

Export Diversification and Sophistication and Industrial Policy in Tunisia

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Abstract

This paper explores the Tunisian experience of exports diversification and the role played by industrial policies. It describes the general trends and the dynamics of diversification using a very disaggregated data set on exports for the period 1995-2017, for both primary and resource-based products and manufactured products. It has been generally recognized that openness and export promotion policies established since the early 1970s succeeded in allowing Tunisia to achieve significant export growth, especially in low-technology manufacturing. But, until recently, the general wisdom has been that the country has achieved limited success in moving up the technological ladder, with diversification, and sophistication of exports. In this paper we show that this view is not warranted, and that extensive diversification and sophistication has taken place over the last couple of decades, and more significantly the most recent period, in which Tunisia has been remarkably resilient, despite the political upheavals which have rocked the country.

The paper highlights the successes and failures of the process of diversification and investigates the role of both the "horizontal" and "vertical" policies pursued. It focuses on the "how" issue and explores whether and how specific policies are successful or not in meeting their objectives. Most importantly it presents a novel approach to study the dynamics of diversification and tries to identify the basic reasons behind the success or failure of diversification. It shows that the dynamics of innovation is extremely rich and varied. Diversification may be successful with products becoming "mature" exports or "emerging" exports. But there may also be failures with products experiencing "stalled" exports or "episodic" exports processes. These empirical findings lead to a questioning of one major argument in the literature that the main constraint to diversification is a market failure due to the fact that innovators (who introduce new products or new markets in exports) bear the major cost of their innovation, but later entrants reap the benefits. Discovery and innovation seem to be very extremely common, but success and consolidation are much more difficult.

The paper draws important conclusions about the effectiveness of "horizontal vs vertical policies", "single vs packages of policies", and the focus on spurring discovery and innovation per se vs supporting the growth of already emerged innovations.

Keywords: Industrial policy, exports, manufacturing, resource-based, horizontal, vertical, diversification, sophistication, innovation, Tunisia.

JEL Classifications: F14, O25, O30, L50.

List of abréviations

APII: Agence de Promotion de l'Industrie et de l'Innovation

EU: European Union

FOR: Fuels, Oils, and Residuals

FTA: Free Trade Area

GDP: Gross Domestic Product

GVC: Global Value Chain

HSC: Harmonized System Classification

HTM: High-Technology Manufacturing

ITCEQ: Institut Tunisien de la Compétitivité et des Etudes Quantitatives

LTM: Low-Technology Manufacturing

MAN: Manufacturing

MD: Million Dinars

MMP: Minerals, Metals, and Products

MOU: Memorandum of Understanding

MTM: Medium-Technology Manufacturing

NA: North Africa countries

NIS: National System of Innovation

OECD: Organization for Economic Cooperation and Development

PMN: Programme de Mise à Niveau

PPNRB: Primary and Natural Resource-Based products

RoW: Rest of the World

SSA: Sub-Saharan Africa

TND: Tunisian Dinar

UNCTAD: United Nations Conference on Trade and Development

UNIDO: United Nations Industrial Development Organization

USD: United States Dollar

1. Introduction

In this paper we consider the role of industrial policy (IP) in the experience of export diversification and sophistication in the specific institutional set up of Tunisia. The subject of industrial policy has received some attention recently in the context of the Middle East and North Africa region. A few studies have undertaken a review of country experiences, including Tunisia, and tried to assess the extent of success or failure of industrial policies and the factors which explain the outcomes (Atiyas et al. 2015). Diop and Ghali (2012) compared the experience of Jordan and Tunisia in export diversification, using data for the 1990s and 2000s. In the same vein Ghali (2012) studied the Tunisian experience using data for the period 1995-2009. These studies found evidence of significant changes towards greater volumes of exports of higher technology products in Tunisia. But research on the topic has been limited and often based on relatively aggregate data and approaches, and without looking closely at the links with industrial policy.

This study of the Tunisian experience is of interest for at least four reasons.

First, Tunisia had an experience of many decades, at least until the 2010/2011 revolution, of a stable political and macroeconomic environment, with relatively healthy economic growth and major progress in terms of poverty reduction, and more broadly of improved human development and social indicators. The role of industrial policy can be better apprehended under such conditions, compared to the many other experiences with major political and institutional instability and recurrent macroeconomic crises.

Second, Tunisia has a long and rich experience with industrial policy. It has been a highly active practitioner of industrial policies since the 1960s. Industrial development was kickstarted through import-substitution and direct government intervention to launch activities and sectors. The difficulties encountered in pursuing these policies, including a financial crisis and sustainability of industries, led to more open and private sector led policies of export promotion through the "free export processing" system of "off-shore exports". The latter system provides a strong set of incentives and very flexible procedures for firms which specialize in exports to set up their activities and operate in a favorable environment compared to the regular business environment. The existence of this specific institutional set-up for "off-shore" exports is of much interest, as it provides an environment where traditional constraints to private foreign and domestic investment are to a large extent resolved, and where the fundamental factors determining diversification and sophistication may be better appreciated.

Third, it has been difficult to characterize the Tunisian experience with industrial policy as either a success or a failure. It has been generally recognized that the system established since the early 1970s succeeded in allowing Tunisia to achieve significant export growth, especially in low-technology manufacturing. But, until recently, the general wisdom has been also that the country has achieved limited success in moving up the technological ladder, with diversification, and sophistication of exports. In this paper we review this experience since the mid-1990s and show that this view is not warranted, and that extensive diversification and sophistication has taken place over the last couple of decades, and more significantly the most

recent period, in which Tunisia has been remarkably resilient, despite the political upheavals which have rocked the country.

Fourth, this case study goes beyond the usual macro-level approaches and uses detailed trade data, for more than 25 years, which allows for a more useful characterization of the experience, a better understanding of the dynamic process of product and export innovation and diversification. This will help us draw specific lessons about the effectiveness of various approaches and instruments used in industrial policy.

We focus in this paper on diversification of merchandise exports only. Diversification in services has been important in Tunisia. From early in the 1960s the development of tourism was such a policy-driven and successful effort to diversify. More recently significant diversification is taking place into other services, such as in new activities based on information, communications, and digital technologies.

In Section 2 we review the main views and issues in the literature on industrial policy, which will guide our analysis of the Tunisian experience and the lessons which can be drawn. In Section 3 we present the main trends in export diversification and sophistication. Sections 4 and 5 deal in detail with the dynamics of export diversification in the manufacturing sector and investigate the role of both "horizontal" and "vertical" industrial policies which were pursued. The same type of analysis is undertaken in Section 6 for primary products and natural resources-based activities. The final Section 7 draws the main conclusions.

2. Main views and issues in industrial policy

The 2008-2009 economic and financial crisis had the merit to revive the interest in industrial policy (IP), and it is not unreasonable to believe that the COVID-19 pandemic and the ongoing economic recession (and possibly depression) will promote it at the core of the post-crisis strategies. These crises had also the merit to demonstrate that the market mechanism was not always efficient either in the allocation of resources across sectors or in the choice of techniques, and that without strong government intervention the market economies of the United States and Europe may have collapsed (Stiglitz et al, 2013).

There has been a revival in industrial policy over the last two decades. A large literature has developed, based on theoretical as well as empirical grounds, which argues for a strong role of IP in generating export diversification, which in turn is a major determinant of productivity growth and structural transformation (Hausmann and Rodrik 2003, Hausmann, Hwang and Rodrik 2007). According to the authors, this mechanism goes through what they call a "self-discovery" process. The idea is that there is a lot of experimentation in determining which sectors are to be supported and in helping to discover the possible latent comparative advantage (Lin 2012). Initial operators, in discovering what can or cannot be produced profitably at world prices support the early entry costs associated with being among the first players while returns are not fully recovered. To support and encourage this process the IP consists of orienting public resources to the first entrants. The economic rationale is that the best-suited investment will shape the country's specialization and more importantly as pointed out by Hausmann et. al. (2007): "... the range of goods that an economy ends up producing and exporting is determined not just by the usual fundamentals, but also by the number of entrepreneurs that can be

stimulated to engage in cost discovery in the modern sectors of the economy. The larger this number, the closer that the economy can get to its productivity frontier. When there is more cost discovery, the productivity of the resulting set of activities is higher in expectational terms and the jackpot in world markets bigger."

Aghion et Al (2015) dig deeper into the subject and highlight that "industrial policies (subsidies or tax holidays) that are allocated to competitive sectors or allocated in such a way as to preserve or increase competition (e.g., by inducing entry or encouraging younger enterprises), have a more positive and significant impact on productivity or productivity growth".

More specifically, Lee (2013) pointed out that failure in technological capability is the main source of the middle-income trap. He advocates that the principal objective of IP in middle-income countries is to foster the shift from traditional industrial policy (trade policy) to technology policy (R&D policy) in order to move from exports of labor-intensive and low-ends goods to higher-end or value-added goods. To do so, middle-income countries have to specialize in sectors with shorter technology cycle times arguing that these latter are linked to higher profitability and characterized by a continuous creation of new opportunities, in contrast with technologies with long cycle times that requires more resources and are dominated by developed countries.

Finally, Ndubuisi and Owusu (2020) building among others on Hausmann et. al. (2007) and using a sample of 120 developed and developing countries show that countries with higher global value chain (GVC) participation have on average higher levels of export quality than countries with lower GVC participation, particularly thanks to technology transfer, knowledge spillover, and access to higher-quality intermediate inputs. However, their results indicate that in the sample comprising advanced economies, improvements in the quality of exported goods that are associated with GVC participation works through both backward and forward linkages, while in the sample comprising developing economies, the channel of impact works only through backward linkages. They also point out that their results show that the benefits associated with GVC through backward linkages do not only lead to increased export quality upgrading but also allow countries to catch-up with the frontier export quality.

Furthermore, four other arguments have been put forward to justify what was called a "rethink" or a "rebirth" of IP. First, climate change that cannot be handled without government intervention to foster private investment in clean technologies. Second, is the post-crises realism that revealed the extent to which laissez-faire policies had allowed the uncontrolled development of non-tradable sectors at the expense of tradable sectors. Third, the increased competition threat posed by China on world markets, and the "excessive dependence" on supply chains centered on China. Finally, the disruptive impact of technological change on societies and polities: automatization, digitalization, industry 4.0 and the internet of things (Aghion et. al. 2011, Aiginger and Rodrik 2020)

However, opponents of industrial policy are still arguing that government intervention could not be justified, for it often lacks the information and capability to design effective policies, and hence invites rent-seeking behavior from economic agents (Rodrik 2008, Naudé 2010a,

Warwick 2013), or prevents competition and allows governments to pick winners (and, more rarely, to name losers) in a discretionary fashion, thereby increasing the scope for capture by vested interests (Aghion et. al. 2011).

The answer is not as straightforward as it might appear. An alternative solution proposed by Rodrik, is to think IP as an interactive collaboration between private and public sectors to determine the country's comparative advantage, while Lin (Lin and Chang, 2009) is arguing that industrial upgrading and technological advance are best promoted by a state that facilitates the private sector's ability to exploit the country's areas of comparative advantage, and also that governments in developing countries can play that role through the channels of information, co-ordination and compensation for externalities

Since then the debate, which culminated with the exchange of reflections between Lin and Chang (2009), is no more about the rationale for industrial policy interventions but moved from the "why" to the "how" and the "content" of the IP. According to Lall (2004), it is not the "why" but the "how" and "the content" that explain the contrast between the success of industrial policy in the Tigers and its failures elsewhere.

Naudé (2010a) pointed out that most countries have engaged in IP in some form or other, even "under the table". In the U.S. where opposition to IP is strong, 77 of the 88 most important innovations between 1971 and 2006 were entirely subsidized by Federal funds (Block and Keller, 2011), the government set up the Small Business Administration to help business, intervened massively in the capital market and bailed out the automobile industry during the 2008-2009 crisis, and through heavy defense and space spending which created national champions such as Boeing in aircraft-making. A strategy that "The Economist" (2010) called "Picking winners, saving losers". Similarly, Mazzucato (2013) makes a strong argument about the major role played by governments in the development and success of major entrepreneurial innovations throughout modern history.

How can we define industrial policy? There is no consensus and there are multiple definitions. One broader definition states that ".. industrial policy is not about one policy, or one institution. It is indeed about the design, implementation, and enforcement of "packages of interactive measures" and their strategic coordination. These packages of policies allow government to provide productive organizations with the most effective mix of incentives and capabilities for developing industrial competitiveness." (Andreoni and Chang, 2019). A narrower definition states that " industrial policy is basically any type of selective intervention or government policy that attempts to alter the sectoral structure of production toward sectors that are expected to offer better prospects for economic growth than would occur in the absence of such intervention, i.e., in the market equilibrium." (Pack and Saggi, 2006). On the other hand, Warwick (2013) pointed out that the literature characterizes IP by the five following dimensions: the aim, the target group, the rationale, the policy domain and finally the policy orientation.

Although definitions vary, what we can draw from them is that an industrial policy is a set of strategies designed to generate, support and facilitate the development of an industry or

subsectors of an industry and that the principal objective of an active industrial policy is to strengthen potential output growth through innovation induced productivity growth.

But more importantly Warwick (2013), drawing on Chang (1997), showed the importance of the "how" by pointing out that industrial policies in the East Asian countries worked not only by providing detailed solutions to specific sectoral problems but also by providing a broad vision of the future of the economy centered around education, skills formation, accumulation of knowledge and capabilities and development of a national system of innovation (Naudé, 2010a). Altenburg (2011) listed five aspects that should be taken into account when dealing with low and lower-middle-income countries: (i) The degree of sophistication of the economy, (ii) Endowment of natural resources, (iii) Location of the country, (iv) its history and patterns of industry, and (v) Capabilities and development orientation of political actors. On the other hand, strong local capabilities have replaced cheap labor and natural resources as determinant of competitiveness. Even low-tech industrial activities like clothing, footwear or food processing require sophisticated capabilities to be able to confront global competition.

