
Data has been cleaned by removing outliers and missing values. We have also eliminated public and services sector enterprises to focus only on private manufacturing firms with at least one employee. In total, we have an unbalanced panel of 12,707 firms observed over a period of 21 years, which represents a total of 266,847 observations. The descriptive statistics of the variables used to estimate labour productivity (total sales by total number of workers) at the firm-level in the first step, and to perform the static and dynamic decomposition in the second step, are summarized in Table 9.

Table 9: Descriptive statistics (firm-level data, yearly averages during the period 2000-2020)

	Mean	Std. Dev.	Min	Max
Sales/workers (log)	10.83	0.12	10.6	11.01
Total number of employees per firm	32.23	143.16	1	16860
Mean firm age	14.33	11.01	1	121
Total number of employees	409,497	48,935	319,491	484,496
Total number of firms	12,707	1,058	9,467	13,901
Total number of employees by firm size				
1-19	44,897	4,247	3,3326	50,597
20-49	42,930	2,231	39,555	46,623
50-99	55,179	3,037	49,335	59,237
100-199	73,778	4,741	62,996	80,646
200+	192,714	46,638	119,652	267,612
Total number of firms by size				
1-19	9,630	999	6,535	10,700
20-49	1,357	71	1,259	1,471
50-99	786	45	705	845
100-199	530	33	458	583
200+	403	50	313	503
Total number of employees by sector				
Agro-food	48,166	8,415	37,229	59,145
Tobacco	257	25	188	310
Textile, clothing, leather, and shoes	180,772	13,242	158,832	203,753
Other Industries	39,114	6,535	30,946	51,541
Oil refining	104	21	61	140
Chemical industries	12,775	3,188	8,608	18,142
Ceramic and glass building	24,017	2,040	20,201	28,130
Mechanical and electrical	104,291	35,231	53,770	15,2027
Total number of firms by sector				
Agro-food	3,201	607	1647	3,902
Tobacco	7	0.8	6	9
Textile, clothing, leather, and shoes	3,251	302	2,499	3,671
Other Industries	2,974	243	2,112	3,197
Oil refining	7	1.7	4	11
Chemical industries	438	40	383	534
Ceramic and glass building	610	52	435	664
Mechanical and electrical	2,219	317	1,650	2,584

Source: Authors' calculations using firm level data from the RNE (2000–2020).

Figure 13: Changes in the average number of employees (log) and sales (log) by sector: 2000-2020



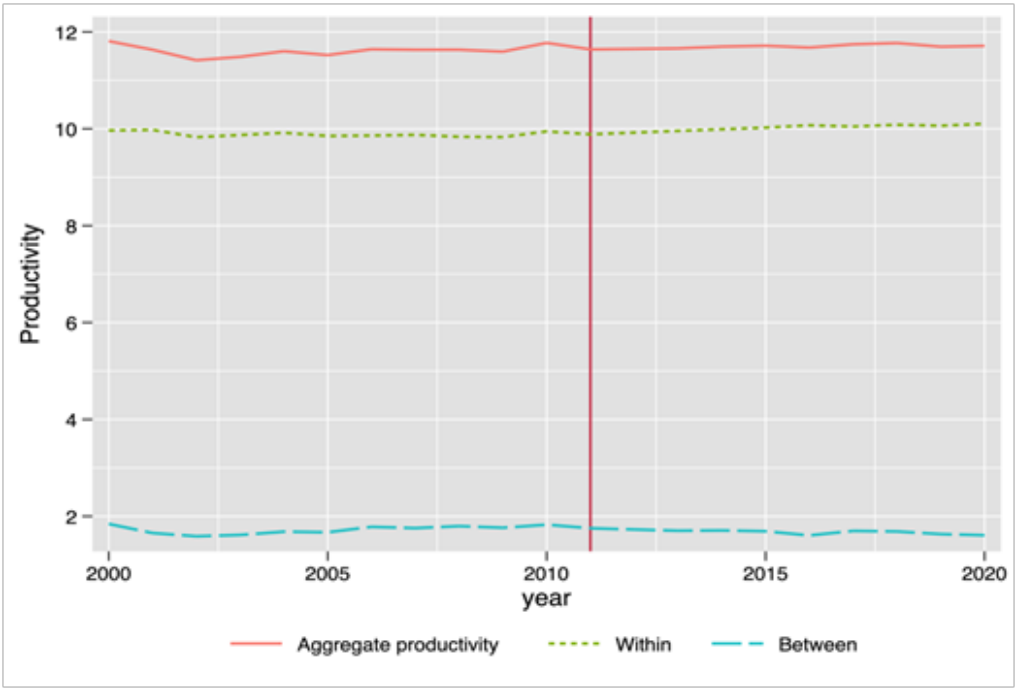
From 2000 to 2020, the total number of employees ranges from 319,491 to 484,496 with an annual average of 409497 jobs for 12,707 firms (32 employees by firm). Most manufacturing firms are small (76% employ between 1 and 19 employees). The average firm age ranges from one year to 121 years. The textile and clothing sector accounts for nearly 44% of manufacturing employment, followed by the mechanical and electrical sector with 25%. The log of the average sale per workers ranges from 10.6 to 11.01 with a standard deviation of 0.12 showing a marginal improvement in aggregate productivity between 2000 and 2020. Figure 13 presents the relationship between sales (log) and total employment (log) by sector.[11] The three sectors of agro-food, mechanical and electrical, and chemical show positive and increasing relationships between sales and job creation. The chemical sector has had a significant jump in employment in 2011 without an equivalent increase in sales, but it experienced a decline in sales in 2020 because of the COVID-19 pandemic. The COVID-19 pandemic has negatively impacted the employment of the agro-food sector, which has significantly decreased. The textile and clothing sector and the mechanical and electrical sector, on the other hand, have both suffered from employment and sales reductions between 2000 and 2020 (textile and clothing sector has experienced very low employment and sales levels since the 2011 revolution).

The results of regressions (Table A4 [in the appendix]) confirm the positive relationship between firm's size and job creation, while the oldest firms are the least job creators. Moreover, the more the share of young employees in the company increases, the more it becomes able to increase its size. The results of the determinants of firm's labour productivity by manufacturing sector confirm the positive relation between firm size and productivity for all sectors (Table A5 [in the appendix]). In addition, young firms under ten years old are more productive. The results show a positive relationship between exporting and productivity for firms operating in the agro-food and chemical sectors. Another important result is that firms in the real regime are more productive than those in the flat-rate regime.

Figure 14 reports the results of the Olley–Pakes decomposition of labour productivity[12] based on the group of 2-digit sectors. From 2000 to 2020, the aggregate productivity (all sectors combined) falls from 11.81 in 2000 to 11.71 in 2020, i.e., an annual decrease of 0.04% on average. Figure 14 shows, in addition, that the unweighted mean productivity increased by 0.06% per year over the study period, but the covariance term decreased from 1.67 in 2000 to 1.61 in 2020. Overall, for all sectors combined, the structural change (reallocation of resources–labour and capital–from less to more productive firms) has not taken place. Nearly all of the increase in aggregate productivity (85%) can be attributed to growth in average productivity, rather than reallocation that only explain 15%. This result suggests the existence of barriers that prevent the reallocation of resources to the most productive firms and/or to the most innovative ones, thus hindering the economy's ability to generate wealth and jobs. Our results are in line with those of Brown et al. (2018) for the case of developing countries in Latin America. They find that the aggregate covariance of firm size and productivity composes between 18% and 20% in Chile and Mexico and 15% in Peru and more important in Colombia, which reaches 37%.

Table 10 reports the results of the Oley-Pakes static decomposition by sector based on the group of 2-digit (23 sub-sectors aggregated to eight manufacturing sectors according to the national accounts grouping (see Table A2 [in the appendix]). For each manufacturing sector, we report the average and the growth rate of (i) the aggregate productivity, (ii) the unweighted mean productivity, and (iii) the covariance between market shares and productivity over the period 2000–2020, as well as before and after the 2011 revolution (see Figure 15 for the annual evolution of these three variables).

Figure 14: Trends in aggregate productivity, unweighted mean productivity and covariance (all sectors combined)



Note: The vertical line represents the year of the revolution (2011).

The agro-food sector has the highest average of the aggregate productivity (12.30) followed by the chemical sector (11.93). The textile & clothing sector has the lowest aggregate productivity of 10.77 (the same ranking is observed for the two periods before and after 2011). The result found for all sectors combined that low reallocation of resources remains valid at the sectoral level. Otherwise, aggregate sectoral productivity is largely explained by the within component. Among the six manufacturing sectors, only two sectors (agro-food and ceramics and glass building) show positive aggregate productivity annual growth rates over the 2000–2020 period (0.14% for both sectors), while the annual growth rates for the four sectors of textile, other industries, mechanical & electrical, and chemical industries are negative in the order of -0.14%, -0.18%, -0.05%, and -0.03%, respectively. The aggregate productivity declines reported for most manufacturing sectors are mainly driven by the large declines in covariance (since the growth rates of within-firm productivity are positive for almost all sectors). Indeed, the covariances fell by 2.88% per year for textile and clothing, 1.81% for other industries, and by 0.9% for mechanical & electrical sector.

Table 10: Olley-Pakes productivity decomposition (average and growth rate over the period 2000-2020 and before and after 2011)

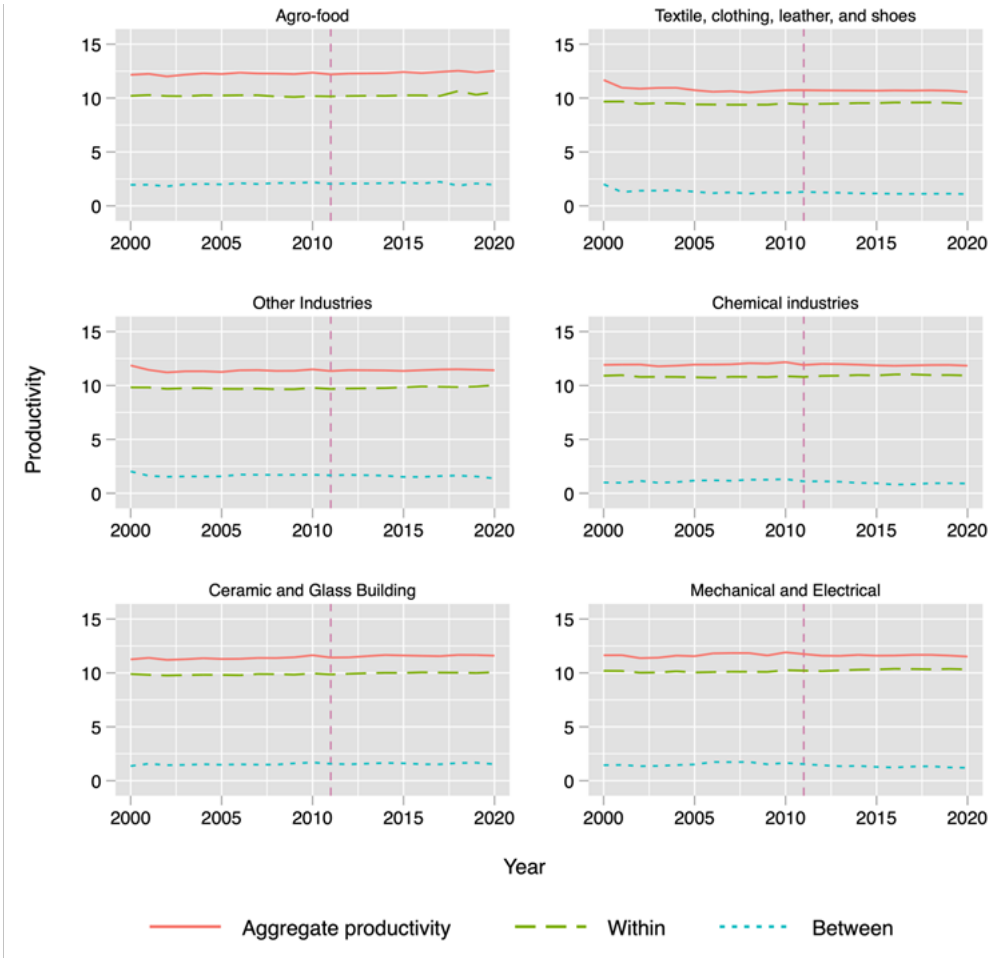
	Average			Annual growth (%)		
	2000 –2020	2000 –2010	2011 –2020	2000 –2020	2000 –2010	2011 –2020
Aggregate productivity						
Agro-food	12.30	12.24	12.37	0.14	0.15	0.27
Textile, clothing, leather, and shoes	10.77	10.84	10.69	-0.47	-0.77	-0.15
Other Industries	11.41	11.41	11.42	-0.18	-0.28	0.06
Chemical industries	11.93	11.96	11.90	-0.03	0.20	-0.05
Ceramic & Glass Building	11.46	11.36	11.58	0.14	0.30	0.15
Mechanical & Electrical	11.64	11.66	11.63	-0.05	0.21	-0.20
All sectors	**11.65**	**11.61**	**11.70**	**-0.04**	**-0.03**	**0.06**
Within (unweighted mean productivity)						
Agro-food	10.25	10.21	10.30	0.17	-0.03	0.40
Textile, clothing, leather, and shoes	09.50	09.48	09.53	-0.09	-0.16	0.05
Other Industries	09.78	09.73	09.83	0.10	-0.04	0.36
Chemical industries	10.88	10.82	10.94	0.01	-0.04	0.12
Ceramic & Glass Building	09.92	09.85	09.99	0.08	0.05	0.22
Mechanical & Electrical	10.20	10.12	10.30	0.06	0.05	0.11
All sectors	**09.95**	**09.87**	**10.01**	**0.06**	**-0.02**	**0.22**
Between (covariance between market shares and productivity)						
Agro-food	2.05	2.03	2.07	0.01	1.03	-0.44
Textile, clothing, leather, and shoes	1.30	1.36	1.17	-2.88	-4.44	-1.79
Other Industries	1.64	1.68	1.59	-1.81	-1.52	-1.81
Chemical industries	1.07	1.14	0.96	-0.46	2.47	-1.94
Ceramic & Glass Building	1.55	1.51	1.58	0.55	2.00	-0.28
Mechanical & Electrical	1.44	1.54	1.33	-0.90	1.24	-2.51
All sectors	**1.70**	**1.73**	**1.68**	**-0.65**	**-0.08**	**-0.86**