The orientation of industrial policy can be horizontal/functional or vertical/selective, strategic (long term) or defensive/reactive (short term), comparative advantage-following or comparative advantage-developing and finally comparative advantage defying, and at the same time taking into account the maturity of sectors and technology or the level of development of countries (Lin and Chang 2009, Warwick 2013). There is also a differentiation between hard and soft industrial policy. While the first is concerned by tariffs, export subsidies and tax breaks, the second is more oriented to the increase of supply of skilled workers, encouraging technology adoption and improving regulation, infrastructure and logistic (Naudé, 2010a). A set of organizations and agencies would then be devoted to implement the different instruments aimed at promoting technology transfer, exports, FDI, new business formation, etc... However, its effectiveness will be dependent on the ability of governments to coordinate the above instruments through structured institutions.

However, in some cases the emergence of sectors was not part of a global strategy and only attributable to an isolated private initiative. This was the case of the Indian software sector, which was driven by private sector agents, and where the government played no role except providing high quality education (Pack and Saggi, 2006).

To conclude, there is a convergence of views in recent literature about a "rethink" of IP to focus on new priorities such as "supporting vulnerable groups, gender equality, reduced fossil energy use or the development of green technologies for new types of agriculture, housing, and transport" (Aghion et. al. 2011, Aiginger and Rodrik 2020).

We draw on the main views from this literature to guide our analysis of the Tunisian experience. We will focus and address three main topics or issues. First, this experience allows us to focus on the "how" issue and explore whether and how specific policies are successful or not in meeting their objectives. Second, we will explore the role of "single" vs "packages" of policies in the relative success of industrial policy. Finally, and most importantly we present a novel approach to study the dynamics of diversification and try to identify the basic reasons behind the success or failure of diversification. One major argument in the literature has been that the

main constraint to diversification is a market failure due to the fact that innovators (who introduce new products or new markets in exports) bear the major cost of their innovation, but later entrants reap the benefits (Hausmann and Rodrik 2003). In this paper we review the empirical experience and show that the dynamics of innovation is extremely rich and varied, and find that “innovation per say” does not seem to be the main constraint to diversification, but rather the sustainability and consolidation of such innovations. This has implications in terms of the focus and efficacy of industrial policy.

3. Aggregate trends in export diversification and sophistication in Tunisia

In the study of export diversification and sophistication in Tunisia we use a data set on exports for the period 1995-2017 which is disaggregated at the 11 digits using the HSC (*Harmonized System Classification*) Revision 3 (Rev.3). For the purpose of our analysis, products are classified into six different groupings.

Primary and natural resource-based products (PPNRB) are classified into three standard groups, according to their nature:

1. Food products (FOODS), sections I, II, III and IV of the HSC,
2. Fuels, oils and residuals (FUELS or FOR), HS27 of section V,
3. Minerals, metals and products (MMP): HS25 and HS26 of section V, and section VI.

The remaining products are manufacturing exports, classified into three groups, according to technological content and labor skills using the 6-digits level classification by UNCTAD³:

4. Manufactured products with low technology intensity (LTM),
5. Manufactured products with medium technology intensity (MTM),
6. Manufactured and semi-finished products with high technology intensity (HTM).

This classification according to technological level is widely used, but one needs to be cautious about the significance of any changes in structure of production which may appear based on such data. For instance, many products which are classified as MTM, or even the HTM, may be closer to the lower technology end than to higher level of technology. Nevertheless, sustained changes and an expanded range of products in any level of technology group should be meaningful and reflect genuine changes in structure of production with consequences in terms of productivity growth and higher wages. In addition, Ghali (2012) and Diop and Ghali (2012) consider alternative classifications according to technological level by the Organization for Economic Cooperation and Development (OECD), the United Nations Industrial Development Organization (UNIDO), and the United Nations Conference on Trade and Development (UNCTAD). Their results show that the trends in diversification and sophistication in Tunisia during the period 1995-2009 are very robust to the choice of classification methodology.

Figure 1 shows the general trends in Tunisian exports as a percentage of GDP during the period 1995-2017. Until the great recession, there has been a steady increase in the integration of

³ In this paper we consider each NDP6 code (as well as NDP4 codes later on) as one "product", which may not always strictly appropriate. Often, the denominations under these codes include “categories of products”.

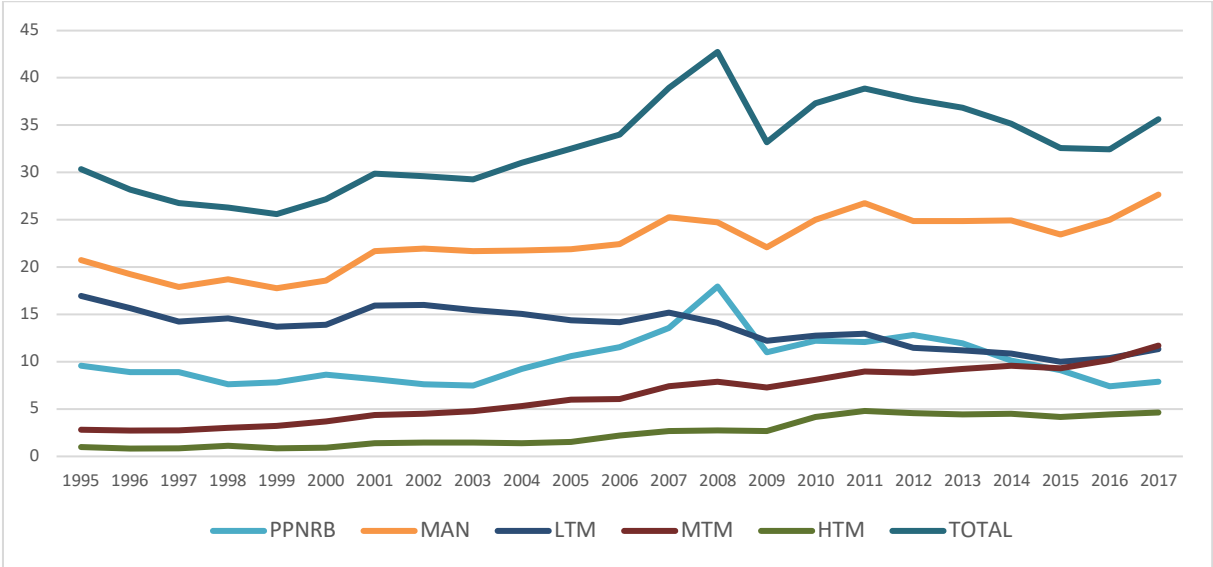
Tunisia in the global economy. The share of exports to GDP increases by almost 13 percentage points from 30.3% in 1995 to 42.7% in 2008. It declined afterwards under the impact of the major negative shock of the global recession, compounded by the political turmoil which followed the revolution in 2010/2011. It reached a low of 32% in 2015-16, before rebounding to 35% in 2017.

What is even more striking are the trends in diversification, as well as sophistication of exports. Exports of primary and natural resources based (PPNRB) products, which increased steadily during the 2000s reaching 18% of GDP in 2008, collapsed afterwards to reach a low of 7.9% in 2017. At the same time, the ratio of exports of manufactured products (MAN) increases steadily from 18-20% of GDP during the 1990s to 22-25% in the 2000s. Even though this trend was somewhat reversed following the revolution, this ratio increased again to reach 27% in 2017.

Even more interesting is the fact that the share of exports of low-intensity technology manufacturing products (LTM) in GDP declines from almost 14-17% in the 1990s and early 2000s to 10-11% towards the end of the period. The share of this category in total exports declines from 54-55% in the 1990s to 30-31% towards the middle of the 2010s (Figure 2).

On the other hand, the ratio of exports to GDP of medium technology (MTM) products increases steadily from less than 3% in the early 1990s to almost 12% in 2017, while that of high technology products (HTM) increases from less than 1% to almost 5% of GDP. During the same period, the share of MTM products in total exports grows from 10% to 33% (Figure 2), and even more striking the share of high-technology group of products increases from 3% to 13%.

Figure 1. Evolution of Tunisian exports, by category of products 1995-2017 (% of GDP)



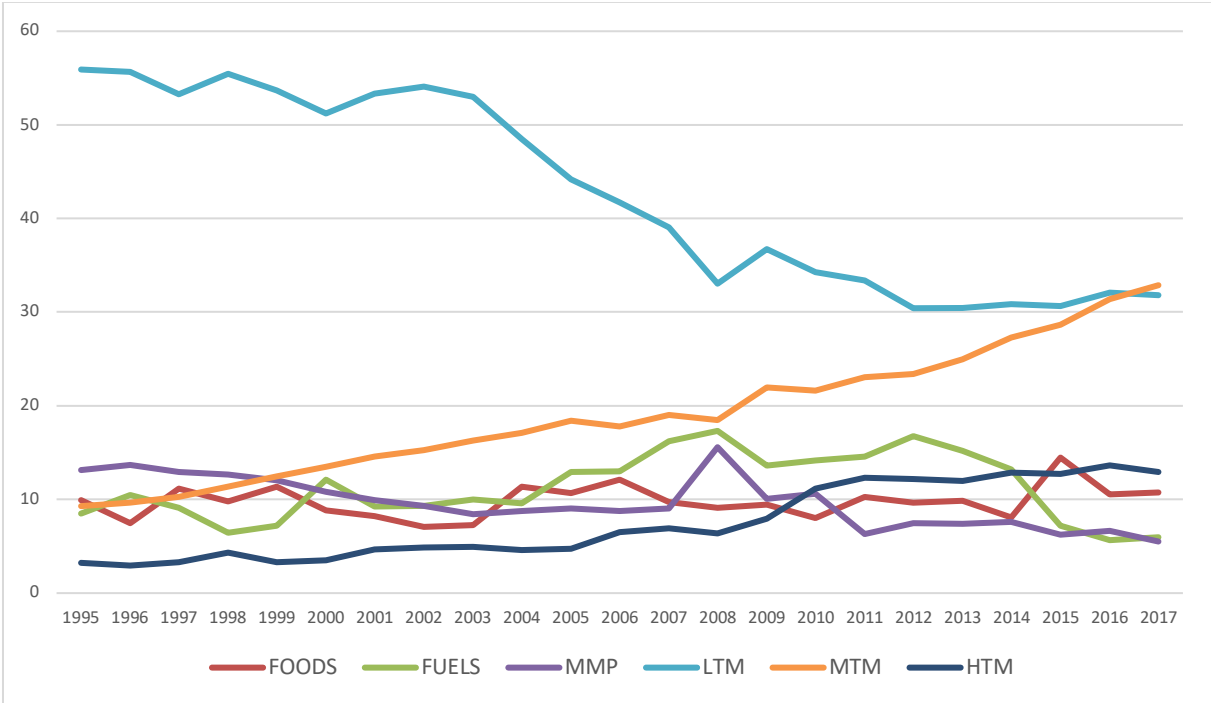
But in order to understand better these changes we need to go beyond these aggregate trends and explore in the next section the dynamics of exports at the product level.

The exports data used in the analysis which follows are expressed in constant US dollars, which controls for the effects of the depreciation of domestic currency as well as for international inflation. Since we do not have data on export price indices in Tunisia, we proceed in two steps to obtain such data. First, we apply the average annual exchange rate between the two currencies to transform export values in domestic currency (TND) into US dollars. Second, the exports in current USD at the HS 4-digit level disaggregation are deflated by the relevant import price indices in the United States (base year 2015), available from the Bureau of Labor Statistics⁴. We therefore obtain values of Tunisian exports expressed in US dollars at 2015 prices, at the HS 4-digit level.

Based on these data, the general trends in export diversification are summarized in a different way in Table 1, using the various export groups discussed above, showing the growth of exports by category over the period.

Total exports expressed in USD (at 2015 prices) have increased by more than 80% over the whole period 1995-2017, growing from around USD 8 billion in 1995 to USD 14.5 billion in 2017. But the dynamics of growth varied considerably across product categories and sub-periods, with the onset of the great global recession as a major disruption. Before the recession growth of total exports was strong at 6.75% per year, even though it was weaker for petroleum products and low technology manufacturing. It was notable that medium and high technology exports were growing rapidly already at double digits.

Figure 2. Evolution of structure of Tunisian exports, by category of products 1995-2017, (% of total exports)



⁴ The Bureau of Labor Statistics price indices data are available mostly at the HS 2-digit level, but also for a few products at the 4-digit level.

The trend changed dramatically since 2008, with exports of primary and resource-based products turning negative, especially due to the disruption of the mining and transformation of phosphate and the depletion of oil and gas reserves. For manufactured products, the trend observed before 2008 became much stronger, with negative growth of traditional exports of manufactures, but continued strength of growth of medium and higher technology intensity manufactures. The most noteworthy dynamics are found in the almost 11-fold increase between 1995 and 2017 in medium technology exports (from USD 0.442 billion to 4.8 billion) and the 15-fold increase in the value of exports of high technology manufactures (from USD 0.127 billion to 1.9 billion).

Table 1. Growth of Tunisian exports by category of products, based on values expressed in USD 2015 prices, 1995-2017

	Average annual growth (%)	Average annual growth (%)	Ratio of exports
	1996-2008	2009-2017	2017/1995
Food products	10.68	-0.53	1.85
Fuels, Oils and Residuals	2.96	-7.82	0.61
Minerals, Metals and Products	6.64	-10.17	0.53
Low-Technology Manufacturing	5.16	-3.48	1.30
Medium-Technology Manufacturing	17.08	4.52	10.83
High-Technology Manufacturing	20.19	7.78	14.86
TOTAL EXPORTS	6.75	-2.10	1.83

Note: The values of exports in USD are calculated using figures in Tunisian dinars to which we apply the average annual exchange rate, deflating by the US import prices (base year 2015) by category of products, from the Bureau of Labor Statistics.