Source: Authors' calculations using firm level data from the RNE (2000–2020).

The Olley–Pakes static decomposition by period (2000–2010 and 2011–2020) shows very interesting results. Thus, while the average annual growth rates of aggregate productivity before and after 2011 are very close, those of the within part are quite different. While the pre-revolution period 2000–2010 displays a general increase in the contribution of the within-firm component to aggregate productivity at least for the following sectors: chemical industries (2.47%), ceramic and glass building (2.00%), mechanical & electrical (1.24%), and agro-food (1.03%), the same cannot be said for the post-revolution period 2011–2020, where the negative annual growth of the within-firm component suggest a deterioration in the allocative efficiency for all sectors. The only sector that shows a better result after the revolution is the textile & clothing sector. Thus, even if the average annual growth rate of the within-firm component remains negative, a clear improvement in the allocative efficiency is observed after the revolution (the rate has gone from -4.2% before 2011 to -2.0% after that). Overall, the results of the static Olley–Pakes decomposition show that the Tunisian manufacturing sector remains trapped by a misallocation of resources between firms. Capital and labour are poorly distributed (less productive firms receive a large share of resources), which reduce the capacity of manufacturing sector to create enough jobs.

Results for the Foster et al. (2001) dynamic decomposition for the whole period 2000–2019 and by 5-year sub-periods are reported in Table 11 and graphically presented in Figure 16. Changes in labour productivity (all sectors combined) are expressed in annual values. Focusing on the overall changes from 2000 to 2020, labour productivity had increased by 0.2% per year. Within-firm and between-firm components contribute both negatively to labour productivity growth. More specifically, the contribution of the within-firm component, which is referred as a pure within-firm improvement, was -16.5%, showing a weakness in firms improving performance, as labour productivity growth is low when the firm-market share is held constant. The negative contribution of between-firm effects (-15.6%) shows that continuing firms with initially above-average labour productivity had lost market share. This result is in line with the Olley–Pakes static decomposition and shows that there is evidence of misallocation, so no reallocation of resources from less to more productive firms. The cross-term accounts for the majority of change in labour productivity (+30.3%). This means that firms which become more productive also increased their market share. Entry and exit contribute negligibly to changes in labour productivity between 2000 and 2020, with a positive net entry of 2% showing that entry firms are more productive than exiting firms.

Figure 15: Trends in aggregate productivity, within-firm productivity and covariance for the manufacturing sectors during the period 2020-2020



The dynamic decomposition by sub-periods shows that Tunisia experienced positive labour productivity growth during the two periods of 2006–2010 and 2016–2019 (5.4% and 0.7%, respectively). While, both sub-periods of 2000–2005 and 2011–2015 (the 5-years period following the 2011 revolution) experienced negative labour productivity growth. Compared to the results found for the whole study period 2000–2019, the positive growth of 5.4% during the period 2006–2010 was mainly attributed to the improvement in the contribution of the within-firm component. Indeed, the negative contribution of the within-firm component decreased from -16.5% during 2000–2019 to 9.5% for 2006–2010. The contributions of the other components are almost the same. The negative growth during the first 5-years after the revolution was mainly attributed to the large negative contributions of both

within-firm and reallocation effects (-11.1%). The cross effect remains positive and high (21.6%), while net entry has no significant contribution to labour productivity growth, due to exits of productive firms (Figure 17). The recovery of labour productivity from 2016 to 2019 was slow, with only 0.7% annual growth.

Table 11: Dynamic decomposition of labour productivity (all sectors combined)

Period	Total	Within	Between	Cross	Net entry	Entry	Exit
	(1+2+3+4)	(1)	(2)	(3)	(4) = (5)-(6)	(5)	(6)
2000–2019	0.002	-0.165	-0.156	0.303	0.020	0.049	0.029
2000–2005	-0.044	-0.383	-0.269	0.553	0.055	0.067	0.012
2006–2010	0.054	-0.095	-0.154	0.298	0.005	0.035	0.030
2011–2015	-0.006	-0.111	-0.111	0.216	-0.000	0.056	0.056
2016–2019	0.007	-0.048	-0.075	0.107	0.023	0.035	0.013

Source: Authors' calculations using firm level data from the RNE (2000–2020).

Figure 16: Contribution to labour productivity growth (all sectors combined)

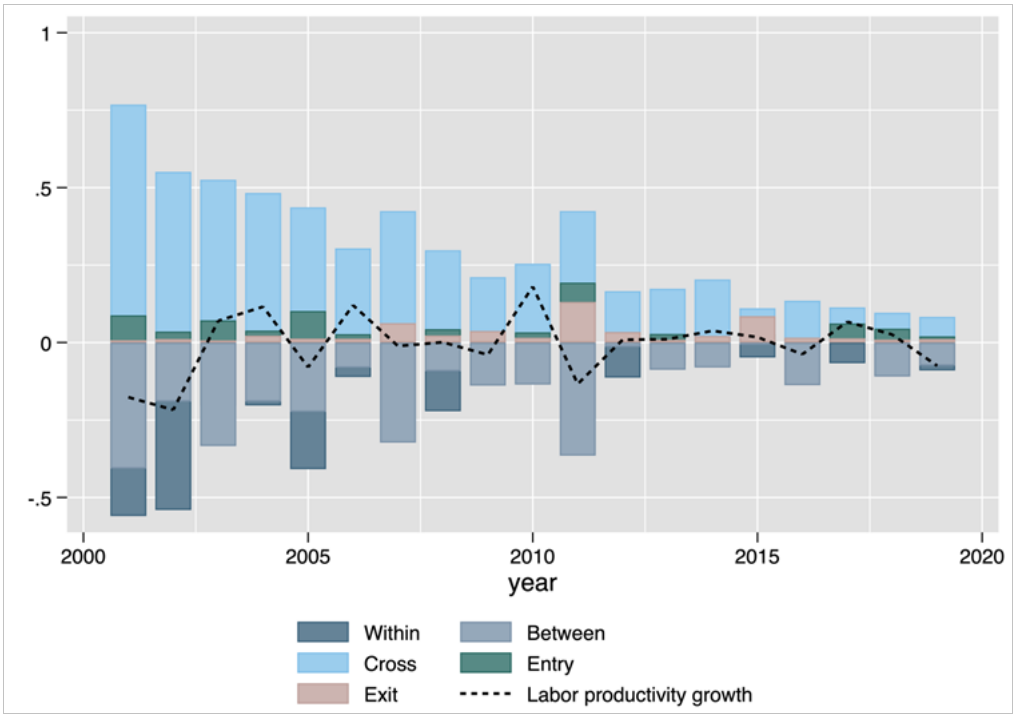
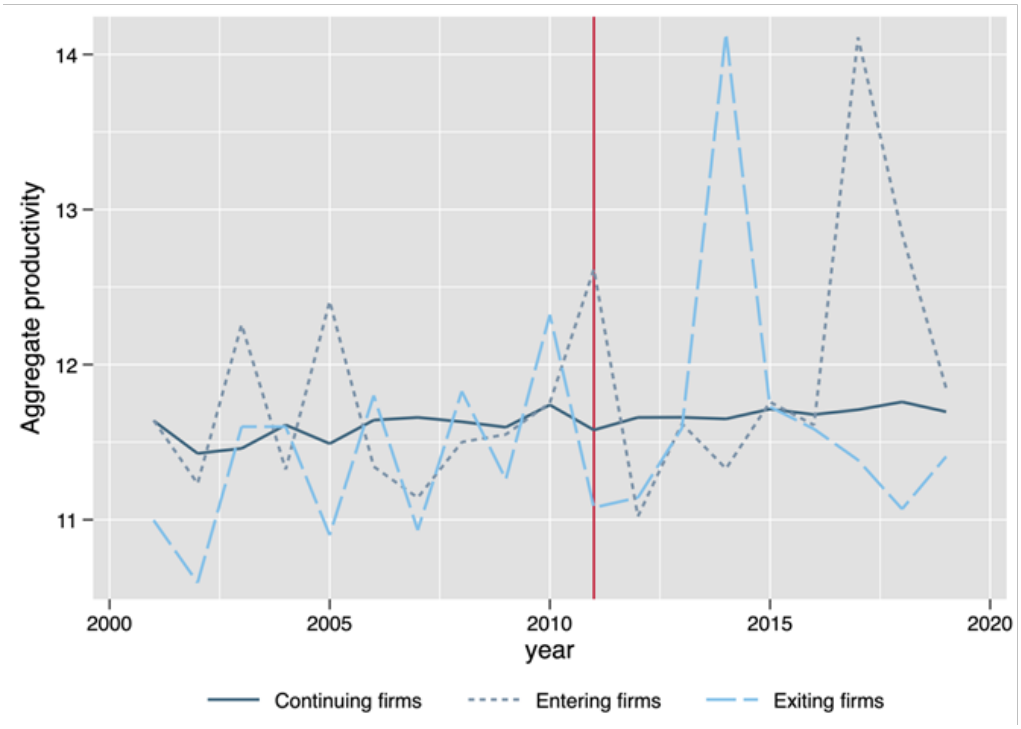


Figure 17: Distribution of aggregate labour productivity (log) by firm status (all sectors combined)



Results for the Foster et al. (2001) dynamic decomposition by sector over the whole period 2000–2019 and by 5-year sub-periods are reported in Table 12 and graphically presented in Figure 18. The agro-food sector shows positive growth in labour productivity over all sub-periods with a downward trend: it about 3.5% in 2006–2010, 1.7% in 2011–2016, and only 0.8% during the last sub-period 2016–2019. Labour productivity in the three sectors of chemical, ceramic & glass and mechanical & electrical shows negative growth rates in the first sub-period after the revolution. The effect of the revolution is most noticeable in the chemical and mechanical & electrical sectors, which experienced a decline in productivity of almost 5.6%. The ceramic & glass sector is the least affected (negative growth rate of 0.2% with an immediate recovery rate of 2.3% during the period 2016–2019). The textile & clothing sector had a recovery in productivity after the revolution, starting from a rate of 0.3% during 2011–2015 to 2.2% for the period between 2016 and 2019.

In terms of contribution to labour productivity, the results by sector are almost the same as those already found for all sectors combined. The within- and between-firm components contribute negatively to productivity growth, while the cross term accounts for the majority of changes in labour productivity growth whatever the sector. The entry effect contribution remains small, specifically during the 5-year period after the revolution, and negative for the chemical and mechanical & electrical sectors (-1.4% and -2.5%, respectively) (see Figure 19).

Table 12: Dynamic decomposition of labour productivity by sector

Period	Total	Within	Between	Cross	Net entry	Entry	Exit
	(1+2+3+4)	(1)	(2)	(3)	(4) = (5)-(6)	(5)	(6)
Agro-food							
2000–2019	0.022	-0.119	-0.093	0.201	0.035	0.049	0.014
2000–2005	0.025	-0.227	-0.138	0.335	0.056	0.064	0.008
2006–2010	0.035	-0.088	-0.118	0.226	0.016	0.032	0.016
2011–2015	0.017	-0.073	-0.035	0.114	0.011	0.026	0.015
2016–2019	0.008	-0.084	-0.080	0.110	0.062	0.079	0.017
Textile, clothing, leather, and shoes							
2000–2019	-0.040	-0.287	-0.236	0.455	0.028	0.052	0.024
2000–2005	-0.177	-0.738	-0.577	1.065	0.071	0.093	0.022
2006–2010	0.005	-0.168	-0.161	0.316	0.018	0.056	0.039
2011–2015	0.003	-0.152	-0.090	0.229	0.015	0.038	0.023
2016–2019	0.022	-0.042	-0.086	0.146	0.003	0.012	0.009
Other Industries							
2000–2019	-0.014	-0.097	-0.077	0.145	0.015	0.033	0.018
2000–2005	-0.096	-0.207	-0.112	0.200	0.023	0.043	0.020
2006–2010	0.052	-0.061	-0.078	0.168	0.023	0.042	0.019
2011–2015	-0.031	-0.091	-0.081	0.137	0.005	0.027	0.023
2016–2019	0.028	-0.014	-0.026	0.058	0.010	0.017	0.007
Chemical industries							
2000–2019	0.004	-0.047	-0.054	0.095	0.010	0.020	0.011
2000–2005	0.022	-0.067	-0.071	0.117	0.044	0.047	0.003
2006–2010	0.044	0.003	-0.034	0.070	0.005	0.013	0.008
2011–2015	-0.058	-0.115	-0.072	0.143	-0.014	0.010	0.024
2016–2019	0.011	0.001	-0.034	0.040	0.003	0.010	0.007
Ceramic & Glass Building							
2000–2019	0.026	-0.053	-0.038	0.100	0.018	0.023	0.005
2000–2005	0.011	-0.177	-0.057	0.220	0.025	0.032	0.006
2006–2010	0.070	0.027	-0.018	0.056	0.006	0.008	0.002
2011–2015	-0.002	-0.039	-0.065	0.067	0.035	0.041	0.006
2016–2019	0.023	-0.018	-0.008	0.048	0.001	0.007	0.005
Mechanical & Electrical							
2000–2019	0.006	-0.152	-0.206	0.360	0.004	0.055	0.051
2000–2005	-0.004	-0.302	-0.202	0.443	0.057	0.065	0.008
2006–2010	0.072	-0.099	-0.280	0.473	-0.023	0.033	0.055
2011–2015	-0.056	-0.139	-0.241	0.350	-0.025	0.095	0.120
2016–2019	0.011	-0.045	-0.077	0.125	0.008	0.020	0.012

Source: Authors' calculations using firm level data from the RNE (2000–2020).

Figure 18: Contribution to labour productivity growth by manufacturing sector

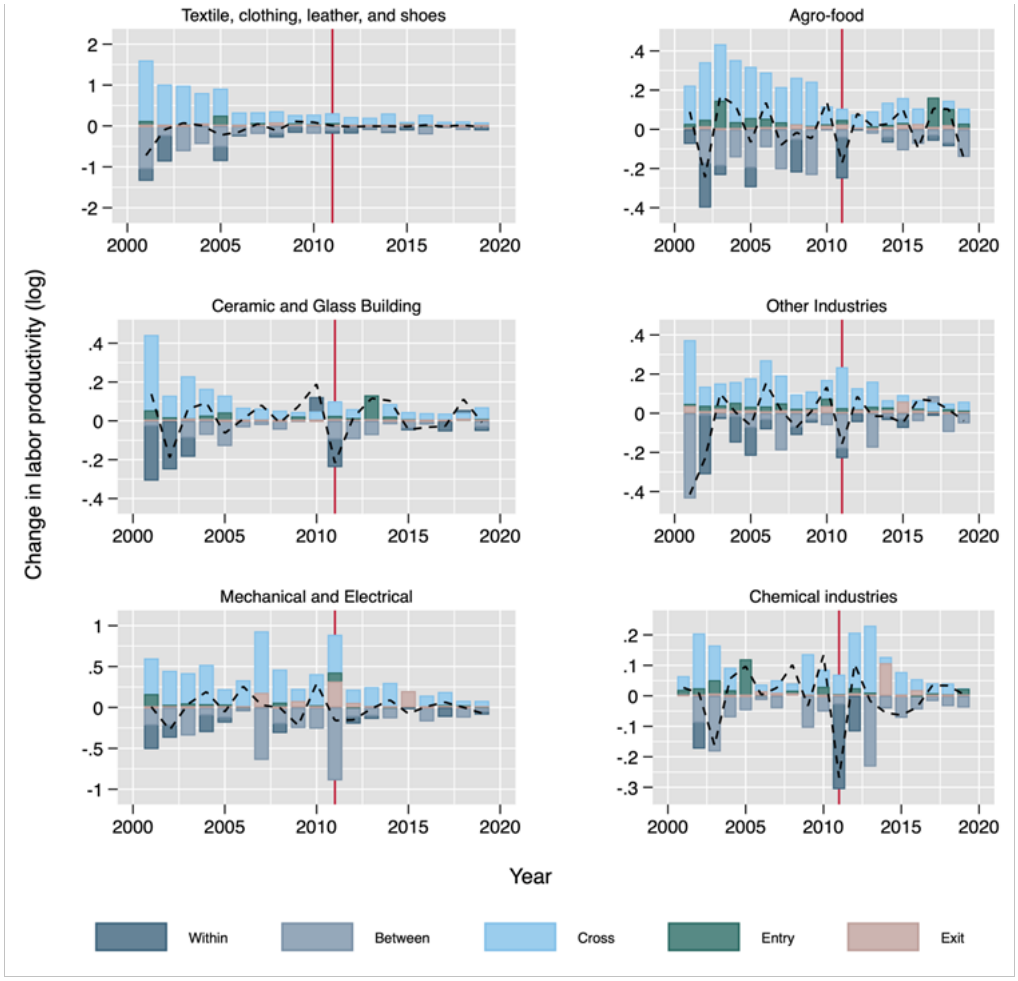
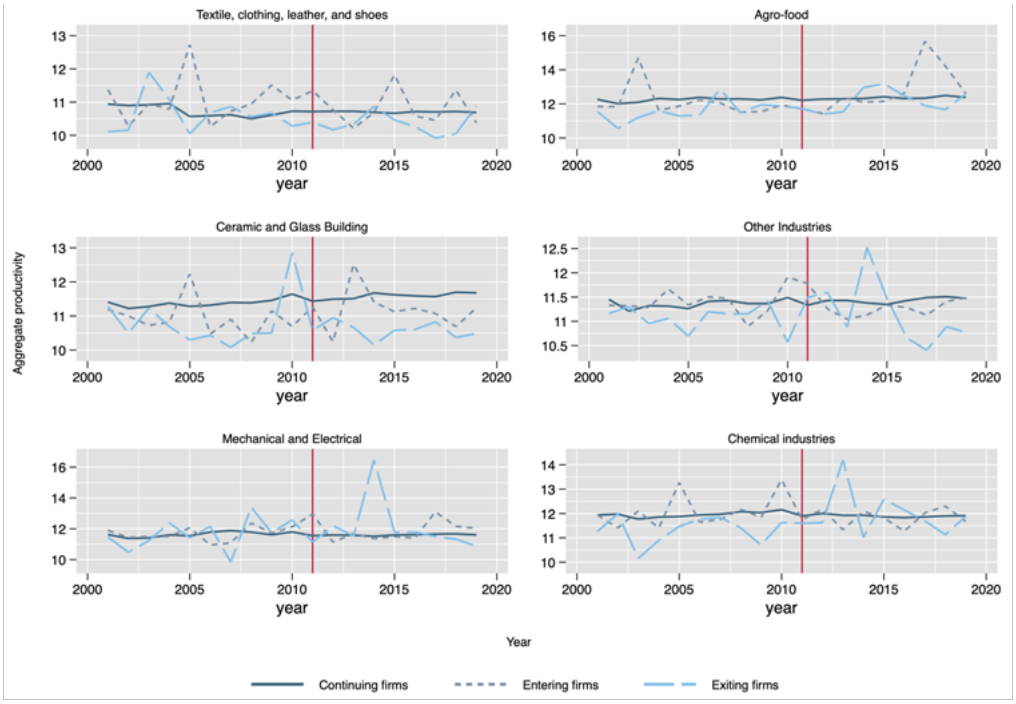


Figure 19: Distribution of aggregate productivity (log) by firm status and by sector



6. Political economy

The previous sections illustrated sectors and firms that generate more jobs. This section highlights the political economy of promoting jobs in Tunisia and completes the results already found through the extensive macro- and micro-level analyses, by public policy analyses as well as economic policy ones to make appropriate employment policies.

We first begin by providing a summary of key takeaways from macro and micro-Tunisian analysis. Then, we present the main economic and political constraints to develop key sectors. At the end, we present the public actions to support job creation in Tunisia, as well as targeted policies for specific sectors.

Key takeaways from the macro and micro analysis

The key takeaways from the macro and micro-Tunisian analysis could be summarized as follows.

From the macro (sectoral level) analysis, the main results found are as follows:

1. Growth in value-added per capita between 2011 and 2018 was "jobless growth", that is, satisfactory job creation did not accompany growth. It was driven by increased productivity and participation rate, rather than an increase in the employment rate.

2. A 1% increase in industry output generates twice as much employment as the services sector (0.23% vs. 0.11%) for the Tunisian population aged between 15 and 64 years, while a 1% increase in services output generates twice as much employment as industry (0.15% vs. 0.08%) for young people between aged 15 and 25 years.

3. The part of manufacturing sector in total value-added has declined considerably by nearly seven percentage points (from 20% in 2000 to 14% in 2019). It has fallen less significantly by two percentage points in its contribution to total employment (from 20% in 2000 to 18% in 2019).

4. At the sectoral level, the agro-food sector has the highest average of the aggregate productivity (12.30) followed by the chemical sector (11.93). The textile & clothing sector has the lowest aggregate productivity of 10.77. This result applies to all sectors combined (low reallocation of resources). Otherwise, aggregate sectoral productivity is largely explained by the within component.

From the micro (firm-level) analysis, the main results are as follows:

1. For manufacturing, self-employment start-ups, which account for 73% of all active firms, generate only 10% of employment, while 47% and 39% of employment are generated by small and medium-sized firms and large firms, respectively.

2. Large firms with 200 or more employees provide a large share of employment, at 27%.

3. Existing leading commercial firms are the most important contributors to net employment growth, followed by large manufacturing sector firms.