4. Dynamics of export diversification and sophistication in manufacturing

We explore in this section the overall dynamics of diversification in manufacturing at the product level. In this analysis of dynamics of exports, we use the 4-digit level disaggregation, which provides an adequate description of the types of products exchanged by technology category⁵. By reviewing the dynamics of growth of exports, evaluated in USD at 2015 prices, we were able to distinguish four types of products:

- Products which we consider as "**mature exports**": they have been exported consistently and in significant amounts throughout the period (at least 1 million USD per year, in at least 20 out of the 23 years from 1995 to 2017), and which reached at least 100 million USD dollars by the end of the period.
- Products which we call "**emerging exports**": they have been exported in significant amounts (greater than 1 million USD per year) for at least 10 years (out of 23), and whose exports continued to grow during the most recent period (2009-2017), and remained greater than 1 Million USD during the most recent years.
- Products which we call "**stalled growth exports**": they have been present as significant exports (1 million USD per year) for at least 10 out of 23 years, but whose exports were

⁵ It should be noted that a few 4-digit products may be found in more than one product category, because the product category classification is made using the 6-digit sub-products, which classifies these 6-digit sub-products in different technology categories. In such cases we aggregate the 6-digit sub-products of a given category into one 4-digit product, resulting in more than one 4-digit product.

declining during the most recent period. These products were not able to sustain their growth dynamics.

- Products which we designate as "**episodic exports**": they appear and disappear as exports but are never sustained for any length of period. Since the data show a large number of products whose values of exports were very small and lack significance, we add another criterion for a product to be included in this category: the total value of exports during the whole 1995-2017 period should be greater than USD 2 million. While exports which are included in this category are "episodic" they still have some significance.
- A residual group includes products which were episodic but had a very low value of exports.

A first snapshot about export dynamics can be gleaned by just looking at the number of products in these categories, as shown in Table 2. The number of mature products, which constitute the bulk of exports in all categories, remained small in all categories, a total of 21 products out of a total of 863 manufacturing products. But there is also lots of innovation and experimentation in all export categories, with varying degrees of success. Many products (130) are "emerging" and growing steadily, while others (164) failed to sustain growth. Still more striking is the large number of products which are exported only episodically for a few years, and then exit. There are rich dynamics taking place, which we explore further for each technology category.

Table 2 shows a summary about exports by technology category and type of growth dynamics, for 3-year averages at 3 points in time: 1995-1997, 2007-2009 and 2015-2017. This allows to see the dynamics between the period until the great recession and the period since then. It also shows the ratio of exports at the end of each period compared to the beginning of the period, or the multi-year rate of increase over the relevant period.

4.1. Low technology exports

While LTM exports expanded at 5.2% per year until the great recession, they declined precipitously by 3.5% per year from 2008 to 2017 (Table 1).

But the dynamics varied significantly according to type of products, as shown in Figure 3.

The "mature exports", which are limited to 11 products, constitute the bulk of the exports in this category and have declined precipitously since 2008, by 40%.

But there is also a significant number (51) of other dynamic "emerging" products. The volume of these exports continued to grow even after the great recession but did not compensate for the decline in the "mature" exports.

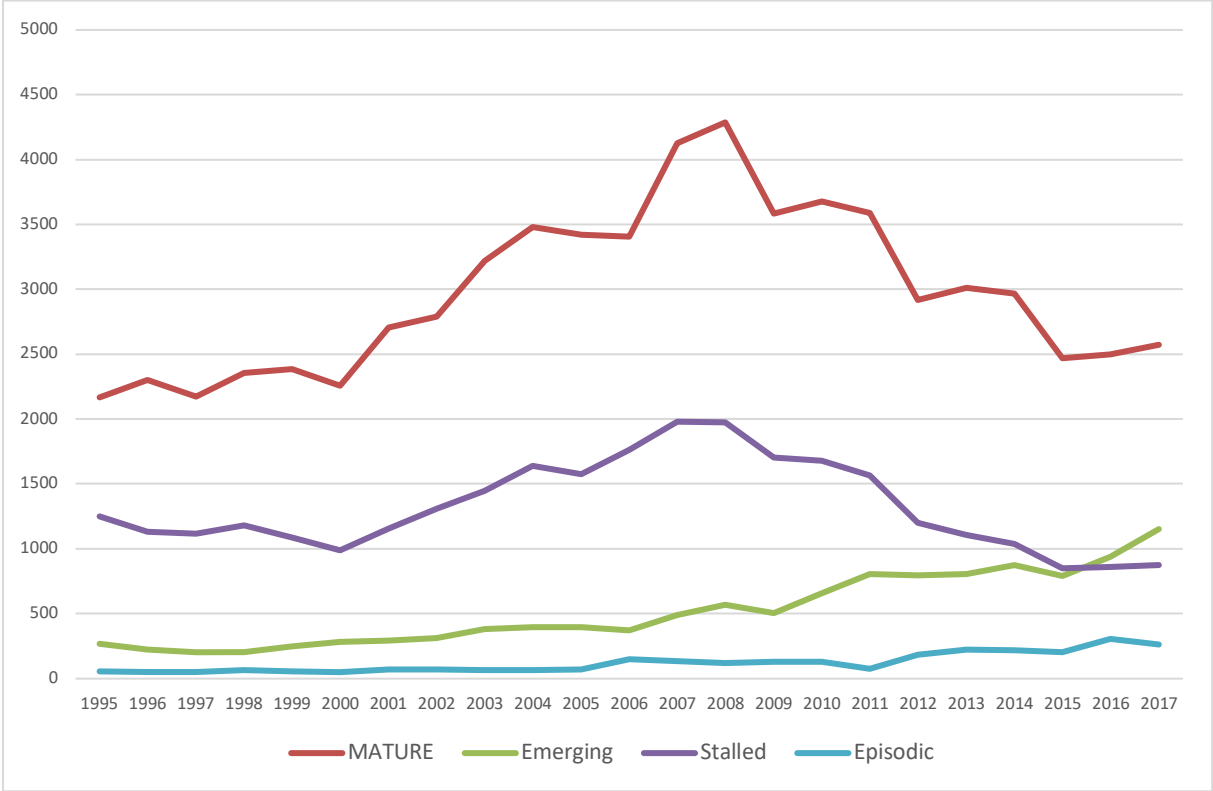
One striking observation is that "mature" and "stalled" exports display the same dynamics. They show solid growth until the great recession but decline continuously afterwards. There are many products (110) whose volume of exports growth has "stalled" since the great recession. They experienced an overall decline of 50% during this recent period.

An even greater number of low-technology products (163) have been exported episodically, but their volume remained small.

Table 2. Manufacturing exports according to technology level and type of growth dynamics, values in millions of USD in 2015 prices

Product Type	Number of Products	Average Value 1995-1997	Average Value 2007-2009	Average Value 2015-2017	Ratio (2007-2009) / (1995-1997)	Ratio (2015-2017) / (2007-2009)	Ratio (2015-2017) / (1995-1997)
Low-technology Manufacturing							
Mature	11	2212.628	3998.660	2512.709	1.8	0.6	1.1
Emerging	51	230.591	521.607	961.757	2.3	1.8	4.2
Stalled	110	1166.787	1887.726	861.256	1.6	0.5	0.7
Episodic	163	53.301	128.662	258.342	2.4	2.0	4.8
Other	167	2.634	3.688	3.051	1.4	0.8	1.2
Total LTM	502	3665.940	6540.343	4597.115	1.8	0.7	1.3
Medium-technology Manufacturing							
Mature	6	193.884	1850.804	2846.622	9.5	1.5	14.7
Emerging	58	124.770	605.812	1145.512	4.9	1.9	9.2
Stalled	43	99.466	540.047	312.426	5.4	0.6	3.1
Episodic	88	46.367	59.259	79.982	1.3	1.3	1.7
Other	85	3.031	2.610	2.122	0.9	0.8	0.7
Total MTM	280	467.518	3058.532	4386.664	6.5	1.4	9.4
High-technology Manufacturing							
Mature	4	37.332	426.891	977.499	11.4	2.3	26.2
Emerging	21	51.402	272.302	661.739	5.3	2.4	12.9
Stalled	11	36.424	328.751	158.173	9.0	0.5	4.3
Episodic	24	2.986	17.163	55.000	5.7	3.2	18.4
Other	21	0.283	0.709	0.254	2.5	0.4	0.9
Total HTM	81	128.427	1045.816	1852.665	8.1	1.8	14.4
All manufacturing							
Mature	21	2443.843	6276.354	6336.830	2.6	1.0	2.6
Emerging	130	406.763	1399.722	2769.008	3.4	2.0	6.8
Stalled	164	1302.676	2756.524	1331.855	2.1	0.5	1.0
Episodic	275	102.654	205.084	393.324	2.0	1.9	3.8
Other	273	5.948	7.007	5.427	1.2	0.8	0.9
Total Manufacturing	863	4261.885	10644.691	10836.444	2.5	1.0	2.5

Figure 3. Low technology manufactures (LTM) exports according to type of growth dynamics (values in millions of USD in 2015 prices)



4.2. Medium technology exports

From Table 1 we observed the growth dynamics of medium technology exports, which have expanded very rapidly at 17% per year until the great recession. Growth slowed somewhat since then but remained healthy at 4.5% per year.

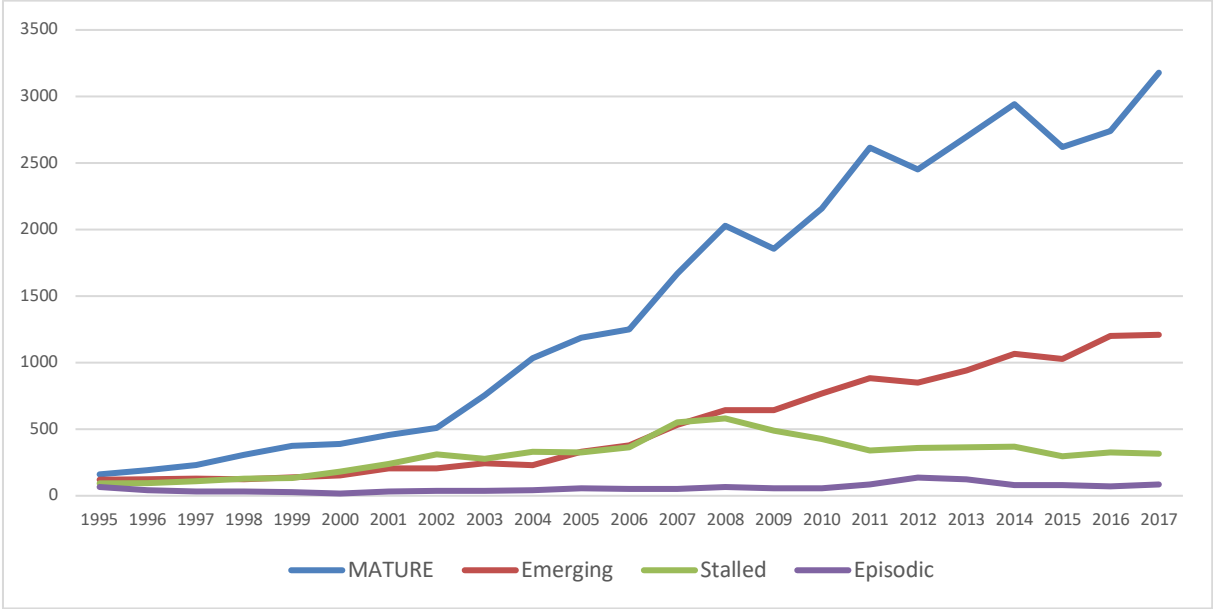
Table 2 and Figure 4 show the evolution of these exports by type of product for the period 1995-2017.

One striking observation is that "mature" and "emerging" exports display the same dynamics. The bulk of the "mature" exports is concentrated in 6 products which have become mature and expanded steadily. But there has been a lot of new diversification and experimentation. We identified 58 products as "emerging" and were expanding rapidly, even after the great recession.

However, the export growth of many other products has either stalled or even collapsed (43 products).

But again, we find many MTM products (88) whose export has been episodic and remained small throughout the period.

Figure 4. Medium technology manufactures (MTM) exports according to type of growth dynamics (values in millions of USD in 2015 prices)



4.3. High technology exports

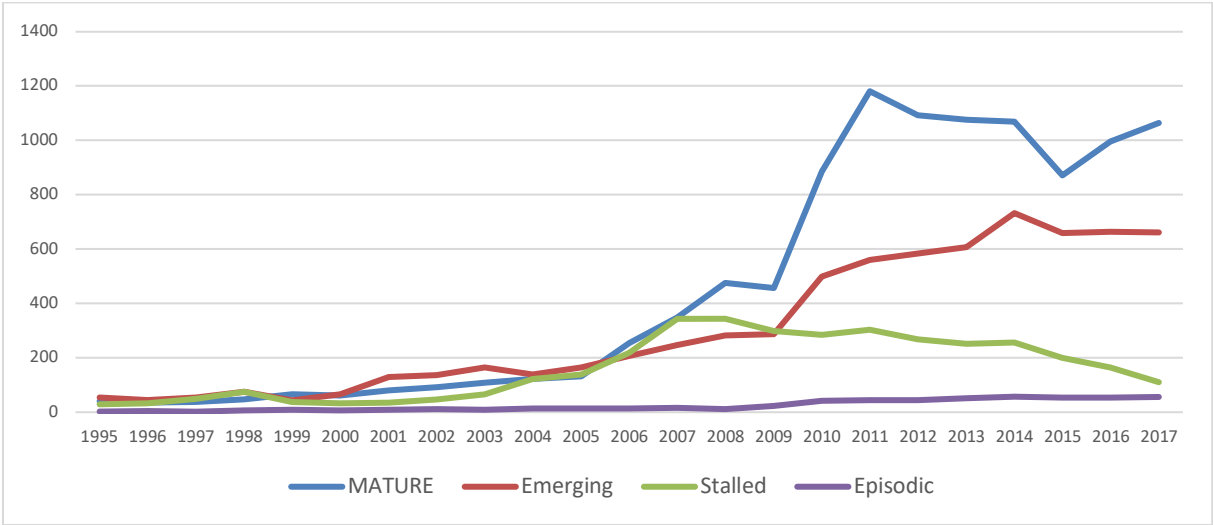
From the data in Table 1 we observe that the expansion of high technology exports has been remarkable, especially since the great recession, growing at 7.8% per year. Their share in total exports increased from 3.2% in 1995 to 13% in 20217 (Figure 2), and their share in total manufacturing exports increased from less than 5% to 17.3%.

Table 2 and Figure 5 show the evolution of these exports by type of product, according to their growth dynamics, for the period 1995-2017.

Like in the case of medium-technology products, the growth dynamics of high-technology products for "mature" and "emerging" exports are remarkably similar. A few products (4) are mature exports and constitute the bulk of these exports which have been growing steadily and reaching a high volume. But many other products (21) have also been growing in a sustained way and could mature over time.

On the other hand, many other products have seen their growth stalled (11) or have been exported only "episodically" (24).

Figure 5. High technology manufactures (HTM) exports according to type of growth dynamics (values in millions of USD in 2015 prices)



5. Industrial policy and export diversification in manufacturing

These empirical findings in the previous section show that there has been a rich process of innovation, diversification, and technological upgrading in manufacturing. What does this Tunisian experience tell us about how to explain these results about successful and less successful innovations? And how these outcomes are related to industrial policy?

After the very active phase of import substitution during the 1960s, with its successes and failures, Tunisia pursued since the 1970s a range of both horizontal and vertical industrial policies aimed at various objectives. Horizontal policies had broad objectives such as: export expansion and diversification, regional development, or technological development. The most important targeted policies focused on a few sectors such as agriculture, tourism, or a few specific products⁶.

In the following discussion we focus of policies which aimed at export diversification and sophistication. We do not consider policies which had other objectives such as regional development, energy, or food security.

5.1. Horizontal industrial policies and export diversification and sophistication in manufacturing

The first broad-based horizontal policy for export promotion and diversification in manufacturing was introduced in the early 1970s, with the implementation of the "off-shore" export model.

Building on this pioneering "off-shore" sector approach for export promotion new policy initiatives were introduced starting with the policies introduced in the context of structural adjustment program starting in 1986. As new market conditions and pressures evolved other

⁶ APII (2010b) provides a detailed review of the manufacturing sector by 2010.

horizontal policies for industrial development have been implemented, complementing the "off-shore" system.

5.1.1 The general institutional setup of "off-shore exporting"

Since the early 1970s Tunisia introduced (Law of April 1972) a special arrangement for fully (100%) exporting firms in manufacturing whether domestic or foreign owned⁷.

This system has remained practically unchanged over 45 years and created a dual-track system with firms producing for the local market being subject to a completely different system of taxation and trade related procedures and rules. Some flexibility was introduced during the 1990s which allowed "fully-exporting" firms the possibility to sell a share of output on the domestic market (which can reach up to 30%, later increased to 50% of sales), in which case tax exemptions are waived on the part of sales in the domestic market.

As indicated above the full holidays on income and corporate taxes were ended, with imposition of a preferential rate in 2014, and normal taxation starting in 2021 (as decided in 2019). In principle the common tax regime is applicable to exporting and domestic market firms without discrimination. The common corporate tax system includes a regular tax rate of 25% and a reduced rate of 13.5% on high value-added activities⁸. This implies in practice a preferential rate of 13.5% for almost all exporting firms, as it benefits the following activities:

- Electrical, electronic, and mechanical industries
- Manufacturing of automobiles, airplanes, ships, trains, and their components,
- Electrical wires and cables,
- Pharmaceuticals and health equipment,
- Textiles, clothing, and leather industries,
- Agrobusiness industries,
- Call centers,
- Information and communications technology activities,
- International trading companies.

But the customs system remained in place which allows for fully liberalized trade and access to all inputs free of duties and taxes. This system allows for firms, essentially in manufacturing, to be established anywhere in the country. In practice this is a generalized free zone system. In 1992 an additional system was introduced for firms localized in specific geographically delimited "free-zones", where more flexibility on labor regulations was allowed. Two major such zones were created in Bizerte and Zarzis, where about 60 and 40 firms were created respectively by 2020.

In addition, Tunisia entered into various preferential trade agreements with Europe since the 1960s which culminated in the free trade agreement of 1995. Thanks to these agreements there has been free access of manufactured products to Europe.

⁷ See Annex 1 for details.

⁸ Another set of activities benefit from a further reduced rate of 10%: agriculture and fishing, handicrafts, environmental activities, projects in lagging regions, and a set of other "socially" oriented activities.

The institutional arrangement, with free access to the European market and a favorable business environment for exporting firms, was quite attractive to foreign as well as domestic investors. This system has allowed the development and rapid expansion of manufacturing exports in Tunisia.

During the two decades since the early 1970s, Tunisia has achieved significant diversification from primary commodities and resource-based manufacturing exports towards low-technology exports, mainly clothing. The ratio of non-fuels merchandise exports to GDP increased from 9.2% in 1970 to 27.8% in 1995. The share of the manufacturing sector in GDP increased from 8.4% in 1970 to 19% in 1995. Apparel and clothing constituted the most important category reaching 56% of total exports in 1995.

Table 3 shows that almost all of Tunisian manufacturing exports take place under the off-shore regime: the share of exports of manufactured products in total exports at around 65% until 2010 has been only slightly higher than the share of the off-shore exports. These shares have increased recently in view of the collapse of natural resource-based exports since the revolution of 2010/2011. But these numbers tend to show artificially large volumes of "off-shore" exports. A more appropriate measure is to take only net exports of the off-shore regime: the share of the off-shore regime manufactured exports was around 36-37% of the total until recently and has increased to more than 50% recently⁹.

A basic feature of the "off-shore" regime is the facility to import free of duty all required intermediate and capital goods for manufacturing. The products are re-exported after processing. The share of domestic value-added proxied by the value of net exports in the off-shore regime in total gross off-shore exports has been around 30-32%, however it has increased recently to 37% in 2017.

Table 3. Off-shore regime exports 1995-2017, %

	1995	2000	2005	2010	2017
Share of manufactures in total gross exports (%)	66.07	66.01	64.83	65.10	75.07
Share of off-shore exports in total gross exports (%)	63.77	63.62	63.68	61.06	74.68
Share of net off-shore exports in exports (%)	34.45	35.53	36.98	33.02	52.41
Share of net off-shore exports in gross off-shore exports (%)	29.85	31.52	33.46	31.43	37.33

One can safely assume that it was an overall satisfactory business environment, which has provided an interesting context to understand product and export diversification processes.

This is one way to abstract from various general impediments related to overall business environment and to product diversification such as: finance, administrative procedures, taxes, constraints on imports, markets (since such firms have free access to European markets).

This system of production for exports operates in the global markets and is fully separate from the regular domestic production system. Presumably, it should be more flexible and responsive to the country's evolution of comparative advantage and global opportunities.

⁹ Total exports are also calculated by adding net "off-shore" exports to gross non-offshore exports.

5.1.2 Market conditions, new pressures, and a new wave of horizontal policies

In the wake of the macroeconomic crisis of the mid-1980s, the structural adjustment programme (since 1986) introduced several reforms, including trade liberalization, financial liberalization, and privatization.

By the mid-1990s global market conditions started to change dramatically, with expanding globalization. A decision was reached in 1994 to end the Multi-Fiber Agreements (MFA) which allowed the imposition by advanced countries of restrictions on clothing and textiles products. This was to be completed by the end of 2005. The process of China joining the WTO was ongoing, which was concluded by the end of 2001. All of these changes created huge pressures for countries specializing in low-technology exports. The share of low-technology exports in global trade was on a downward trend (Fagerberg and Verspagen, 2020). Competition from China and other countries such as Turkey was becoming very intense.

At the same time, Tunisia entered also into a broad-based free trade agreement with the European Union in 1995, which aimed to establish a full free trade area in industrial products over a 12-year period, and further liberalization in other activities. This agreement expands and deepens previous trade agreements with the EU which allowed for preferential access of Tunisian industrial goods into the European market.

These various policies did not target any specific sector or activities, but more broadly the business environment and a few "horizontal" policy objectives mainly: exports, regional development (Ghali and Rezgui, 2015). In addition to broad-based programs to promote an "innovation-driven" economy, which focus on expanding and upgrading education, expanding ICT and promoting Research and Development, Tunisia launched two programs targeting industrial development: export expansion and the Programme for "Mise à Niveau" (PMN).

Export expansion, diversification programme and dedicated funds.

At the same time, the "Off-Shore" system of manufacturing was launched, Tunisia put in place other mechanisms to promote exports. A dedicated export promotion agency was created in 1973, a trade insurance mechanism instituted in 1984, and a budget funding mechanism was put in place in 1985 to provide subsidies for related activities, such as transportation costs¹⁰. With support from the World Bank additional programs were implemented since 1999 for trade facilitation and access to foreign markets. Activities included reforms of trade procedures and funding to access new markets. In addition, a number of special funds have been created and implemented to target specific sector¹¹.

The "Programme de Mise à Niveau".

The other major industrial policy intervention was the "Programme de Mise à Niveau" (PMN), or industrial upgrading which was implemented following the signature of the EU-Tunisia FTA agreement in 1995, which aimed at led to its full entry into force after a long transition period on January 1, 2008. The Tunisian government, with support from the EU implemented a full

¹⁰ The Centre de Promotion des Exportations and the Fonds de Promotion des Exportations.

¹¹ See Annex 3 for details

program for modernization and upgrading of manufacturing activities to improve the competitiveness of firms.

Concurrently with the use of the Fonds de Développement de la Compétitivité (FODEC) as a local source of funding, the PMN has been supported by various bilateral and multilateral international donors.

While one could argue that this program is a "vertical industrial policy" since it targets manufacturing, we prefer to consider it as a "horizontal" policy since it is open to a wide range of industrial and manufacturing activities. The program did not target specifically any activity or product but all of manufacturing. It was to a large extent a program of subsidies to industrial firms to provide incentives for them to upgrade their technology, their management, and overall capabilities through "material" and "immaterial" investments.

Table 4 provides a summary of a few indicators about the PMN. While detailed data on actual full implementation about the program are not available, Table 4 shows indicators based on approved plans for upgrading by firms. A total of 6205 plans were approved by the end of 2019, involving a somewhat lower number of firms. The support was open to all firms and sectors, whether exporting or import-competing. The main criteria are the need and willingness of firms to undertake actions to improve their competitiveness through material and immaterial investments and changes in production technology, financial structure, and management.

The average annual investments for all of manufacturing firms was about 476 Million dinars. These investments would benefit from a subsidy which averages 13.2% of the investment plan, from funds allocated by the government and grants from the European Union.

One measure of the significance of the program is the ratio of these values to manufacturing value added. The planned investments reach a yearly average of 5.7% of manufacturing value added during the period 1996-2019. The relative significance of the interventions has been declining over time, from 7.5% in the late 1990s to 3.7% most recently. The subsidy rate has averaged 0.8% of manufacturing value added and has been declining as well¹².

The extent of support, including the rate of subsidy, varied considerably according to sectors. The main exporting sectors of textiles and clothing, mechanical and electrical, and leather and shoes industries account for 40% of the approved investment plans. But the relative importance of these two sectors has changed over time. While the textiles and clothing sector was the main beneficiary during the earlier period shown in the table (2001-2005), the emerging mechanical and electrical industry became the top beneficiary during the later period (2011-2015). But other domestic market-oriented sectors did benefit from significant support such foodstuffs and

¹² When we calculate these indicators based on deflated values by the consumer price index, we obtain: 491 million dinars (at 2010 prices) per year of investments, and 63 million Dinars of subsidy. The ratio of investment to value added is 5.2% and subsidy to investment is 13.3%.

agro-business, and construction materials. The rates of subsidy varied considerably as well according to sectors.

Table 4. Indicators for the "Programme de Mise à Niveau", 1996-2019

	1996-2000	2001-2005	2006-2010	2011-2015	2016-2019	Total or Average
Number approved cases	862	1383	1246	1856	858	6205
Investments (Millions of Dinars)	1555.520	1817.087	2442.107	3517.141	2101.752	11433.607
Subsidies (Millions of Dinars)	221.069	247.943	330.117	426.248	286.247	1511.624
Manufacturing Average annual Value Added (Millions of Current Dinars)	4142.6	5803.2	9154.9	11927.1	14232.8	
Average annual ratio investments to VA (%)	7.51	6.26	5.34	5.90	3.69	5.74
Ratio subsidies to Investment (%)	14.21	13.65	13.52	12.12	13.62	13.22
Ratio of subsidy to VA (%)	1.07	0.85	0.72	0.71	0.50	0.77
	Sector share of Investments (%)		Subsidy % of Investments		Subsidy % of VA	
	2001-2005	2011-2015	1996-2019		2001-2005	2011-2015
Foodstuffs and agro-business	13.54	19.01	11.7		0.67	0.70
Mechanical, electrical and electronic	16.41	26.06	14.3		0.74	0.57
Apparel and clothing, leather and footwear	24.16	14.30	17.2		0.68	0.56
Construction materials	20.56	14.32	8.9		1.89	1.09
Miscellaneous	14.84	14.32	13.7		1.02	0.99
Chemicals	8.84	9.27	11.7		0.77	0.73

Source: Authors' calculations, based on data from Bureau de Mise à Niveau and INS.