4. The Olley–Pakes static decomposition shows that Tunisian manufacturing sector is marked by a lower output and a misallocation of resources between firms. Nearly all the increase in aggregate productivity is attributed to growth in average productivity (85%), rather than reallocation (15%). Capital and labour are poorly distributed (less productive firms receive a large share of resources), which reduce the capacity of manufacturing sector to create enough jobs.

5. The dynamic decomposition shows that within-firm and between-firm components contribute both negatively to labour productivity growth, witnessing a poor performance of firms. The negative contribution of between-firm effects shows a lack of resources reallocation from less to more productive firms. The results of Foster et al. (2001)'s decomposition by sector confirm those already found for all sectors combined. The within and between components contribute negatively to productivity growth, while the cross term accounts for the largest change in labour productivity growth across all sectors.

6. Entry and exit has contributed little to changes in labour productivity between 2000 and 2020: with a positive net entry of only 2%, entry firms are more productive than exiting firms.

Economic and political constraints

Based on the two available waves of the World Bank Enterprise Surveys (WBES) and following McMillan et al. (2017), we try to identify the general constraints (that apply across all sectors) to jobs creation in Tunisia. Moreover, from our macro and micro analysis, we try to identify the main specific issues that block the development of the promising manufacturing sectors. The WBES survey is an excellent source of information on business environment for companies. It is useful to identify the barriers faced by Tunisian firms. The availability of the data for several other countries allowed us to compare Tunisia with other MENA countries such as Egypt, Morocco, and Jordan.

Figure 20 and Figure 21 report the three main obstacles to business for 2013 and 2019, respectively. Half of the Tunisian companies state political instability as the major/severe obstacle in 2013, that is, two years after revolution. Access to finance is the major obstacle for 31% of Jordanian firms, while 21% of Moroccan firms consider corruption as the first cause. In 2019, eight years after the Arab Spring, political instability remains the main obstacle for 34% of companies in Egypt, compared with only 11% of Tunisian companies. In 2019, access to finance is the main constrains on firms' operations in Tunisia (Figure 21) and corruption is the main concern for 15% of firms in three countries: Tunisia, Morocco, and Jordan. The higher level of corruption has a larger negative impact on employment growth and sales of Tunisian firms (Table 13).

Figure 20: Three main obstacles to business operations by country (2013)

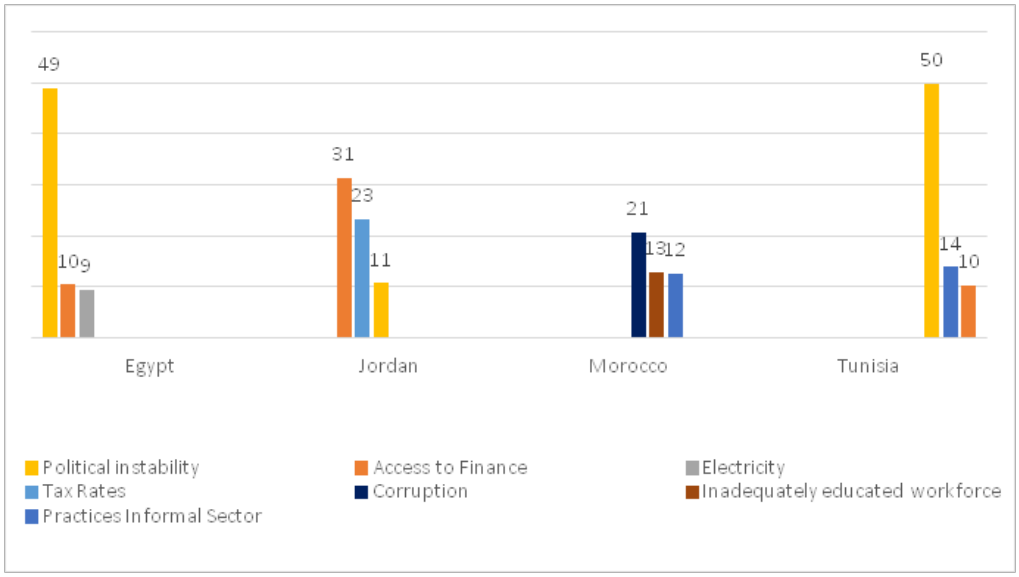
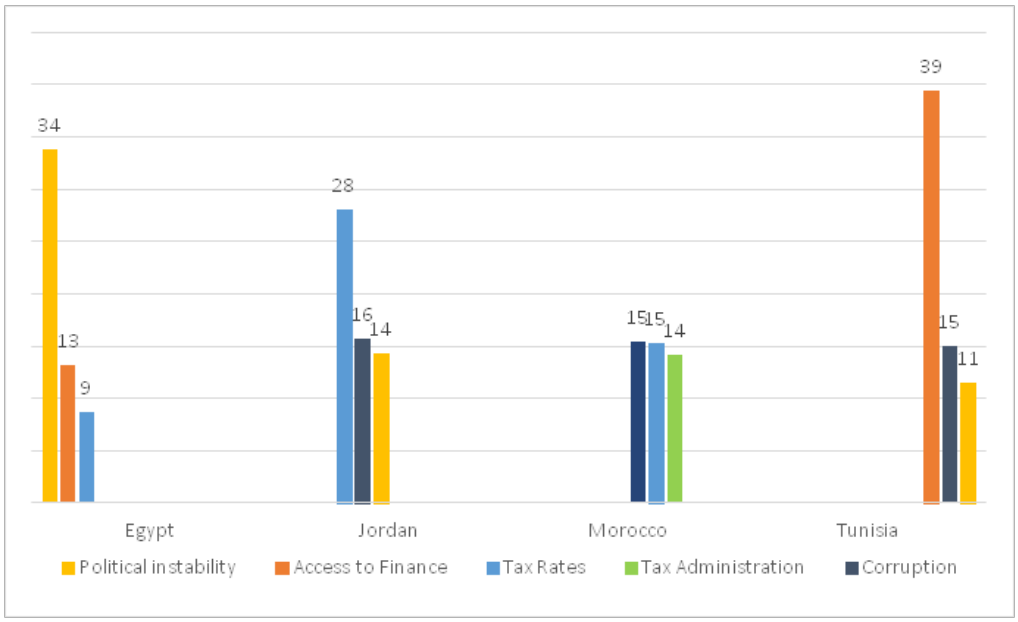


Figure 21: Three main obstacles to business operations by country (2019)



From our analysis, and using static and dynamic decompositions, we can identify the main specific barriers to jobs creation in manufacturing sectors as the following: (i) the Tunisian manufacturing sector remains plagued by a misallocation of resources between firms, (ii) a weakness in firm improving performance, (iii) and a negligibly small contribution of entry and exit to labour productivity change in the period 2000–2020. Indeed, the low productivity growth rate (even negative for several manufacturing sectors such as textile & clothing, chemical industries, and mechanical & electrical sector) highlights the existence of barriers to reallocate resources toward more productive activities, an inefficiency that could undermine sustaining long-run growth. Moreover, market barriers and the heavy and lengthy administrative procedures explain the low contribution of the net entry component to aggregate labour productivity.

Table 13: The cost of corruption

	Tunisia			Four selected MENA countries (Egypt, Jordan, Morocco, Tunisia)		
	Real annual sales growth (%)	**Annual employment growth (%)**	**Log labour productivity (Sales per worker, USD)**	**Real annual Sales growth (%)**	**Annual employment growth (%)**	**Log labour productivity (Sales per worker, USD)**
Corruption as major/severe obstacle (Y/N)	-4.689**	-4.192**	-0.111	-1.603	-1.466	-0.105
	(1.995)	(1.701)	(0.126)	(1.466)	(1.195)	(0.117)
Log of size	1.585**		-0.039	1.061*		0.035
	(0.799)		(0.049)	(0.569)		(0.059)
Log of size, 3 FY ago		-2.243***			-3.470***	
		(0.703)			(0.725)	
Young firms (5 years of less) Y/N	1.482	6.876	0.362*	3.924	6.273**	0.045
	(3.885)	(4.434)	(0.205)	(2.662)	(2.696)	(0.167)
Firm is part of larger firm (Y/N)	0.110	-3.503*	-0.116	-0.617	-1.844	0.020
	(1.839)	(1.883)	(0.173)	(1.759)	(1.382)	(0.166)
Manager has university education (Y/N)	-0.235	1.307	0.218*	1.807	1.803	0.172
	(2.104)	(1.711)	(0.120)	(1.407)	(1.354)	(0.121)
Manager experience in sector (years)	-0.151	-0.073	-0.003	-0.149**	-0.104	0.008
	(0.097)	(0.080)	(0.006)	(0.070)	(0.069)	(0.006)
Export 10% or more of sales (Y/N)	2.311	2.987	-0.132	0.346	3.377**	0.063
	(2.476)	(2.077)	(0.141)	(1.808)	(1.684)	(0.146)
Foreign ownership (Y/N)	3.850	0.906	-0.166	1.440	0.416	0.077
	(2.475)	(2.678)	(0.160)	(3.072)	(1.919)	(0.212)

continued next page

Table 13 Continued

	Tunisia			Four selected MENA countries (Egypt, Jordan, Morocco, Tunisia)		
	Real annual sales growth (%)	**Annual employment growth (%)**	**Log labour productivity (Sales per worker, USD)**	**Real annual Sales growth (%)**	**Annual employment growth (%)**	**Log labour productivity (Sales per worker, USD)**
Retail firms (Y/N)	-6.895	-4.156	0.066	-2.548	-1.653	0.233
	(4.595)	(4.136)	(0.285)	(2.622)	(2.366)	(0.228)
Other services firms (Y/N)	-2.743	0.538	0.163	-3.101*	-1.736	0.314**
	(2.252)	(1.854)	(0.129)	(1.618)	(1.505)	(0.136)
Constant	-3.217	11.055***	10.854***	-4.184	14.881***	10.004***
	(4.522)	(3.855)	(0.339)	(3.054)	(3.078)	(0.315)
Number of observations	546	557	566	2 419	2 731	2 731
R2	0.096	0.109	0.043	0.208	0.169	0.128

Notes: FY: Fiscal year; (Y/N): yes or no question.
Source: Authors' calculation using the World Bank Enterprise Surveys

Apart from these general and specific constraints identified directly from our analysis, there are other serious obstacles to job creation in Tunisia related to the functioning of the labour market itself, such as the structural mismatch and the informal sector. Indeed, though there is higher education sector development, Tunisian economy is disadvantaged through low-skilled employment and low-wage activities not covered by laws. Thus, the newly unemployed people are mainly young and well-educated, reflecting a structural mismatch between education and training, on the one hand, and the labour market on the other hand (World Bank, 2010). The Tunisian economy is largely oriented towards activities intensive in low-skilled or unskilled labour. The employed population is mainly involved in activities with low value-added (such as trade, transport & telecommunications, construction, and textiles & clothing), therefore requiring primary and/or secondary schooling. According to the employment survey of the Arab Institute of Business Managers (IACE hereinafter)[13] it appears that the most frequently vacant jobs in 2016 corresponded to low-skilled labour (blue-collar workers, commercial attachés, etc.). According to the Tunisian Centre for Economic Intelligence and Monitoring, seven out of ten companies say that they have difficulties in hiring skilled workers (Labidi et al., 2017).