Complementary programs were added to the PMN to provide even more specific grants for priority technological investments or research and development¹³.

The limited data available suggests that the actual implementation of the program investments and subsidies granted are much less than the approved plans. The grants effectively disbursed for the whole period reached 732 Million Dinars or 48% of the total approved amounts of subsidies.

In view of slow implementation, the lack of sufficient data and lack of quality evidence it is difficult to draw clear conclusions about the effectiveness of the program in affecting competitiveness and promote export diversification and sophistication. However, it can be observed that there is no correlation between access to the program and success in export diversification. The textile and clothing sector which did benefit strongly from the program experienced the worst performance as we show below. On the other hand, for the mechanical, electrical and electronic industry, which was extremely successful, the rate of subsidy per unit of value added was relatively low.

¹³ Two such programs are the Investissement Technologique Prioritaire and the Prime au titre des Investissements dans les activités de Recherche Développement. Over the period 1999-2019 the Investissement Technologique Prioritaire program approved a total volume of investments (material and immaterial) of 710 Million Dinars, which is equivalent to 6.2% of the PMN. It committed 223 MD of subsidies, at a rate of 31% of investments. By end of 2019, a total of 108 Million Dinars was disbursed or 48% of total committed.

Two studies which provide an evaluation of the impact of the PMN reveal very limited success¹⁴. ITCEQ (2010, 2017) evaluates performance until 2009 and for the period 2006-2016 and finds insufficient implementation of policies and programs which were supposed to upgrade the capabilities of firms in terms of improved financial or personnel management, better human resources and improved skills, and more technological innovation. This meant that there was little evidence of improved efficiency of beneficiary firms and real upgrading.

The impact evaluation by Marouani and Marshalian (2018) uses advanced techniques and an "intention-to-treat" approach, as they are unable to use actual directly observed treatment data on firms which benefit or not from the program, and reaches three major conclusions. First, overall PMN interventions had a weak positive impact on employment and no impact on wages. They find no evidence of increased quality of jobs and skills. Second, there is quite significant heterogeneity in terms of impact depending on firm size: more employment but no impact on wages for small sized firms, but no impact on employment, lower wages and higher profits for medium and large sized firms. Third, there is evidence that subsidies to firms were often only postponing the inevitable failure of the non-competitive firms, but not sustaining their survival. Overall, there are limited benefits as to improved productivity and upgrading of firms. However, there is much more evidence of rent seeking by better connected firms, such as the larger ones, which increases their profits and postpones the failure of non-competitive ones.

These results are in line with the position of the opponents of IP who argue that Governments often lack the information and capability to design effective industrial policies, and hence invite rent-seeking behaviour from economic agents (Rodrik, 2008; Naudé, 2010a).

On the other hand, Hausmann and Rodrik (2003) recommend that governments need to play a dual role in fostering industrial growth and transformation. "They need to encourage entrepreneurship and investment in new activities ex-ante but push out unproductive firms and sectors ex-post". Naudé (2010a) and Aghion (2011) pointed out that IP as a process allows for considerable experimentation in identifying which sectors are to be supported but it requires that support to inefficient firms be discontinued as soon as this becomes evident, and that they be allowed to exit the market.

5.1.3 Geography and diversification of manufacturing exports

One of the objectives of "horizontal" policies has been the geographical diversification of exports, which was explicitly pursued by the "export expansion" program.

Relative comparative advantage, transportation costs and transaction costs play a role in determining the success or failure of diversification and its extent. In order to study the impact of these factors, we examine the various categories of Tunisian exports according to country destination by aggregating them into four major destinations:

- The most traditional and important destination, the European Union (EU28 countries)
- The neighboring North African countries (NA: Algeria, Libya, Morocco, and Egypt)

¹⁴ Another study by Jendoubi and Goaied (2007) uses an efficiency frontier of production function approach to assess the impact of PMN in the textiles and clothing sector. But it is not a direct evaluation of the program.

- The Sub-Saharan Africa region (SSA)
- and the Rest of the World (RoW).

To assess the significance of the geographical diversification, we used as indicator the change in share of exports of the destination region in the total exports of each category. Due to space constraints we show in Table 5 only the shares of exports for the sub-periods 2007-2009 and 2015-2017.

(i) Mature manufacturing exports

The geographical distribution of all three categories of mature manufacturing exports shows the predominance of the EU destination with more than 90%. These shares changed little over the whole period, except for a small increase in the share of the rest of the world over the recent period 2015-2017. The latter gain ranges from less than 1 percentage point for high-technology exports to almost 4 percentage points for low-technology exports.

We observe a large increase of low-technology exports to Sub-Saharan Africa (more than 100-fold increase between 1995 and 2017), but the volume remained exceedingly small or about 1% of exports.

(ii) Emerging manufacturing exports

The share of the EU in all categories of emerging manufacturing exports was much lower than for mature exports. Significant shares of these exports go to North Africa and the rest of the world.

But the dynamics of diversification varies significantly depending on level of technology. For the period 2007-2017, the EU loses share for low technology exports (- 4 points), but its share increases significantly for medium (+8 points) and high-technology (+7 points) exports. On the other hand, exports to the rest of the world gain share for low-technology products (+6 points) and high-technology (+2.5 points) products.

But the most noteworthy dynamics is the loss of market share of North Africa for all categories of products: low-technology (-2 points), medium-technology (-8 points) and high-technology (-9 points). The process of integration in the North African region has regressed.

(iii) Stalled manufacturing exports

As one would expect, stalled manufacturing exports show a lot of variability in the dynamics of diversification with many successes and failures.

For instance, for medium-technology products exports to the EU gain share during the early period (not shown in Table 5) of 1995-2008 (+18 points) while the rest of the world loses (-15 points). During the following period 2008-2017 (Table 5), the share of North Africa declines (- 8 points) while the shares of the RoW (+ 5 points) and of Sub-Saharan Africa (+ 3 points) increase. Other categories of technology exports have different dynamics, which mean that lots of experimentation has been taking place, which was not always successful.

Table 5. Share of manufacturing exports according to destination and category of products, average for 2007-2009 and 2015-2017 (%)

	Shares 2007-2009			Shares 2015-2017		
	LTM	MTM	HTM	LTM	MTM	HTM
MATURE						
North Africa	0.44	1.40	2.05	0.36	1.49	1.91
Sub Saharan Africa	0.30	1.15	0.57	1.08	0.38	0.45
Rest of the World	1.83	5.99	4.10	5.43	8.30	4.87
UE28	97.43	91.46	93.28	93.13	89.83	92.77
TOT MATURE	100.00	100.00	100.00	100.00	100.00	100.00
EMERGING						
North Africa	10.19	30.97	18.72	8.28	22.78	9.69
Sub Saharan Africa	4.01	4.30	2.19	3.78	4.27	1.44
Rest of the World	10.62	11.70	5.02	16.85	12.17	7.53
UE28	75.18	53.03	74.07	71.09	60.78	81.33
TOT EMERGING	100.00	100.00	100.00	100.00	100.00	100.00
STALLED						
North Africa	14.83	35.10	1.65	10.79	26.95	3.41
Sub Saharan Africa	2.70	3.37	0.59	2.12	6.59	1.40
Rest of the World	4.37	6.08	3.69	8.64	10.94	20.43
UE28	78.10	55.45	94.07	78.45	55.52	74.75
Total STALLED	100.00	100.00	100.00	100.00	100.00	100.00
EPISODIC						
North Africa	17.05	40.10	11.29	27.45	18.58	3.46
Sub Saharan Africa	3.76	8.13	3.18	6.17	2.90	0.90
Rest of the World	40.03	12.78	29.95	30.46	12.91	9.11
UE28	39.15	39.00	55.59	35.92	65.62	86.53
TOTAL EPISODIC	100.00	100.00	100.00	100.00	100.00	100.00

(iv) Episodic manufacturing exports.

The dynamics of these exports shows no pattern, with lots of variability according to destination and level of technology, signaling opportunistic exports and experimentation.

But it is obvious that this experimentation into new markets such as in SSA or the rest of the world has been taking place mainly for low-technology exports and to a lesser extent to medium-technology exports. For high technology exports the experimentation has been mostly with EU markets.

5.2. Targeted industrial policies and successes in innovation and diversification in manufacturing

In Tunisia, it is well accepted that the "off-shore" exports regime was successful in generating strong growth of manufacturing and exports. It was a "horizontal" policy to the extent it did not target any specific activity. But through strong financial incentives and great facilitation to attract foreign investment and entrepreneurship, it helped produce rapid growth in

manufacturing and diversification of the economy through specialization in low-technology products.

Our discussion shows that it is difficult to associate clearly whether the new "horizontal" industrial policies introduced in the 1990s did succeed in promoting diversification and increased sophistication of exports in Tunisia. No empirical studies show convincingly such an impact. On the other hand, empirical evidence shows also that diversification was concentrated in a few activities, products, and sectors. This concentration does not preclude a role for "horizontal policies" which may result from natural market dynamics and private entrepreneurship. But coming to such a conclusion requires that we exclude the existence of "targeted" policies which explain the sector-specific outcomes.

We noted above that only a limited number of products have become "*mature exports*" and constitute a significant part of low-technology, medium-technology, and high-technology exports.

Annex 2 Table A2 shows the list of all products in each category, at the 2-digit level, and the value of exports in 2017 in USD. In order to focus on the most significant exports, and for the purpose of our policy discussion we include only products of some significance and use as a threshold a minimum value of exports of USD 20 million in 2017.

In addition to the well-developed mature exports, within each category of exports according to technology level there has been a lot of dynamism and innovation. Many products have experienced strong growth which continued through the 2010s (*Emerging strong growth exports*) while others stalled (*stalled growth exports*).

A very larger number of products (measured at the 4-digit level) has been exported "episodically", with varying degrees of success. This pool is much larger than the one from which emerged "mature", "emerging" and "stalled" products. This reflects a very dynamic process of experimentation, and there does not seem to be any underlying industrial policies which helped this process. We will not discuss these products in this section.

In order to find out whether and how industrial policies may have played a role in the success or failure of innovation and diversification of exports in Tunisia during the period 1995-2017 we review the cases where there is evidence of targeted industrial policies, and their role in determining the observed outcomes of diversification.

Annex 2 Table A3 presents the same data of Table A2 in a different way, showing the export products and the value of exports in 2017, decomposed according to the dynamics of exports, providing a snapshot of the sectoral experiences in manufacturing which we consider next in the policy discussions.

5.2.1. The rise of mechanical and electrical industries

The most striking performance over the last two decades has been the strong rise of the mechanical and electrical industry, which became the main export sector in Tunisia. It includes mainly the following 2-digit categories of exports: HS84, HS85, HS87, HS88 and HS90. A few other intricately linked activities have also expanded such as HS39 and HS94.

These exports belong mostly to the medium and high-technology exports. In Table A3 they are disaggregated into two major groups of activities: the auto-components industry and the rest of mechanical and electrical. They constitute 35% and 19%, respectively, of total manufacturing exports in 2017.

The dramatic surge of the auto-parts exports since the 1990s

The bulk of *mature exports in the medium-technology* category are related to parts and components of motor vehicles (HS84, HS85 and HS87). This industry has been developing already since the 1980s, through innovation and experimentation by entrepreneurs. A few firms were strong and dynamic exporters, especially of "wires and cables" for automobiles.

But there is a strong case for arguing that a specific industrial policy was behind the acceleration and sustainability of the success of the auto parts industry.

Since the end of the 1980s Tunisia introduced so-called "off-set" clauses in contracts with automobile suppliers requiring them to ensure some "local content" of exports against their sales in the country. These local content clauses did probably contribute to the emergence of some firms and industries, but it can be argued that initially most of these exports were by activities of firms not related to the "off-set" of imports clauses.

Starting the mid-1990s, the industry has expanded extremely rapidly. It was at that time, during the 1990s, that Tunisia formalized the policy which required that importers of automobile vehicles should show evidence of compensatory exports with minimal local content. This was introduced formally in the "Cahier de Charges" which regulate imports of motor vehicles in 1995 (World Bank 2008, p. 15)¹⁵. According to the rules specified in the "Cahier de Charges" which has to be adhered to by automobile manufacturers who plan to market their products on the Tunisian domestic market, they have to:

- Commit to enter into an industrial partnership with Tunisia, for technology transfer, development of domestic production and exports of products related to the auto industry,
- The industrial cooperation may include various types of activities: exports of Tunisian products in the Mechanical and Electrical industries, activities such of transfer of technology, of certification of products, of participation in industrial fairs and events, and FDI,
- The annual value of the program of industrial partnership should not be less than 50% of the annual value of the manufacturer's imports of motor vehicles,
- The value of the program of industrial partnership may include expenditures on technical assistance and certification of products, FDI undertaken by manufacturer (less than 10% of value of total FDI), and the value of Tunisian exports realized by manufacturer,
- The (value added content of) exports undertaken by manufacturer may be for own use or for marketing for other purposes, with a diversification requirement (any single product cannot exceed 50% of the overall value of exports).

¹⁵ Arrêté des Ministres du Commerce, de l'Industrie et du Transport, du 10 Août 1995. Journal Officiel de la République Tunisienne.

These rules were more effectively enforced, especially the required 50% off-set of the value of imports (APII 2010a). These rules encouraged global (especially European) automakers to either establish their own production affiliates or encourage sub-contractors to do so in the production of auto-parts.