Finally, the informal sector and its rapid growth remain an important challenge for the Tunisian economy. Despite the lack of official statistics about the share of this sector in the Tunisian economy, all studies dealing with it underline a fast-growing sector. According to the IMF's report, the informal economy represented 30% of the Tunisian GDP in 2010.[14] In 2015, there were 1,092,000 workers in the informal sector, representing 32.2% of the total employment.[15]

Public actions to support job creation in Tunisia

In this sub-section, we follow Dirk's framework paper (Willem te Velde, 2021)[16] to identify the political economy issues to promote sectors in Tunisia. We try to identify the efforts implemented by Tunisia for the following four issues: (i) political economy relations, (ii) credible commitments, (iii) appropriate public goods, and (iv) investment facilitation.

a. Political economy relations

The democratic transition after the 2011 revolutionary thrust has been accompanied by a severe economic recession which accounts for the difficulties experienced by Tunisia today, albeit partly. Ten years after the Tunisian revolution, the country's political life is marked by multiple crises coupled with social conflicts: thirteen governments have succeeded each other since 2011. To deal with these challenges, the government, the Tunisian General Labour Union (UGTT, *Union Générale Tunisienne du Travail*) and the Tunisian Confederation of Industry, Trade and Handicrafts (UTICA, *Union Tunisienne de l'Industrie, du Commerce et de l'Artisanat*) have always defused conflicts and pacified social exasperations and tensions, particularly the ones relating

to employment and especially youth employment. Restoring social dialogue in Tunisia and involving those concerned is the only solution to rationalize and optimize the intervention of all stakeholders to resolve the nexus of guaranteeing decent work for young people and ensuring competitiveness for producing firms.

As investment climate could matter, Tunisian policy makers should focus on reducing political, social, and economic instability by addressing its root causes, such as high unemployment rates, regional disparities, and income inequality. Different concerned authorities should foster reforms relating to business environment to achieve a transparent and efficient regulatory regime. They also should focus on streamlining administrative procedures and strengthening the rule of law.

A meaningful participation in social dialogue and electoral power makes an important contribution to achieve this goal. Indeed, social dialogue and collective bargaining could shape the relationship between the government and different social groups to assure possible efficient actions (for the negative impact of political instability on Tunisian firms' performance, see Matta et al. (2018)). Electoral power remains an important pillar for dialogue culture and partnership reinforcement and can help ensure the autonomy of different partners and create a democratic culture. At least, the government need to include a better coordination structure for different partners to agree on the objectives and consistently address various issues.

At least two key elements can guarantee the success of this dialogue. Firstly, given the significant political, economic, and security challenges that characterize the current period, coupled with the health crisis caused by the COVID-19, all stakeholders are aware of the usefulness of such dialogue to improve working conditions and promote firms' productivity. Secondly, Tunisia has expressed its willingness to dialogue on 14 January 2013 by signing a social contract or “Social Pact” based on several principles, in particular the principle of reconciling workers' rights and that of the sustainability and competitiveness of private and public productive institutions.[17] This social dialogue would most likely accommodate social tensions and promote job creation if it succeeds in: (i) building trust among labour market stakeholders, (ii) involving all actors in a participatory approach to promote the common interest and increase productivity, (iii) reviewing wage policy and the wage/productivity relationship, (iv) revising labour market laws and wage bargaining procedures, and (v) protecting formal employment.

b. Credible commitments

The political instability that Tunisia has experienced over the past decade has reduced the credibility of the state and its involvement with its citizens. Since 2011, a single Strategic Development Plan (SDP), that of 2016–2020, has been developed around five main axes: 1) enhancing good governance, administrative reform, and anti-corruption; 2) accelerating the adoption of crucial reforms to develop a higher value-added economy; 3) developing human capital and promoting social inclusion; 4) reducing regional disparities; and 5) embracing the green economy as a pillar of sustainable

development. Regarding the first axis, Tunisia has made significant progress in the fight against corruption. This commitment is reflected in the new Constitution of 2014, which provides, in Article 130, the creation of the Forum for Good Governance and the Fight against Corruption. Although the implementation of this Forum, mandated by the Constitution, has not yet taken place, Tunisia has established, since 2011, a National Anti-Corruption Commission (INLCC). The competition law of September 2015 was enacted to speed up the process of antitrust hearings and increase penalties for anti-competitive behaviour (USAID, 2016).

To make its administration more transparent, Tunisia elaborated, in September 2014, a National Action Plan for Open Government for 2014–2016. The adoption in March 2016 of the Right of Access to Information Act (Organic Law No. 2016-22) was a crucial step on the road to good governance and transparency. This text guarantees free access to all information published by the government, public entities and entities controlled by the government and provides for very few exceptions.

The implementation of effective anti-corruption laws and strategies, and increased transparency, remains the major challenges for Tunisia to build trust and to bridge the gap between the government and the people.

c. Appropriate public goods

In the 1990s, the Tunisian state created sector-specific technical support centres, such as the Centre Technique du Textile - CETTEX, which provides advice and expertise to textile and apparel firms. The government also created the 'Mise à Niveau' programme (PMN) in 1995 to enhance competitiveness and accelerate the business processes of modernization. Moreover, the government installed two free trade zones in Bizerte (60km north of Tunis) and in Zarzis (450km south of Tunis) to offer more favourable environment for foreign investors.

To reduce the economic disparities between coastal and non-coastal areas, Tunisia has created 140 regional development zones (ZDR) in lagging interior areas (Benner, 2019). The goal has been to attract private investments by providing fiscal incentives, fiscal transfers, and direct investments in infrastructure and developed land. Firms located in those zones benefit from an investment grant of 25% provided by the Tunisian Government. To effectively target tax and financial incentives, for lagging areas in the interior of the country, the Tunisian Government has decided to differentiate incentives according to three classes of ZDR (Benner, 2019): the first group of regional development zones (ZDRI), the second group of regional development zones (ZDRII), and the priority development zones (ZDP). However, the effect of these incentive measures on job creation in lagging areas remains very limited. Economic activity and employment remain concentrated on the coast areas. The lack of a good infrastructure and a poor human capital in the lagging areas are the main reasons for the failure of these incentive policies.

To strengthen the synergies and externalities between firms, universities, and research centres, Tunisia is involved since 1999 in the establishment of ten techno-

poles (technology parks). Each techno-pole has an area of specialization that depends on the region in which it is established. For example, the Bizerte pole deals with agro-food industries, Borj Cédria pole for renewable energy and vegetal biotechnology. The El-Ghazala pole (Ariana) hosts all companies involved in technology and communication. Its objectives are to help set up technology companies in the park by providing all the resources they need on site and to stimulate cooperation between universities researchers and private enterprise.

Transport infrastructure has been deteriorating for the past decade, and it does not provide the required connectivity between Tunisian's regions and with its neighbours. Tunisia's ranking deteriorated between 2012 and 2016 from 54th to 93rd, according to the Logistics Performance Index of the World Bank, due to delays in key infrastructure projects and shortcomings in the maintenance of existing infrastructure (OECD, 2017).[18]

d. Investment facilities or incentives

Business regulations in Tunisia are complex, opaque, and not easily accessible to both local and foreign investors. According to the 2020 edition of the World Bank's Doing Business report, Tunisia ranked 78th out of 190 countries, ahead of Algeria (157th) and Egypt (114th), but behind Morocco (53rd) and Jordan (75th).

The institutional framework for investment is also complex. There are multiple institutions to oversee investment projects (CEPEX, FIPA, APII, APIA, ONTT, etc.)[19] and a multitude of funds to finance them. These institutions are attached to different ministries and often act separately, making the system even more opaque for companies (OECD, 2017).

In the aftermath of the 2011 revolution, Tunisia embarked on a process of reforms to meet the revolution's slogan: “Work, freedom, and dignity”. An emergency employment plan was prepared in March 2011 around four pillars: (a) job creation; (b) promotion of entrepreneurship; (c) protection of existing and threatened jobs; and (d) improvement of youth employability. This emergency plan was replaced in December 2012 by the National Employment Strategy 2013–2017, which includes six strategic objectives, such as improving the employability of the workforce (with a particular focus on facilitating the transition from education to the workforce and ensuring that the training system considers the needs of the economy).

Since 2014, significant achievements have been made, the most important of which is the revision of the 1993 investment code. The 1993 investment code succeeded in stimulating private sector development for several years, its effectiveness then declined, particularly because of multiple revisions (sometimes motivated by political or rent-seeking agendas) that made it extremely complex (World Bank, 2014). A lengthy reform process was initiated in 2012 and a new version of the revised investment code was then presented to the Tunisian national assembly in 2015 and approved in September 2016. This new investment code aims to strengthen investment protection and improve access to the investment market by easing key restrictions on FDI.

Tunisia's ranking on the "business creation" dimension has improved from 63rd place in 2019 to 19th place in 2020 before Morocco (43rd), Egypt (90th), and Jordan (120th). Some additional measures are also being taken to reduce mismatch in the labour market. The government adopted, in 2015, a National Plan for the Reform of Higher Education and Scientific Research (2015–2025), which aims to improve the quality of education in order to enable greater employability of graduates.

Immediate public actions to support jobs in Tunisia

As mentioned in the foregoing, the Tunisian manufacturing sector is characterized by low productivity. It has many small firms operating mainly in low value-added sectors (of all private manufacturing firms, 85% were one-person firms, and only 0.3% had more than 100 employees). Small manufacturing firms are failing to grow and to create jobs. Large manufacturing firms create more jobs, but it is still insufficient and below their capacity. Manufacturing is, however, the sector with greatest potential for job creation; it is thus opportune to provide it with adequate support measures to increase its productivity, for example, by improving the skills of employees and providing them with transferable ones or by encouraging innovative projects. Support for research and development, and training in manufacturing can also be improved.

These interventions depend on the size of firm and its sector of activity. For example, for large manufacturing firms, it is important to support their capacity for innovation (promote cooperation between firms and universities; between firms and research centres; ensuring appropriate resources and infrastructure needed for innovation; etc.), to help them find new international markets and to simplify export procedures. The government should implement policies to improve the competitiveness of firms and the export orientation, as well as structural changes towards high-tech exports (the Republic of Korea is a good and successful example). For small manufacturing firms, access to financing presents the main obstacle. Providing the necessary financial resources can help these firms especially during the start-up period. Financial and/or fiscal support for these young and small firms should be limited in time, as these interventions may prevent the entry of more productive firms and thus slow down the process of reallocation of resources in the economy. It is, therefore, necessary to combine several industrial policies simultaneously. It is interesting to (i) support the R&D of existing companies to boost innovation and overall productivity; (ii) encourage companies in difficulty and which are not productive to exit the market (reduce aid and subsidies devoted to these companies) and (iii) encourage the entry of new and more dynamic competitor firms on the market.

The country should also have capacities and regulatory regimes to enforce laws and encourage market dynamism to promote fair and effective competition policies as well as firm dynamics. Indeed, Tunisian enterprises and economic sectors experience serious difficulties because of luck of well-informed competition policies that enhance potential economic dynamism and inhibit employment growth. Priority could be

given to measures in favour of sectors with great potential for job creation such as the manufacturing sector. These measures are also intended to articulate policies on investment and transparency, besides competition enhancing.

These efforts need to be continued by enhancing capacities through company-to-company skill transfer (spillover effects) with programmes of training supporting collaboration between institutions and enterprises with rational collaboration programmes. In addition, emphasis must be placed on skills that transfer from almost any career. It is thus important to target significant barriers to development of polyvalent workplace competencies and flexible skills such as lack of appropriate training or the absence of specific methodologies that make transfer of expertise within teams efficient and sustainable. There is also an obvious possibility for using labour mobility to acquire, transfer skills, and alleviate the shortage in labour market, but this needs to be accompanied with measures providing decent wages and fair working conditions.

Besides investment incentive, emphasis needs to be put on competition between firms especially for hiring labour force. Redressing the competitive balance requires addressing the problem sources. For example, the presence of monopoly in the labour market can encourage employers to impose wages and other working conditions. Besides, the fear of losing their human capital investment obtained during their service reduces employee's mobility. Furthermore, the decline of labour income share in overall GDP can be explained by wage stagnation because of the decrease of workers power bargaining and the union density. Thus, the government should promote collective bargaining rights and workers right to join trade unions and negotiate fair wages.

Our results show also that the services sector generates more jobs for youth, while the manufacturing sector generates more jobs for the whole population. Improving the links between the two sectors (manufacturing-related services, such as design, research, engineering, marketing, logistics services, e-commerce platforms, etc.) and increasing 'servicification' of manufacturing (smart manufacturing, information technology and digital processes) can be beneficial for the job creation. In parallel with this 'servicification' of manufacturing, which is an advanced stage in structural transformation, the modernization and industrialization of agricultural sector as well as the industrialization of rural areas and the support of employment intensive technologies remain necessary for decent and productive job creation.

7. Conclusions and policy implications

This paper has examined structural change and job creation outcomes in Tunisia during the last two decades. It is based on both a macroeconomic and microeconomic analysis. It relies on sectoral and firm-level data from the Tunisian Business Register to highlight that growth in value-added per capita between 2011 and 2018 was "jobless growth" that is it did not result by a considerable creation of new jobs. It was rather driven by increased productivity and by participation rate. Therefore, manufacturing, self-employment start-ups which account for 73% of all active firms, generate only 10% of employment, while 47% and 39% of employment are generated by small and medium-sized firms and large firms, respectively. We also find that a 1% increase in industry output generates twice as much employment as the services sector (0.23% vs. 0.11%) for the population between 15 and 64 years of age, while a 1% increase in the services output generates twice as much employment as industry (0.15% vs. 0.08%) for young people aged between 15 and 25 years.

The micro-level analysis shows that Tunisian manufacturing sector is affected by a misallocation of resources between firms: the less productive ones receive larger share of resources directing investment from their productive use. Agro-food sector has the highest average of the aggregate productivity, followed by the chemical sector. The textile & clothing sector has the lowest aggregate productivity. Moreover, within-firm and between-firm components both contribute negatively to labour productivity growth, implying poor firm performance. The negative contribution of between-firm effects shows no reallocation of resources from less to more productive firms. Entry and exit contribute negligibly to changes in labour productivity between 2000 and 2020, with a positive net entry of 2%, meaning that entering firms are more productive than exiting firms.

The political instability of the past decade has challenged the governance and the credibility of the state and the societal fabric. The lack of community trust in government as well as the lack of transparency of investment-related information is a major impediment to investment in Tunisia, despite the progress made in terms of legislation and development strategies. For example, the 2016–2020 Strategic Development Plan identifies as a priority the "enhancing good governance, administrative reform, and anti-corruption". The implementation and monitoring of anti-corruption laws and strategies, and increased transparency remain the major challenges for Tunisia to address the lack of confidence and gap between the

government and the people. Providing a favourite investment climate can steady employment creation. Furthermore, favourable conditions require the simplification of procedures, regulations, and formalities to free up economic initiative and reduce costs to firms. Social protection should be part of the solution because it guarantees the reduction of inequalities and decent lives for all. Decent work should be encouraged to effectively addressing the precarious non-standard forms of employment that has compromised the access of workers to social protection.

Easier access to finance is one of the major obstacles to business in Tunisia. Moreover, business regulations are complicated, long, and not easily accessible to both local and foreign investors and thus increase the costs of doing business. It is, therefore, recommended to promote investment by removing barriers to market entry and by reforming the financial sector. A lengthy reform process was initiated in 2012 to promote investment, and a new version of the revised investment code was then presented to the Tunisian national assembly in 2015 and approved in September 2016. This new investment code aims at investment protection and improves access to the investment market by easing key restrictions on Foreign Direct Investment. Removing current barriers to investment, specifically in higher value-added activities, can increase firms' efficiency by an efficient reallocation of resources to the most productive firms and sectors.

Finally, rational programmes on skills transfer and mobility with close collaboration between institutions and firms are relevant to build up multidisciplinary teams and support productivity and competitiveness as well as sustainable job creation.

Notes

1. The United States Agency for International Development (USAID, 2016). Tunisia Country Development Cooperation Strategy.

2. Institut National de Statistique (2021). La Croissance Economique au Deuxième Trimestre 2021.

3. Solow's neoclassical growth model and Harrod-Domar post-Keynesian model.

4. Tunisian Labor Survey, 2020.

5. INS (2019). Informal employment Indicators in 2019.

6. INS (2020). Indicateurs de l'emploi et du chômage du deuxième trimestre 2020.

7. INS (2018). Tunisian Labour Survey.

8. Based on the World Bank's Job Structure Tool: https://datatopics.worldbank.org/JobsDiagnostics/jobs-tools.html

9. See World Bank (2009) for the Shift-share that also can be used to decompose the change in value-added per worker by sector.

10. Before 2011, the public sector hired an average of 7,500 people per year, compared to 22,200 people per year between 2011 and 2013, i.e., an increase rate between 19.1% and 29.1%. Since 2014, the government has suspended hiring following the 2013 agreement with International Monetary Fund (IMF), reducing the hiring growth rate to 5.1% in 2014, and then to 2.4% in 2015.

11. The two sectors "Tobacco industry" and "Oil refining" are excluded from the analysis because the number of firms operating in these two sectors is very limited and most of them are state-owned enterprises.

12. Bartelsman et al. (2013) show that the lessons learned from an Olley–Pakes decomposition in labour productivity are consistent with those of a TFP decomposition.

13. IACE (2016), Rapport sur l'emploi, 2016.

14. Report of the International Monetary Fund about Informal Economy in Tunisia (2010).

15. Social Protection and the Informal Economy in Tunisia: Challenges of Transition to the Formal Economy in Tunisia, prepared by the Centre for Research and Social Studies (CRES) and the African Development Bank (AfDB).

16. Willem te Velde, D. 2021. Supporting Jobs for Young Women and Men in Africa. A Framework for Country-level Analysis.

17. The National Dialogue Quartet comprised by the UGTT, the UTICA, the Tunisian Human Rights League (LTDH), and the Tunisian Order of Lawyers has won the 2015 Nobel Peace Prize for its decisive contribution to the building of a pluralistic democracy in Tunisia in the wake of the 2011 revolution.

18 .OCDE (2017). État d'avancement des réformes en Tunisie.

19. CEPEX: Centre de Promotion des Exportations ; FIPA: Foreign Investment Promotion Agency ; APII: Agence de Promotion de l'Industrie et de l'Innovation ; APIA: Agence de Promotion des Investissements Agricoles; ONTT: Office National de Tourisme Tunisien.

References

Aghion, P. and P. Howitt. 1992. "A model of growth through creative destruction". *Econometrica*, 60(2): 323–51.

Arouri, H., A.B. Youssef and F. Quatraro. 2016. "Entry, exit and net job creation in Tunisia: An exploratory analysis". *Eurasian Business Review*, 6(3): 323–37.

Aterido, R., A. Hlatshwayo, D. Pieterse and A. Steenkamp. 2019. Firm Dynamics, Job Outcomes, and Productivity: South African Formal Businesses, 2010–14. World Bank Policy Research Working Paper, No. 8788. The World Bank, Washington, D.C.

Baily, M.N. 2003. Organization for Economic Co-operation and Development (OECD). 2003. "The Sources of Economic Growth in OECD Countries: A review Article." *International Productivity Monitor* 7: 66-70.[NEED MORE DETAILS]

Barro, R.J. 1991. "Economic growth in a cross section of countries". *The quarterly journal of economics*, 106(2): 407–443.

Bartelsman, E.J. and M. Doms. 2000. "Understanding productivity: Lessons from longitudinal microdata". *Journal of Economic literature,* 38(3): 569–94.

Bartelsman, E.J., J. Haltiwanger and S. Scarpetta. 2004. "Microeconomic evidence of creative destruction in industrial and developing countries". Available at SSRN 612230.

Bartelsman, E.J., J. Haltiwanger and S. Scarpetta. 2013. "Cross-country differences in productivity: The role of allocation and selection". *American economic review,* 103(1): 305–34.

Benner, M. 2019. "A new Arab social contract". In *Institutional Perspectives for Economic Reform in Arab Countries.* Cham: Springer.

Brandt, N. 2005. "Business dynamics and policies". *OECD Economic Studies*, 2004(1): 9–36.

Brown, J.D., G.A. Crespi, L. Iacovone and L. Marcolin. 2018. "Decomposing firm-level productivity growth and assessing its determinants: Evidence from the Americas". *The Journal of Technology Transfer,* 43(6): 1571–1606.

Cusolito, A.P. and W.F. Maloney. 2018. *Productivity Revisited: Shifting Paradigms in Analysis and Policy*. Washington, D.C.: World Bank Publications.

Davis, S.J. and J. Haltiwanger. 1992. "Gross job creation, gross job destruction, and employment reallocation". *The Quarterly Journal of Economics*, 107(3): 819–63.

De Vries, G., M. Timmer, and K. De Vries. 2015. "Structural transformation in Africa: Static gains, dynamic losses". *Journal of Development Studies*, 51(6) : 674–688.

Döpke, J. 2001. "The employment intensity of growth in Europe". Kiel Working Paper No. 1021.

Ericson, R. and A. Pakes. 1995. "Markov-perfect industry dynamics: A framework for empirical work". *The Review of economic studies,* 62(1): 53–82.

Fei, J.C. and G. Ranis. 1964. Development of the Labour Surplus Economy: Theory and Policy. Illinois: Irwin, Homewood.

Foster, L., J. Haltiwanger and C.J. Krizan. 2001. *Aggregate Productivity Growth: Lessons from Microeconomic Evidence,* pp. 303–372. Chicago: University of Chicago Press.

Hopenhayn, H.A. 1992. "Entry, exit, and firm dynamics in long run equilibrium". *Econometrica: Journal of the Econometric Society,* 60(5), 1127–50.

Jovanovic, B. 1982. "Selection and the evolution of industry". *Econometrica: Journal of the Econometric Society*, 50(3): 649–70.

Kapsos, S. 2006. "The employment intensity of growth: Trends and macroeconomic determinants". In *Labor Markets in Asia*, 143–201). London: Palgrave Macmillan.

Krugman, P.R. 1997. *The Age of Diminished Expectations: US Economic Policy in the 1990s*. Cambridge, MA: MIT Press.

Kuznets, S. 1971. *Economic Growth of Nations: Total Output and Production Structure.* Cambridge, MA: Harvard University Press.

Labidi, L., L. Bennour. and A. Jaidi. 2017. L'emploi formel et informel des travailleurs immigrés en Tunisie : cartographie et profils socioéconomiques des travailleurs immigrés en Tunisie. Organisation International du Travail (OIT).

Lewis, W.A. 1954. "Economic development with unlimited supplies of labour". *The Manchester School*, 28(2): 139–91.

Martins, P.M. 2019. "Structural change: Pace, patterns and determinants". *Review of Development Economics*, 23(1): 1–32.

Matta, S., S. Appleton and M. Bleaney. 2018. "The microeconomic impact of political instability: Firm-level evidence from Tunisia". *Review of Development Economics*, 22(4): 1590–1619.

McMillan, M. and D. Headey. 2014. "Introduction–understanding structural transformation in Africa". *World Development,* 63: 1–10.

McMillan, M., D. Rodrick and I. Verduzco-Gallo. 2014. Globalization, Structural Change, and Productivity Growth, with an Update on Africa. *World Development,* 63: 11–-32.

McMillan, M., J. Page. D. Booth, D. and D.W. te Velde. 2017. Supporting economic transformation: An approach paper. London: *Overseas Development Institute, Supporting Economic Development programme.*

McMillan, M.S. and D. Rodrik. 2011. "Globalization, structural change and productivity growth".. National Bureau of Economic Research Working Paper No. w17143..

McMillan, M.S. and K. Harttgen. 2014. "What is driving the 'African Growth Miracle'?". National Bureau of Economic Research Working Paper No. w20077.

Melitz, M.J. and S. Polanec. 2015. "Dynamic Olley-Pakes productivity decomposition with entry and exit". *The Rand journal of economics*, 46(2): 362–75.

Nurkse, R. 1953. *Problems of Capital Formation in Underdeveloped Countries*. Oxford: Basil Blackwell.

Olley, S. and A. Pakes. 1996. "The dynamics of productivity in the telecommunications equipment industry". *Econometrica*, 64(6): 1263–98.