One of surprising results of the policy has been the emergence of two low-technology exports: plastics and furniture/bedding. These are low-technology or medium-technology, and some of them have been growing consistently, even reaching *maturity*:

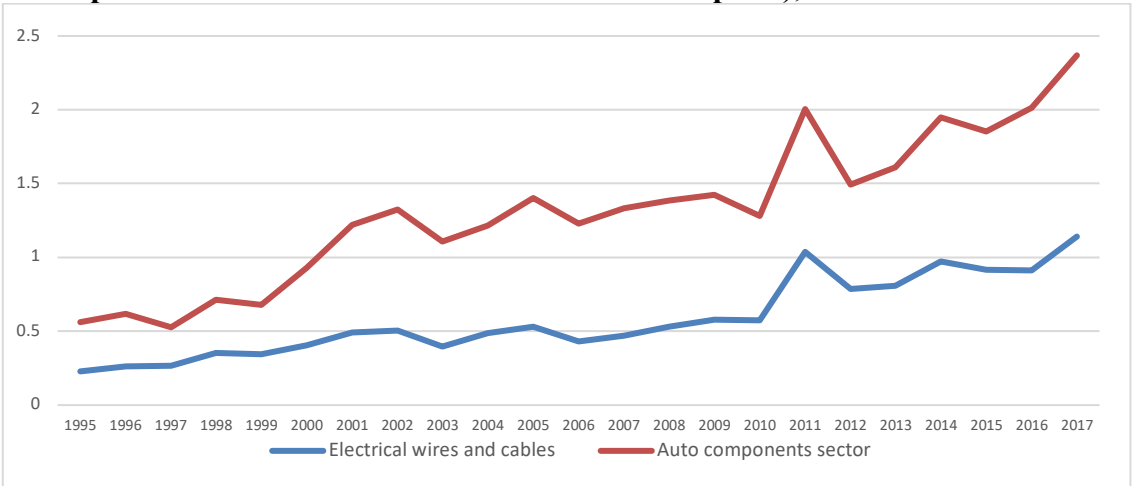
- Plastics products (HS3917, HS3926). The growth of these exports remains strong.
- "Seats (other than those of heading 94.02), whether or not convertible into beds, and parts thereof" (HS9401).

The link between the off-set policy and the growth of exports of the auto-components can be seen from Figure 6 which shows the evolution of the ratio of exports of auto-components (in value-added) to imports of automobiles. This indicator approximates the targeted objective of the local content policy. We notice that exports of auto-components were already significant in 1995, reaching 55% of the value of imports of motor vehicles, with wires and cables being the most important product. As we noted earlier, a significant part of these exports was not undertaken within the framework of the local content policy.

From a policy perspective the local content requirement did not target a new industry or set of activities, it only provided stronger incentives to an already market tested set of products. The success is quite clear from Figure 6, as the off-set ratio increased rapidly and reached more than 100% within five years. It jumps again since 2011 and reaches more than 200% over the last few years. The local content policy does not even require enforcement anymore. One single product, which is wires and cables, makes up more than 40% of these exports, and a 100% off-set ration. In fact, the local content requirement was canceled in 1999, as it became irrelevant¹⁶.

¹⁶ Arrêté des Ministres du Transport, du Commerce et de l'Industrie, du 5 Février 1999, modifiant l'Arrêté du 10 Août 1995 portant approbation du cahier des charges relatif à la commercialisation de matériels de transport routier fabriqués localement ou importés, tel que modifié par l'arrêté du 15 Août 1996 (Journal Officiel du 16 Février 1999).

Figure 6. Off-set ratios for auto-components exports (domestic value-added in exports of auto-components as ratio of the value of automobile imports), 1995-2017



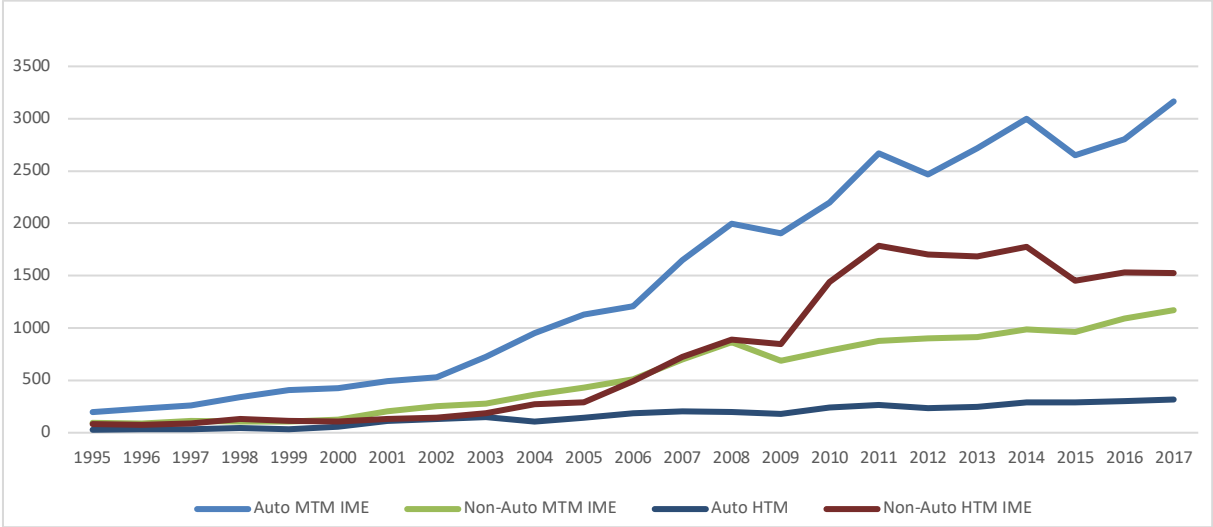
Strong growth since the great recession of other medium and high-technology mechanical, electrical and electronic exports

Beyond the growth and diversification of the auto-components sector, many other products in the mechanical and electrical industry started growing also during the 1990s. Growth accelerated somewhat during the early 2000s. But it was mostly since the great recession in 2008-2009 that a number of medium and high-technology exports, belonging to the mechanical, electrical and electronic industry, have emerged rapidly and have become *mature* (Figure 7):

- Electrical transformers, static converters (for example, rectifiers) and inductors (HS8504).
- Telephone sets, including telephones for cellular networks or for other wireless networks; other apparatus for the transmission or reception of voice, images or other data, including apparatus for communication in a wired or wireless network (HS8517)
- Monitors and projectors, not incorporating television reception apparatus; reception apparatus for television, whether or not incorporating radio-broadcast receivers or sound or video recording or reproducing apparatus (HS8528).
- Parts and components for aircraft (HS8803).

We find also that many medium and high-technology products belonging to the 2-digit groupings are classified as emerging or stalled exports.

Figure 7. Mechanical, electrical, and electronic industry exports: auto-components and other products, 1995-2017 (Millions USD, constant prices)



It is tempting to suggest that the expansion of these activities did benefit from spillover effects of the success of auto-components exports. While this requires further enquiry, one would expect that the presence of many activities in the auto-parts industry in the country, and their success, should encourage similar activities in the electrical, electronic, and mechanical industry to develop.

However, there is evidence that a "targeted policy" supported the emergence of one part of this industry, the parts, and components of aircrafts. A few projects for parts and components for aircrafts were launched during the early 2000s and exports started expanding. But the take-off of the activity was supported by similar policies to what was implemented for auto-components. A partnership agreement with a major aircraft maker, and involving many sub-contractors, was signed in 2009 to promote the manufacture of components of aircrafts in Tunisia¹⁷. This led to the rapid growth of exports in the following period. By 2017 this activity involved around 80 industrial units employing 13000 people.

The great recession of 2008-2009 and diversification

The growth of the medium and high-technology mechanical and electrical industry exports accelerated dramatically with the onset of the great recession of 2008-2009 (See Figures 4 and 5). Figure 7 shows clearly that the fastest acceleration in exports following the great recession was for MTM auto-components which increased by 40% between 2009 and 2011, and for HTM non-auto components which increased by 110%. This happened while the country was also going through a major political revolution/crisis and turmoil.

This surge in exports was certainly supported by the targeted industrial policies. But it was also greatly supported by the policies in European countries to stimulate demand for the auto-

¹⁷ MOU signed with Airbus company in January 2009 to create an aeronautical industrial park.

industry in response to the crisis, as well as restructuring of the industry through delocalization and sub-contracting.

5.2.2. The tentative emergence of some chemical and pharmaceutical exports

An interesting finding is the tentative diversification towards a few medium and high-technology exports in three main 2-digit activities:

- pharmaceutical (HS30),
- tanning and dyeing (HS32),
- essential oils and various chemicals (HS33).

While there is no evidence of sector specific interventions to support the growth of the tanning and dyeing and essential oils and chemicals activities, we are able to identify such a role in the emergence of pharmaceuticals.

Pharmaceuticals were a state monopoly until the end of the 1980s, but manufacturing in the sector was opened for the private sector in 1989, including for foreign investors. Even though it was import-competing, the activity would benefit from a duty and tax-free system of imports of inputs similar to the "off-shore" system for exports. Preference for domestic production over imports was given in the process of procurement by the government monopoly for imports and distribution of pharmaceuticals and health supplies. A 10% price margin advantage was allowed. In addition, since the early 1990s, domestic producers could outbid competing imports, by offering to substitute for them under specific conditions of quality, price and minimal provision of security inventories¹⁸.

This policy led to the development of an industry which provides about 50% of the needs of the domestic market. But it has been able also to expand its activity to exports in neighboring countries. Several firms are even fully exporting (15 out of 64 active firms).

5.2.3. The emergence of a new medium and high technology export: optical, precision, medical and surgical equipment

Another most interesting finding is that one medium-technology product, not related to the auto-industry, has also experienced strong growth and *matured*: "Instruments and appliances used in medical, surgical, dental or veterinary sciences, including scintigraphic apparatus, other electro-medical apparatus and sight-testing instruments" (HS9018).

But a variety of other similar products of medium and high-level technology, which are part of HS90, have been successful *emerging exports*:

- MTM: 9001,9004,9028
- HTM: 9015, 9018, 9025, 9027, 9030, 9031, 9032
- LTM: 9021.

One 4-digit HTM product is classified as stalled exports in this group (9026).

¹⁸ Under a so-called "correlation system".

There is no evidence of any targeted industrial policy to support these activities and products. It appears to be the result of private and market driven innovation.

A quite similar experience led by private initiative is the Indian software sector. According to Pack and Saggi (2006) the main actors were the university graduates who went abroad for further training and acquired some expertise in the high-tech sector. The industry expanded on the basis of interaction between the high-quality education financed by the government and infrastructure and international knowledge provided by foreign firms mostly U.S.

5.3. Sectoral declines and mixed results in low-technology exports: natural outcomes, failure of horizontal policies or lack of vertical policies?

While progress was being achieved in export diversification and sophistication with the strong growth of medium and high-technology products, there was lack of success in the low-technology category. Whether for traditional exports or for new exports growth stalled or became negative. Tunisia appears to be not competitive anymore in such activities and no "industrial" policies would help overcome such problems.

Traditional mature but declining activities: apparel and clothing, footwear and leather products

The *low-technology mature exports* are mostly apparel, clothing and footwear-leather products (HS61, HS62, HS63, HS64), which have emerged since the early 1970s with the establishment of the off-shore exports system. These products were fully consistent with the country's comparative advantage at the time and expanded rapidly, without any need for more specific targeted industrial policies.

A significant number of products belonging to these 2-digit activities have shown some dynamism and are classified as *emerging or stalled low-technology*.

These activities faced a major challenge of competitiveness with the dismantling of the MFA agreements, with the loss of the preferential access to the EU market, and the FTA agreement with the EU.

The "Programme de Mise à Niveau" was designed to a large extent as a "defensive" policy instrument to help domestic firms in the import-competing sector to withstand competition from imports after the full opening of the market for industrial products with full implementation of the FTA with the European Union. These activities were mainly in the low-technology category such as in apparel and clothing, and leather and footwear. We noted above that this sector was a major beneficiary of the PMN.

The results of the policy are mixed at best. While growth of the exports of this sector continued since the mid-1990s, and the sector adapted to the new conditions, the exports of the 11 "mature" products peaked in 2008 and have been in decline ever since. Their value fell by almost 40% between 2008 and 2017. Tunisia does not seem to be competitive anymore in such products.

Some indirect evidence points to a decline in import-competing activities as well. Table 6 shows the ratio of exports in total output for the two main manufacturing activities: mechanical and electrical industry and textiles, clothing, and leather. The mechanical and electrical industry shows a steady increase in the export orientation of the activity, as the share of exports reaches more than 80% by 2017. On the other hand, the share of exports for textiles, clothing and leather shows a strong increase until the mid-2000s, and stagnation afterwards. Low-technology exports, including clothing and apparel, started declining in real terms since the great recession. They dropped by 15% in one year, from its highest level of US \$ 6.9 billion in 2008 to US \$ 5.9 billion in 2009 and never recovered. Since the share of exports in total production declines somewhat since 2009, this implies that real production for the domestic market was declining as well.

Table 6. Share of exports in total output, 1997-2017 (%)

	1997-1999	2000-2002	2003-2005	2006-2008	2009-2011	2012-2014	2015-2017
Mechanical and Electrical Industry	39.09	49.31	61.98	67.44	69.87	72.63	77.25
Textiles, Clothing and Leather	70.26	74.76	82.03	85.17	82.29	81.38	83.01

The "horizontal" policies have clearly failed to help sustain these activities which do not seem to be competitive anymore. But it is doubtful any targeted policies would have had a better chance to succeed.