Organization for Economic Co-operation and Development (OECD). 2010. OECD Employment Outlook 2010: *Moving Beyond the Jobs Crisis. Paris: Organization for Economic Co-operation and Development.*

Pages, C., G. Pierre, S. Scarpetta. 2009. *Job creation in Latin America and the Caribean: Recent Trends and Policy Challenges.* Palgrave MacMillan and World Bank.

Pakes, A. and R. Ericson. 1998. "Empirical implications of alternative models of firm dynamics". *Journal of economic theory*, 79(1): 1–45.

Rijkers, B., H. Arouri, C. Freund, and A. Nucifora. 2014. "Which firms create the most jobs in developing countries? Evidence from Tunisia". *Labour Economics*, 31: 84–102.

Shorrocks, A.F. 1999. "Decomposition procedures for distributional analysis: A unified framework based on the Shapley value". Mimeo. University of Essex.

Silva, E.G. and A.A. Teixeira. 2008. "Surveying structural change: Seminal contributions and a bibliometric account". *Structural Change and Economic Dynamics*, 19(4): 273–300.

World Bank and Observatoire National de la Jeunesse. 2014. "Tunisia: Breaking the barriers to youth inclusion". Report No. 89233-TN. The World Bank, Washington, D.C.

World Bank. 2009. Job Generation and Growth (JoGG) Decomposition Tool. *Understanding the Sectoral Pattern of Growth and its Employment and Productivity Intensity*. Reference Manual and User's Guide Version 1.0. Poverty Reduction and Economic Management (PREM). The World Bank, Washington, D.C.

World Bank. 2010. "Towards innovation driven growth". Tunisia Development Policy Review, Report 50847-TN. The World Bank, Washington, D.C.

World Bank. 2014. "The unfinished revolution: Bringing opportunity, good Jobs, and greater wealth to all Tunisians". Tunisia Development Policy Review, Report 86179 - TN. The World Bank, Washington, D.C.

Appendix

Table A1: Employment, output, productivity and population by Gender, Tunisia 1998-2018 and 2018-2025 (p) and 2025-2030 (p)

	Unit	1998	2005	2010	2018	2025	2030
Population (N)	**1,000 people**	**9,510**	**10,107**	**10,635**	**11,565**	**12,347**	**12,756**
Population, male	1,000 people	4,798	5,058	5,303	5,732	6,124	6,328
Population, female	1,000 people	4,712	5,048	5,332	5,833	6,223	6,428
Working Age Population (A)	**1,000 people**	**5,935**	**6,783**	**7,358**	**7,808**	**8,116**	**8,412**
Working Age Population, male	1,000 people	2,963	3,362	3,646	3,858	4,032	4,195
Working Age Population, female	1,000 people	2,971	3,421	3,712	3,950	4,085	4,217
Labour Force (L)	**1,000 people**	**3,028**	**3,310**	**3,720**	**4,012**	**4,429**	**4,753**
Labour Force, male	1,000 people	2,278	2,441	2,727	2,944	3,220	3,433
Labour Force, female	1,000 people	751	869	993	1,068	1,209	1,320
Employment (E)	**1,000 people**	**2,561**	**2,884**	**3,235**	**3,391**	**3,741**	**4,013**
Employment, male	1,000 people	1,936	2,147	2,430	2,563	2,828	3,034
Employment, female	1,000 people	625	738	805	827	913	979
Unemployment (U)	**1,000 people**	**467**	**426**	**485**	**621**	**688**	**740**
Unemployment, male	1,000 people	342	294	297	380	392	400
Unemployment, female	1,000 people	126	132	188	241	296	341

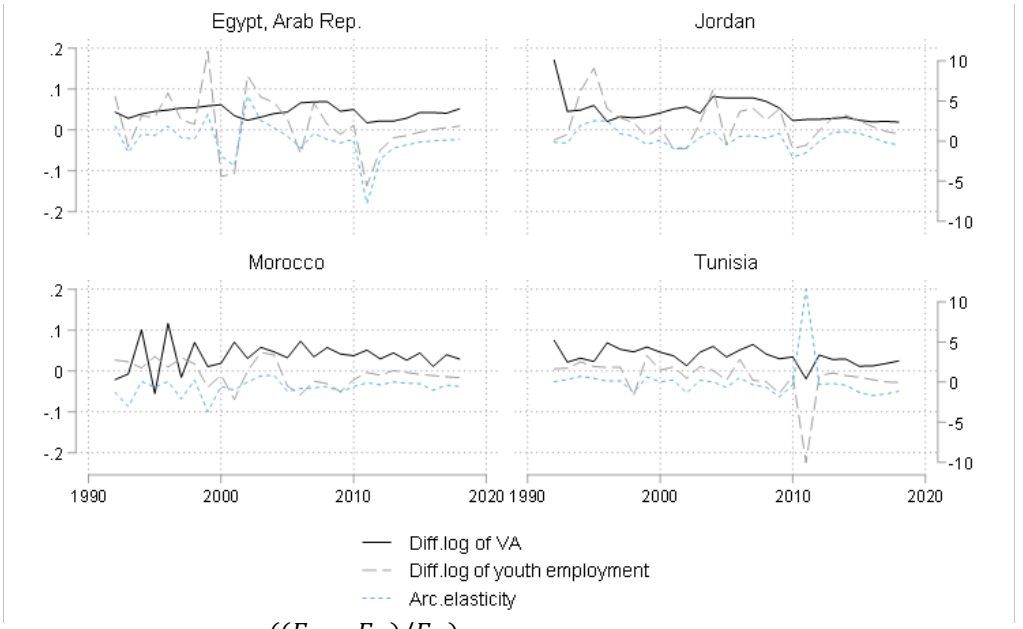
continued next page

Table A1 Continued

	Unit	1998	2005	2010	2018	2025	2030
Indicators							
Share of Working Age Population	**% of Population**	**62.40**	**67.12**	**69.18**	**67.51**	**65.74**	**65.94**
Share of Working Age Population, male	% of male Population	61.76	66.47	68.75	67.31	65.83	66.29
Share of Working Age Population, female	% of female Population	63.06	67.77	69.61	67.72	65.64	65.60
Labour Force Participation	**% of WAP**	**51.03**	**48.80**	**50.56**	**51.38**	**54.57**	**56.51**
Labour Force Participation, male	% of male WAP	76.87	72.60	74.81	76.30	79.87	81.85
Labour Force Participation, female	% of female WAP	25.26	25.41	26.76	27.04	29.59	31.31
Employment Rate	**% of Labour Force**	**84.57**	**87.13**	**86.95**	**84.52**	**84.47**	**84.42**
Employment Rate, male	% of male Labour Force	85.00	87.94	89.10	87.08	87.83	88.36
Employment Rate, female	% of female Labour Force	83.27	84.85	81.05	77.46	75.53	74.18
Unemployment Rate	**% of Labour Force**	**15.43**	**12.87**	**13.05**	**15.48**	**15.53**	**15.58**
Unemployment Rate, male	% of male Labour Force	15.00	12.06	10.90	12.92	12.17	11.64
Unemployment Rate, female	% of female Labour Force	16.73	15.15	18.95	22.54	24.47	25.82

Notes: WAP = Working Age Population; LF = Labour Force. Employment Status Projections - Annual Change Projected. 2018–2025 (p) and 2025–2030 (p). Data were taken from the World Bank's World Development Indicators (WDI).

Figure A1: Distribution of youth employment growth, value-added growth, and arc-elasticities



Notes: The arc-elasticity $\varepsilon_i = \frac{((E_{i1} - E_{i0})/E_{i0})}{((Y_{i1} - Y_{i0})/Y_{i0})}$, where the numerator is the percentage change in employment in country *i*, E_i, between period 0 and 1, and the denominator is the corresponding percentage change in output, Y_i (Kapsos 2006).

Figure A2: Distribution of youth employment growth, value-added growth, and arc-elasticities (agriculture)

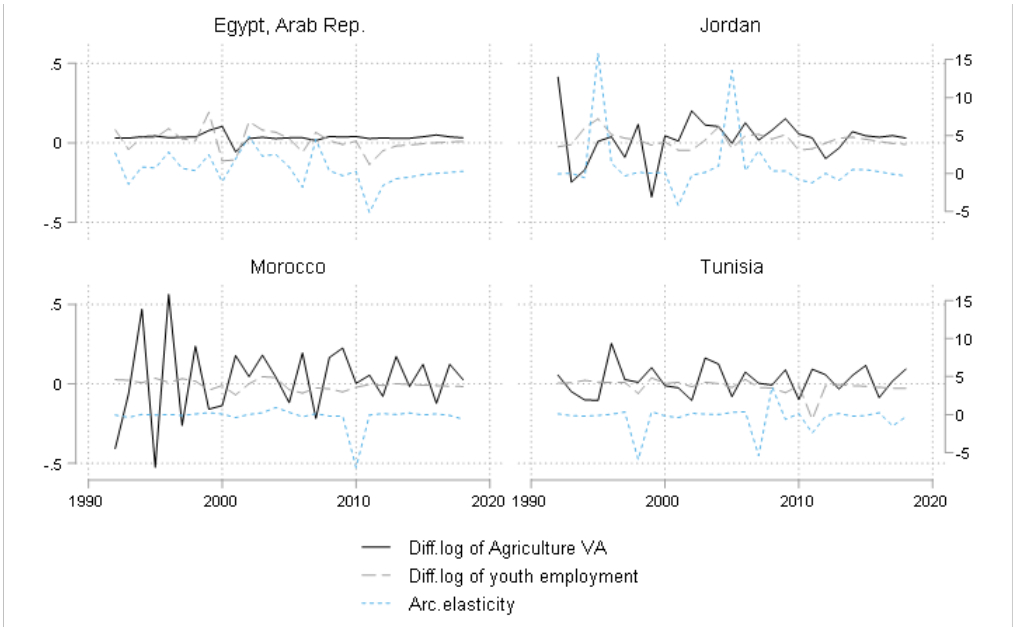


Figure A3: Distribution of youth employment growth, value-added growth, and arc-elasticities (industry)

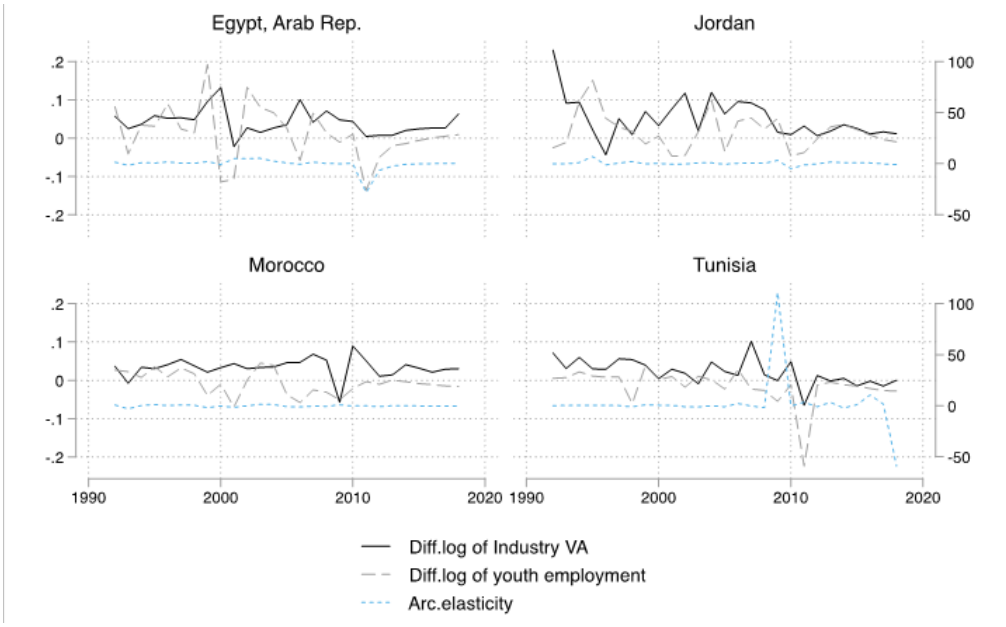


Figure A4: Distribution of youth employment growth, value-added growth, and arc-elasticities (services)