The mixed results of a variety of other low-technology products

The analysis of export dynamics revealed also that a broad range of products mostly of the low-technology category have been exported at one point or the other. But have not matured, and are identified as either *emerging or stalled exports*:

- LTM and MTM: Plastics and articles thereof (HS39),
- LTM: leather and leather products (HS41, HS42),
- LTM: paper and paperboard (HS48),
- LTM: cotton, other fibers, and yarns (HS52, HS53, HS56),
- LTM: ceramics and glassware (HS69, HS70),
- LTM: iron and steel (HS72),
- LTM and MTM: articles of steel (HS73),
- LTM: articles from other metals: copper (HS74), aluminum (HS76) and other base metals (HS83),
- MTM: ships and boats (HS89),
- LTM and MTM: Furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; lamps and lighting fittings, not elsewhere specified or included; illuminated signs, illuminated name-plates and the like; prefabricated buildings (HS94),
- LTM: toys and sports requisites (HS95),
- LTM: other manufactures (HS96).

The prospects for these activities remain uncertain, including the ability of the existing "horizontal" policies to help sustain the growth of these activities.

6. Innovation and diversification and industrial policy in primary products and natural-resource-based manufacturing

In this section we review the experience of innovation and diversification in exports for primary products and those based on natural resources. These traditional Tunisian exports are classified into three groups: foods, fuels which are mainly extraction and export of oil and gas products, and metals and minerals dominated by phosphates extraction and products based on its transformation into fertilizers.

6.1. Dynamics of export diversification and sophistication in primary products and natural-resource-based manufacturing

For these activities we applied the same approach, as for manufacturing products, in terms of identifying the dynamics of export growth for the various products in each group. The results are shown in Table 7.

Tunisian exports of primary and resource-based products are highly concentrated in 8 mature products: 2 foods (olive oil and dates), 2 fuels and 4 phosphates and derivative chemicals. During the period 2007-2009 the 8 mature products accounted for 74% of total exports of primary and resource-based products.

Table 7. Exports of primary and natural-resource-based products, according to type of growth dynamics; values in millions of USD in 2015 prices

Product Type	Number of Products	Average Value 1995-1997	Average Value 2007-2009	Average Value 2015-2017	Ratio (2007-2009) / (1995-1997)	Ratio (2015-2017) / (2007-2009)	Ratio (2015-2017) / (1995-1997)
Food Products							
Mature	2	311.147	661.828	676.304	2.1	1.0	2.2
Emerging	20	55.196	123.015	246.934	2.2	2.0	4.5
Stalled	40	303.536	920.690	530.789	3.0	0.6	1.7
Episodic	57	41.832	30.479	119.590	0.7	3.9	2.9
Other	68	0.947	0.920	1.396	1.0	1.5	1.5
Total FOODS	187	712.658	1736.932	1575.013	2.4	0.9	2.2
Fuels, Oils and Residuals							
Mature	2	1372.328	1762.172	890.345	1.3	0.5	0.6
Emerging	0	0.000	0.000	0.000	0.0	0.0	0.0
Stalled	0	0.000	0.000	0.000	0.0	0.0	0.0
Episodic	4	2.823	3.078	46.241	1.1	15.0	16.4
Other	8	0.010	0.075	0.078	7.3	1.0	7.6
Total FUELS	14	1375.162	1765.324	936.663	1.3	0.5	0.7
Minerals, Metals and Products							
Mature	4	1180.029	1736.435	609.687	1.5	0.4	0.5
Emerging	7	28.073	62.179	105.131	2.2	1.7	3.7
Stalled	11	318.912	291.716	167.417	0.9	0.6	0.5
Episodic	28	53.031	10.862	13.357	0.2	1.2	0.3
Other	83	0.959	1.629	2.872	1.7	1.8	3.0
Total MMP	133	1581.005	2102.820	898.464	1.3	0.4	0.6
Primary and Natural Resource Based							
Mature	8	2863.504	4160.435	2176.335	1.5	0.5	0.8
Emerging	27	83.269	185.194	352.065	2.2	1.9	4.2
Stalled	51	622.447	1212.406	698.206	1.9	0.6	1.1
Episodic	89	97.687	44.418	179.188	0.5	4.0	1.8
Other	159	1.917	2.624	4.345	1.4	1.7	2.3
Total PPNRB	334	3668.824	5605.077	3410.140	1.5	0.6	0.9

While there have been limited attempts at diversification and innovation in the petroleum and minerals sectors, we find that there are many emerging (20) and stalled (40) growth products in the foods sector. However, these attempts seem to have little success as the volume of these exports remained small, and those stalled are more important than the "emerging" growth products.

The process of diversification in the minerals, metals and products sector has been weaker, but has an interesting experience.

6.2. Geography and diversification of primary products and resource-based exports

Table 8 shows the distribution of exports by geographical destinations, along the same lines of analysis of manufacturing products.

Since there has been little growth or diversification of fuels, oils and residuals exports (FOR), we focus on foodstuffs (FOODS) and mining and minerals exports (MMP).

Table 8. Share of primary and resource-based manufacturing exports according to destination and category of products, average for 2007-2009 and 2015-2017 (%)

	Shares : 2007-2009			Shares : 2015-2017		
	FOODS	FOR	MM	FOODS	FOR	MM
MATURE						
North Africa	25.89	1.98	6.80	23.57	0.17	11.86
Sub Saharan Africa	1.86	0.04	1.05	2.22	0.33	0.87
Rest of the World	19.58	10.96	68.73	34.44	25.58	62.85
UE28	52.67	87.02	23.41	39.77	73.92	24.42
TOTAL MATURE	100.00	100.00	100.00	100.00	100.00	100.00
EMERGING						
North Africa	27.15	-	20.72	30.63	-	31.90
Sub Saharan Africa	13.87	-	21.15	7.08	-	31.54
Rest of the World	17.04	-	18.99	27.65	-	9.84
UE28	41.94	-	39.14	34.64	-	26.72
TOT EMERGING	100.00	-	100.00	100.00	-	100.00
STALLED						
North Africa	35.52	-	38.82	29.73	-	53.20
Sub Saharan Africa	7.11	-	6.86	10.18	-	9.88
Rest of the World	19.11	-	26.25	22.03	-	29.05
UE28	38.27	-	28.07	38.06	-	7.87
Total STALLED	100.00	-	100.00	100.00	-	100.00
EPISODIC						
North Africa	22.35	93.05	38.52	34.77	3.33	63.28
Sub Saharan Africa	3.69	4.40	13.20	11.62	0.94	5.91
Rest of the World	10.20	2.21	30.82	35.81	9.54	14.93
UE28	63.76	0.33	17.46	17.81	86.20	15.88
TOTAL EPISODIC	100.00	100.00	100.00	100.00	100.00	100.00

FOODS: Food products , FOR: Fuels, oils and residuals , MM: Minerals, metals and products

The exports of foodstuffs are the most diversified geographically, with the share of the EU not exceeding 40% for the various categories.

A significantly increasing share of mature exports has been going to neighboring North African countries and the rest of the world, with a declining share of the EU throughout the period 1995-2017. This trend has been taking place since 2008 for emerging exports as well.

A similar, even stronger, pattern of diversification for resource-based manufacturing exports towards North Africa and the rest of the world has been taking place.

We observe also quite significant attempts at diversification, for both foodstuffs and resource-based manufactures, towards Sub-Saharan African countries and the rest of the world as shown by the increasing share of stalled and episodic exports.

6.3. Industrial policy and diversification in foods exports

According to our classification there are only two products which are "mature". The most important one is "unpacked olive oil", which is a very traditional long-time export product. But dates is a new "mature" export which has emerged over the last few decades and became significant.

However, many products are identified as "emerging" major exports or "stalled" growth exports such as: packaged olive oil (HS1509), live fish and other fish products (HS03), fresh vegetables (such as SH0702 or SH0904), oils and fats (HS1515, HS1517) preparations of cereals and pastry (HS1902, HS1905). There is an even larger number of products whose export has been episodic.

The success in export diversification for one mature product (dates) and one "emerging growth" product (packaged olive oil) has been supported by "targeted" policies, including specific subsidies. Table 9 shows that subsidies to the export of dates were relatively low at less than 1%, but significant subsidies equivalent to 4.4% of exports went to packaged olive oil during the early years of growth 2008-2012. The rate of subsidy to olive oil declined to 1% later with the significant growth of these exports.

Other foods and agribusiness products did benefit from a large subsidy program. But these subsidies cover a large range of activities, which were mostly not specifically aimed at diversification of exports. While the ratio of such subsidies as a percentage of exports is high at around 2%, it does not mean that export activities did benefit.

The predominance of failure in the diversification process in the foods sector could be explained by the lack of clear policies of the "horizontal" or "vertical" type. Of course, this may be explained also by the restrictive EU policies on imports of food products, which are not covered by the FTA free movements of goods.

Table 9. Subsidies as % of foods exports, 2008-2017

	2008-2012	2013-2017
Packaged olive oil	4.36	0.99
Dates	0.80	0.87
Foods excluding olive oil and dates	1.83	2.06

6.4. Industrial policy and diversification in minerals, metals, and products

The main "mature" exports are in the traditional mining of phosphates and its transformation into fertilizers. No major new innovations or diversification have been achieved in this sector over the last few decades.

Some products are traditional and significant but do not make it into the "mature" category. Salt (HS2501) is such an old and traditional export, which is classified as "emerging" according to our criteria, while it should be considered as "mature". The "fluorides" exports (HS2826) are realized by one major company which has been in existence for a long time and there has been no role of industrial policy in its development.

On the other hand we observe some attempts at diversification with varying degrees of success: gypsum and plasters (HS2520), cement (2523), essential oils (HS3301).

These activities did not benefit from any specific or targeted policies. The cement and construction materials activity benefited from the "Programme de Mise à Niveau", but it is also subject to extensive regulations and price controls, as it is very intensive in energy which was highly subsidized until 2014. The same could be said about essential oils, which have been successful with no support of any industrial policy.

7. Conclusions

Based on the detailed review and analysis of the Tunisian experience over 23 years in export diversification and the role of industrial policy we can draw a few important conclusions which have significant policy relevance. In many ways these conclusions are consistent with findings from the experience in East Asia. They are nuanced in as far as they support an active role for industrial policy, but not any policies. Industrial policies can be successful, but they may be harmful and wasteful. It all depends on the right design and implementation.

First, the main issue for export diversification and upgrading does not seem to be the discovery and innovation per say. Experience shows that there is a lively process of innovation and discovery with a large number and a broad range of products being able to be exported at least for some period. The attempts at diversification have been highly active both in terms of products and geographical destination of exports.

In terms of the debates about industrial policy the emphasis on innovation and discovery may be excessive, and the focus on the issue of picking winners or not may be largely misplaced. The central issue in industrial policy may be more about what is required to support promising already emerged innovations, not to be started but to grow and be sustained. The focus of industrial policy should be to identify the factors behind the weak ability of innovative firms to remain competitive, to sustain exports over time and to grow!

Second, we have found that there is limited or no successes in diversification absent either horizontal or vertical or both types of policies. For activities where no explicit and well-designed export diversification policies were attempted, no significant diversification took place. Almost all cases of successful diversification were supported by some kind of industrial policies.

Third, the greatest successes of industrial policy were almost never based on attempts at picking winners. They typically build on emerging dynamism and activities and try to support their expansion. These activities tend to be consistent with comparative advantage and have a clear potential for success. This most effective support is through helping building partnership,

attracting foreign direct investment and providing technological and technical support. It tries to deal with the "market" failures which hinder the diversification process.

Fourth, we have identified cases where only "horizontal" policies or only "vertical" policies were successful. The "off-shore" system of incentives to support manufacturing since the early 1970s, is broad based and did not focus on any specific activity. It was successful in launching the process of diversification into low-technology exports for at least two decades. Targeted policies such as support for diversification of olive oil exports into higher value-added packaging or dates were also successful, when building on natural comparative advantage.

Fifth, the Tunisian experience suggests however that the choice for industrial policy is not between "horizontal" and "vertical" policies. The most successful cases in terms of diversification and upgrading are supported by an appropriate combination of both types of policies. While "horizontal" policies create the appropriate environment and overall set of incentives, targeted sectoral policies support the growth and expansion of specific products and industries. This was the case for the mechanical, electric, and electronics sector with its auto-components as well as non-auto components activities.

Sixth, the Tunisian experience shows limited success for industrial policy interventions which use subsidies as a main instrument. Subsidies tend to be captured and get mired into rent-seeking, slow and ineffective bureaucratic processes.

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Annex 1

Excerpts from Law of April 1972

- (i) Business facilitation, for registration of firms, access to land, and public services,
- (ii) Simplified customs procedures and tax-free imports of intermediate goods, with a system of controls on plant premises by customs officials (anywhere), this is equivalent to a "free-zone" system,
- (iii) Exemption from Value-Added taxes on all inputs, imported or locally produced,
- (iv) From 1972 to 2013: full exemption from corporate and personal income taxes during the first 10 years of activity and 50% reduction on these taxes for the next 10 years.
- (v) From 2014 to 2018: reduced tax rate on corporate profits of 10%, and exemptions on 2/3 on income realized by non-corporate entities¹⁹,
- (vi) A tax reform was undertaken in the Finance Law of 2019, which ends tax exemptions and reductions on profits from exports, which subjects them to the common regime starting its implementation on profits realized in 2021 (for new firms);
- (vii) Exemptions from corporate taxes on reinvested profits,
- (viii) For foreign or non-resident investors no restrictions on ownership of land and firms and free transfer of dividends and invested capital,
- (ix) Subsidies on social security taxes: the government pays the equivalent of the employers' contributions to social security on labor.

¹⁹ In case exports are realized by non-corporate entities, income from exports is subject to personal income taxes on 1/3 of such realized income.