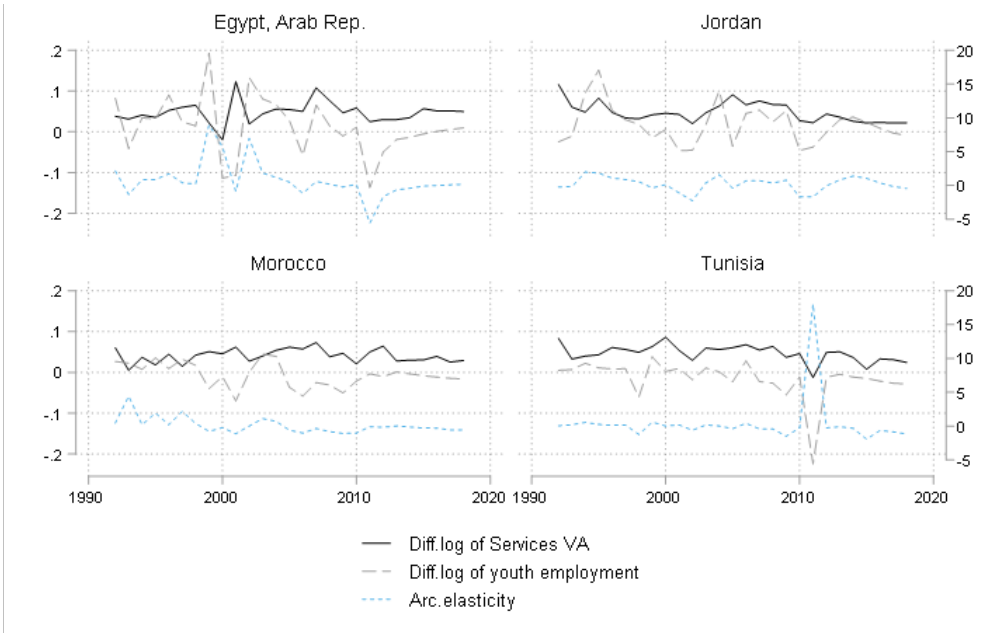


Table A2: Decomposition of growth in per capita value added with productivity rate change by major sector

% Yearly Contribution to Growth	2000-2010		2010–2018		2000–2018	
	Percent	% Contribution	Percent	% Contribution	Percent	% Contribution
Annual Growth per capita Value-Added	3.27	100%	0.76	100%	2.15	100%
Change in Productivity	2.18	67%	1.23	160%	1.75	81%
Contribution of within-sector productivity change	2.08	64%	0.95	124%	1.58	73%
Agriculture	0.01	0%	0.53	70%	0.29	14%
Industry	0.23	7%	-0.38	-50%	-0.07	-3%
Services	1.84	56%	0.8	104%	1.35	63%
Inter-sectoral reallocation	0.1	3%	0.28	36%	0.17	8%
Agriculture	-0.07	-2%	-0.24	-32%	-0.18	-8%
Industry	0.07	2%	-0.06	-8%	0	0%
Services	0.1	3%	0.58	76%	0.34	16%
Static reallocation	0.07	2%	0.3	39%	0.12	5%
Agriculture	-0.07	-2%	-0.16	-20%	-0.11	-5%
Industry	0.07	2%	-0.06	-8%	0	0%
Services	0.07	2%	0.52	68%	0.22	10%
Dynamic reallocation	0.03	1%	-0.02	-3%	0.05	2%
Agriculture	0	0%	-0.09	-11%	-0.06	-3%
Industry	0	0%	0.01	1%	0	0%
Services	0.03	1%	0.06	7%	0.12	5%
Change in Employment rate	0.22	7%	-0.36	-47%	-0.04	-2%
Change in Participation Rate	0.03	1%	0.2	26%	0.11	5%
Change in Share of Working Age Population	0.84	26%	-0.31	-40%	0.33	15%

Note: Authors' calculations using WDI data and the Job Structure Tool of the World Bank.

Table A3: Correspondence between the 2009 national nomenclature (NAT09) and the national accounts

Code Nat09	Nat 2009	National Accounts
10	Manufacture of food products	Agro-food industry
11	Manufacture of beverages	
12	Manufacture of tobacco products	Tobacco industry
13	Manufacture of textiles	
14	Manufacture of wearing apparel	Textile, clothing, and leather
15	Manufacture of leather and related products	
16	Manufacture of wood and of products of wood and cork, except furniture	
17	Manufacture of paper and paper products	
18	Printing and reproduction of recorded media	Diverse industries
22	Manufacture of rubber and plastics products	
31	Manufacture of furniture	
32	Other manufacturing	
19	Manufacture of coke and refined petroleum products	Oil refining
20	Manufacture of chemicals and chemical products	
21	Manufacture of pharmaceuticals, medicinal chemical and botany	Chemical industry
23	Manufacture of other non-metallic mineral products	Building materials, ceramics, and glass
24	Manufacture of basic metals	
25	Manufacture of fabricated metal products, except machinery and equipment	
26	Manufacture of computer, electronic and optical products	Mechanical and electrical industries
27	Manufacture of electrical equipment	
28	Manufacture of machinery and equipment n.e.c.	
29	Manufacture of motor vehicles, trailers and semi-trailers	
30	Manufacture of other transport equipment	

Table A4: Determinants of firm's performance

Dependent variable	Tunisia				Selected MENA countries (Egypt, Jordan, Morocco, and Tunisia)			
	Percentage of workers under 30	Annual Employment growth	Purchase of fixed assets in last FY (Y/N)	Innovator (Y/N)	Percentage of workers under 30	Annual employment growth	Purchase of fixed assets in last FY (Y/N)	Innovator (Y/N)
Size (log)	3.533***	2.357***	0.196**	0.083	3.342***	1.562***	0.316***	0.103*
	(1.271)	(0.710)	(0.077)	(0.076)	(0.956)	(0.542)	(0.060)	(0.060)
Age (log)	-12.400***	-5.073***	-0.296**	-0.170	-9.749***	-2.772**	-0.273***	0.070
	(2.522)	(1.685)	(0.146)	(0.129)	(1.372)	(1.121)	(0.087)	(0.075)
Higher labour intensity manufacturing (Y/N)	-5.261	-1.130	-0.421	-0.186	-5.965*	-3.119	-0.281	-0.105
	(4.899)	(3.003)	(0.304)	(0.303)	(3.619)	(1.918)	(0.298)	(0.207)
Moderate labour intensity manufacturing (Y/N)	5.554	1.870	0.573	0.317	-3.764	5.189	0.219	0.070
	(9.522)	(3.088)	(0.871)	(0.735)	(4.502)	(3.500)	(0.377)	(0.445)
Very low labour intensity	-3.825	6.126**	-0.239	0.707**	-6.516	2.107	0.024	0.446**
manufacturing (Y/N)	(5.894)	(2.788)	(0.327)	(0.335)	(4.037)	(2.292)	(0.236)	(0.225)
Retail (Y/N)	-8.191	0.334	0.063	-0.642*	-0.391	1.724	-0.114	-0.312
	(5.996)	(4.186)	(0.415)	(0.377)	(4.024)	(2.275)	(0.233)	(0.230)
Other services (Y/N)	-8.916**	3.988*	-0.398*	0.016	-8.791***	1.240	-0.032	-0.306
	(4.358)	(2.347)	(0.230)	(0.236)	(3.040)	(1.691)	(0.175)	(0.187)
Percentage of under 30		0.081**	-0.000	0.004		0.064***	0.002	0.005**
		(0.041)	(0.004)	(0.004)		(0.023)	(0.003)	(0.002)
Constant	53.907***	5.897	0.508	-0.283	59.841***	6.224*	-1.166***	-1.217***
	(8.396)	(5.268)	(0.477)	(0.456)	(5.530)	(3.243)	(0.376)	(0.324)
Observations	476	461	476	475	2,955	2,625	2,943	2,900
R2	0.164	0.186			0.169	0.154		

Source: Authors' calculations using the World Bank's Enterprise Surveys for selected MENA countries in 2013.

Table A5: Determinants of firm's labour productivity by manufacturing sector

Variables	All manufacturing Sectors	Agro-food industry	Textile, clothing, and leather	Diverse industries	Chemical industry	Building materials, ceramics, and glass	Mechanical and electrical industries
Medium size (20-99)	0.157***	0.659***	-0.294***	0.457***	0.366***	0.224***	0.100***
	(0.008)	(0.021)	(0.014)	(0.016)	(0.034)	(0.029)	(0.017)
Large size (100+)	0.208***	1.141***	-0.359***	0.703***	0.590***	0.629***	0.179***
	(0.011)	(0.030)	(0.018)	(0.030)	(0.052)	(0.039)	(0.024)
Exporting (Y/N)	-0.118***	0.882***	-0.095***	0.123***	0.772***	0.015	-0.125***
	(0.009)	(0.032)	(0.015)	(0.021)	(0.053)	(0.061)	(0.019)
Real regime (Y/N)	1.139***	1.134***	0.841***	1.098***	0.290**	0.718***	1.386***
	(0.009)	(0.022)	(0.024)	(0.011)	(0.120)	(0.037)	(0.021)
Young firms (less than Ten years) (Y/N)	0.141***	0.172***	0.079***	0.229***	0.087***	0.124***	0.141***
	(0.006)	(0.012)	(0.012)	(0.012)	(0.032)	(0.026)	(0.015)
Northeast	-0.300***	-0.044**	-0.198***	-0.301***	-0.362***	-0.609***	-0.346***
	(0.009)	(0.018)	(0.018)	(0.016)	(0.048)	(0.032)	(0.019)
Northwest	-0.349***	-0.031	-0.042	-0.430***	-0.470***	-0.726***	-0.683***
	(0.017)	(0.023)	(0.059)	(0.038)	(0.118)	(0.089)	(0.054)
Central East	-0.112***	0.171***	-0.122***	-0.158***	-0.151***	-0.393***	-0.139***
	(0.007)	(0.015)	(0.013)	(0.012)	(0.030)	(0.031)	(0.015)
Central West	-0.247***	0.113***	-0.233***	-0.513***	-0.195	-0.455***	-0.270***
	(0.017)	(0.023)	(0.053)	(0.034)	(0.124)	(0.089)	(0.060)
Southeast	-0.357***	-0.186***	-0.038	-0.214***	-0.487***	-0.495***	-0.534***
	(0.013)	(0.021)	(0.050)	(0.024)	(0.101)	(0.045)	(0.036)

continued next page

Table A5 Continued

Variables	All manufacturing Sectors	Agro-food industry	Textile, clothing, and leather	Diverse industries	Chemical industry	Building materials, ceramics, and glass	Mechanical and electrical industries
Southwest	-0.370***	-0.090***	-0.306***	-0.524***	-0.957***	-0.894***	-0.583***
	(0.023)	(0.031)	(0.086)	(0.042)	(0.172)	(0.161)	(0.089)
Tobacco industry	0.563***						
	(0.103)						
Textile, clothing, and leather	-0.828***						
	(0.009)						
Diverse industries	-0.178***						
	(0.008)						
Oil refining	3.018***						
	(0.110)						
Chemical industry	0.521***						
	(0.016)						
Building materials, ceramics, and glass	-0.249***						
	(0.014)						
Mechanical and electrical industries	-0.021**						
	(0.009)						
Constant	9.295***	8.986***	8.979***	9.081***	10.55***	9.554***	9.107***
	(0.011)	(0.023)	(0.023)	(0.012)	(0.122)	(0.041)	(0.021)
Observations	172,896	43,287	43,590	40,715	6,151	8,245	30,681
R-squared	0.208	0.148	0.047	0.333	0.090	0.160	0.190

Notes: Great Tunis is the reference modality for region variable. For the first estimation (all sectors combined), agro-food sector is used as reference modality. The independent variable is the labour productivity. We use pooled OLS with dummy year's variable.
Source: Authors' calculations using the RNE data on manufacturing sector over the last two decades 2000–2020.

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