Annex 2

Table A1. Synthesis of main horizontal and vertical policies

2-Digit export group	Mature, emerging and stalled growth products HS 4-Digit level	Active Industrial Policy
MANUFACTURING EXPORTS		
Greatest success: the auto components industry		
LTM HS39	3926	- Export promotion policy / "off-shore" regime.
MTM HS39	3917	- "Local content" clauses
MTM HS84	8407, 8409, 8414, 8421, 8483	- PMN / FODEC
MTM HS85	8534, 8535, 8536, 8544	- FOPRODEX
HTM HS85	8506, 8507, 8511, 8523, 8532, 8539, 8542, 8543,	
MTM HS87	8708, 8716	
HTM HS90	9032	
LTM HS94	9401	
Great Success of Other Mechanical and electrical industries		
MTM HS84	25 products	- Export promotion policy / "off-shore" regime.
HTM HS84	8412, 8470, 8471, 8473	- "Local content" clauses
MTM HS85	8509, 8511, 8515, 8533, 8537, 8538, 8547	- PMN / FODEC
HTM HS85	12 products	- FOPRODEX
MTM HS87	8701, 8702, 8703, 8704, 8705, 8712, 8714	- Partnership agreement with aircraft maker.
HTM HS88	8803	
Emerging success: Optical, precision, medical and surgical products		
LTM HS90	9021	No specific policies / private initiative
MTM HS90	9001, 9004, 9028	
HTM HS90	9015, 9018, 9025, 9027, 9030, 9031, 9032	
Tentative success of Medium and high technology exports: pharmaceuticals and other chemicals		
HTM HS30	3004, 3005, 3006	- "Correlation system"
MTM HS32	3208, 3209, 3210, 3212, 3213, 3214	
MTM HS33	3303, 3304, 3305, 3306, 3307	
Declining low-technology exports		
LTM HS61	15 products	- Export promotion policy / "off-shore" regime.
LTM HS62	15 products	- PMN / FODEC
LTM HS63	10 products	- FOPRODEX
LTM HS64	5 products	
Mixed experience of other low-technology activities		
LTM HS39	3922, 3923, 3924, 3925	- Export promotion policy / "off-shore" regime.
MTM HS39	3901, 3903, 3904, 3905, 3907, 3909, 3912, 3915, 3919, 3920, 3921	- PMN / FODEC - FOPRODEX
LTM: HS41, HS42	9 products	
LTM: HS48	9 products	
LTM: HS52, HS53, HS56	9 products	
LTM: HS69, HS70	9 products	
LTM: HS72	5 products	
LTM HS73 MTM HS73	13 products	
LTM: HS74, HS76, HS83	17 products	
MTM: HS89	3 products	
LTM HS94	9403, 9404	
LTM: HS95	3 products	
LTM: HS96	6 products	
PRIMARY AND NATURAL RESOURCE BASED EXPORTS		
Greatest success: Food Products		
FO: HS08	0804: Dates	- Fonds de Promotion de la Qualité des Dattes - Fonds pour le Développement de la Compétitivité dans les secteurs de l'Agriculture et de la Pêche - FOPRODEX
FO: HS15	1509: Non Packaged Olive Oil	- Fonds pour le Développement de la Compétitivité dans les secteurs de l'Agriculture et de la Pêche - FOPRODEX
Emerging success: of Food Products		
FO: HS15	1509: Packaged Olive Oil	- Fonds de promotion de l'huile d'olive conditionnée - Fonds pour le Développement de la Compétitivité dans les secteurs de l'Agriculture et de la Pêche - FOPRODEX
Tentative success of Food Products		

FO: HS02	0207	-Fonds pour le Développement de la Compétitivité dans les secteurs de l'Agriculture et de la Pêche -FOPRODEX
FO: HS03	0301	
FO: HS04	0401	
FO: HS07	0702	
FO: HS08	0809, 0810	
FO: HS09	0910	
FO: HS11	1103	
FO: HS15	1516	
FO: HS16	1604	
FO: HS20	2009	
FO: HS21	2106	
Greatest success: Minerals and Metals		
MM : HS28, HS31	HS2809, HS2835, HS3103, HS3135	No specific policies National Champion
Emerging success: Minerals and Metals		
MM : HS25, HS28, HS33	2501, 2505, 2511, 2520 2836 3301, 3302	No specific policies

Table A2. Mature, Emerging and Stalled manufacturing exports

(Products at the 2-digit level, whose value of exports in 2017 is greater than 20 million USD)

HS 2-Digit Codes	Value of exports in 2017 (millions USD 2015 prices)				
	Mature	Emerging	Stalled	Total	
LTM Exports					
39	234.727	6.157	21.897	262.780	Plastics and articles thereof
41		252.501		252.501	Raw hides and skins (other than furskins) and leather
42		57.739	31.986	89.725	Articles of leather; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silkworm gut)
48		111.522	23.967	135.489	Paper and paperboard; articles of paper pulp, of paper or of paperboard
52			39.606	39.606	Cotton
53		20.792		20.792	Other vegetable textile fibres; paper yarn and woven fabrics of paper yarn
56			23.943	23.943	Wadding, felt and nonwovens; special yarns; twine, cordage, ropes and cables and articles thereof
61	386.769	125.497	109.126	621.392	Articles of apparel and clothing accessories, knitted or crocheted
62	1357.224	26.841	244.016	1628.082	Articles of apparel and clothing accessories, not knitted or crocheted
63	118.606	23.560	84.682	226.849	Other made-up textile articles; sets; worn clothing and worn textile articles; rags
64	364.516	15.218	18.696	398.430	Footwear, gaiters and the like; parts of such articles
69			21.442	21.442	Ceramic products
70		37.955	1.679	39.634	Glass and glassware
72		17.161	17.329	34.490	Iron and steel
73		98.348	76.550	174.899	Articles of iron or steel
74		91.349	4.088	95.436	Copper and articles thereof
76		71.553	18.982	90.535	Aluminium and articles thereof
83		9.027	18.646	27.673	Miscellaneous articles of base metal
90		39.546		39.546	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; parts and accessories thereof
94	110.977		28.448	139.426	Furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; lamps and lighting fittings, not elsewhere specified or included; illuminated signs, illuminated nameplates and the like; prefabricated buildings
95		71.743		71.743	Toys, games and sports requisites; parts and accessories thereof
96		28.706	25.592	54.298	Miscellaneous manufactured articles
Total LTM	2572.820	1105.217	810.676	4488.712	
MTM Exports					
32		13.928	6.415	20.343	Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other colouring matter; paints and varnishes; putty and other mastics; inks
33		63.455		63.455	Essential oils and resinoids; perfumery, cosmetic or toilet preparations
39		151.987	50.723	202.710	Plastics and articles thereof
73		40.064	54.432	94.496	Articles of iron or steel
84	126.9776	320.230	62.097	509.304	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof
85	2531.3588	274.307	9.191	2814.857	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles
87	380.9276	82.118	55.353	518.398	Vehicles other than railway or tramway rolling stock, and parts and accessories thereof
89		8.859	25.765	34.624	Ships, boats and floating structures
90	139.6759	216.271		355.947	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; parts and accessories thereof
TOTAL MTM	3178.940	1171.219	263.975	4614.134	
HTM Exports					
30		48.493		48.493	Pharmaceutical products
84		32.994	7.169	40.163	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof
85	744.669	452.516	98.662	1295.847	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles
88	319.868			319.868	Aircraft, spacecraft, and parts thereof
90		127.286	4.287	131.573	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; parts and accessories thereof
Total HTM	1064.536	661.289	110.119	1835.944	
Total Exports	6816.296	2937.724	1184.769	10938.789	

Table A3. Sectoral Distribution of Manufacturing Exports, 2017

2-Digit export group	Mature, emerging and stalled growth products HS 4-Digit level	Value of exports in 2017, millions of USD 2015 prices		
		Mature	Emerging	Stalled
Greatest success: the auto components industry		3217	556	69
LTM HS39	3926	234		
MTM HS39	3917			49
MTM HS84	8407, 8409, 8414, 8421, 8483	127	105	13
MTM HS85	8534, 8535, 8536, 8544	2364	90	
HTM HS85	8506, 8507, 8511, 8523, 8532, 8539, 8542, 8543,		245	7
MTM HS87	8708, 8716	381	52	
HTM HS90	9032		64	
LTM HS94	9401	111		
Great Success of Other Mechanical and electrical industries		1232	670	212
MTM HS84	25 products		215	49
HTM HS84	8412, 8470, 8471, 8473		33	7
MTM HS85	8509, 8511, 8515, 8533, 8537, 8538, 8547	168	184	9
HTM HS85	12 products	745	208	92
MTM HS87	8701, 8702, 8703, 8704, 8705, 8712, 8714		30	55
HTM HS88	8803	319		
Emerging success: Optical, precision, medical and surgical products		140	318	4
LTM HS90	9021		39	
MTM HS90	9001, 9004, 9028	140	216	
HTM HS90	9015, 9018, 9025, 9027, 9030, 9031, 9032		63	4
Tentative success of Medium and high technology exports: pharmaceuticals and other chemicals			127	7
HTM HS30	3004, 3005, 3006		49	
MTM HS32	3208, 3209, 3210, 3212, 3213, 3214		14	7
MTM HS33	3303, 3304, 3305, 3306, 3307		64	
Declining low-technology exports		2227	191	457
LTM HS61	15 products	387	125	109
LTM HS62	15 products	1356	27	244
LTM HS63	10 products	119	24	85
LTM HS64	5 products	365	15	19
Mixed experience of other low-technology activities			1075	435
LTM HS39	3922, 3923, 3924, 3925		6	22
MTM HS39	3901, 3903, 3904, 3905, 3907, 3909, 3912, 3915, 3919, 3920, 3921		152	2
LTM: HS41, HS42	9 products		310	32
LTM: HS48	9 products		112	24
LTM: HS52, HS53, HS56	9 products		21	63
LTM: HS69, HS70	9 products		38	23
LTM: HS72	5 products		17	17
LTM HS73 MTM HS73	13 products		138	130
LTM: HS74, HS76, HS83	17 products		172	42
MTM: HS89	3 products		9	26
LTM HS94	9403, 9404			28
LTM: HS95	3 products		71	
LTM: HS96	6 products		29	26

Annex 3

Special Funds

A number of special funds (Fonds Spéciaux) have been created and implemented to target specific sectors or to finance specific actions. The advantage of these funds is that there is, on the one hand, the possibility of creating stable resources through dedicated taxes, and, on the other hand, greater flexibility in their management mode. Among those directly linked to our study we can cite the most important ones:

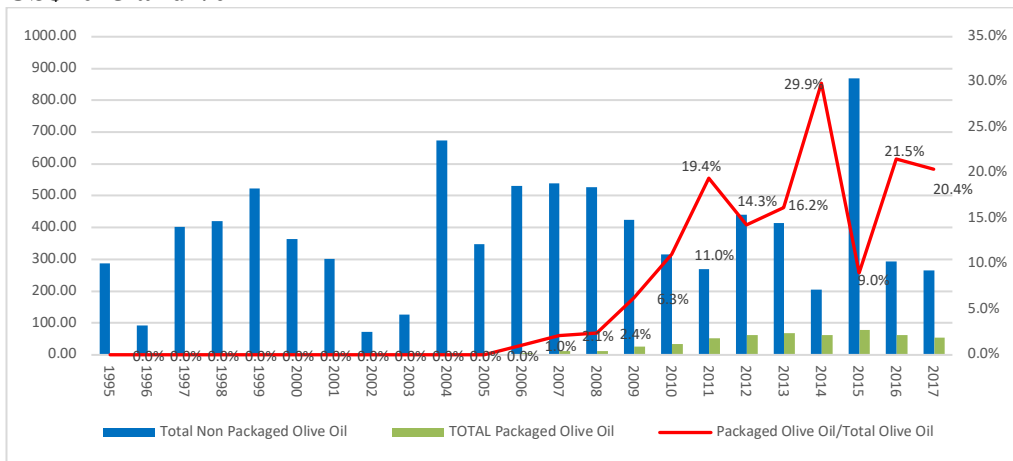
- Fonds pour le Développement de la Compétitivité de l'Agriculture et de la Pêche (FODCAP), (Special fund for the promotion of competitiveness of agriculture and fishing).
- Fonds de Promotion des Dattes (FPD), (Special fund for the promotion of dates).
- Fonds de Développement de la Compétitivité, dans les secteurs industriels, des services et de l'artisanat (FODEC), (Special fund for the promotion of competitiveness in the industrial, service and handicraft sectors).
- Fonds de Promotion de l'Huile d'Olive Conditionnée (FPHOC), (Special Fund for the promotion of packaged olive oil).
- Fonds de Promotion des Exportations (FOPRODEX), (Special Fund for the promotion of exports).

Expenditures from these five funds accounted in 2017 for nearly 0.67% of the government budget.

Two funds deserve special attention. The "fund for the promotion of packaged olive oil" (2005²⁰) and the "fund for the promotion of dates" (2007²¹). These funds are financed by dedicated taxes.

What is remarkable through the figure A3-1 is that the implementation of the fund for the promotion of packaged olive oil is behind the dramatic increase of exports of packaged olive oil with a surge at around 30% of total export of olive oil in 2014.

Figure A3-1. Evolution of the exports of Packaged and Non Packaged Olive Oil (HS1509), US\$2015 and %



The same phenomenon is noticeable for dates. Figure A3-2 shows that the slope of the curve of exports of dates moved up dramatically since 2008.

²⁰ Loi n° 2005-106, Décret n° 2006-2095.

²¹ Loi n°2007-70, Décret 2009-723

Figure A3-2. Evolution of exports of Dates (HS804), US\$2015

