

Kingdom of Morocco



Directorate of Financial Studies and Forecasts

*Moroccan exports dynamics:
intensive and extensive
margins*

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Introduction

The present paper introduces a more detailed microeconomic analysis of the development and determinants of the Moroccan exports during the period 1998-2012. More particularly, it aims to shed light on the dynamics of exports by dividing them into extensive margin, which represents the variations of exports of goods that are classically sold in already explored markets, and intensive margin, which illustrates the presence of new exchanges' flow of new products and/or to new markets.

The selected process, to determine the share of these two margins in the Moroccan exports growth, is inspired by the approach adopted by the World Bank and is based on trade refined data¹ according to the nomenclature of the 6-digit Harmonized System (sh6) relating to the period 1998-2012.

The analysis distinguishes between the period before and after the international financial crisis for the purpose of highlighting the structural changes that appeared during the last fourteen years. The microeconomic review of the trade flows between Morocco and its partners may allow identifying the various sources of the exports dynamics. Based on the refined data of trade exchanges, a commercial transaction is defined herein by two parameters: the product being transacted and the market to which the aforementioned product is exported (country of destination)². Therefore, the development of the global exports between two given periods may be explained either by the creation of new transactions (extensive component) or by the transactions' continuous performances between two periods (intensive component)³.

I- Moroccan exports general profile

The table below shows the general profile of the Moroccan exports between 1998 and 2012. The number of exported products recorded an overall increase rate of 21% between the two dates from 2429 to 2948 products. Similarly, the number of export markets increased by 24% moving from 141 to 175 markets between the two dates.

The number of transactions (product-market flow) increased by 58%, moving from 11339 transactions in 1998 to 17872 transactions in 2012, with an average value per transaction moving from MMAD 6.1 in 1998 to MMAD 10.3 in 2012. The average value per exported product moved from MAD 28 in 1998 to nearly MMAD 63 in 2012. During the same period, the average value per served market moved from nearly MMAD 487 to nearly MAD 1, 1 billion.

¹ Including temporary admissions.

² This microeconomic analysis may be detailed further by including a third parameter corresponding to the number of exporting businesses. Because of a lack of information about this aspect, we will make do herein with the two dimensions product and country.

³ Wok hypothesis: considering a detailed level of the nomenclature of products (sh6), only transactions (product-market flow) whose export value exceeds MAD 1,000 annually are taken into account.

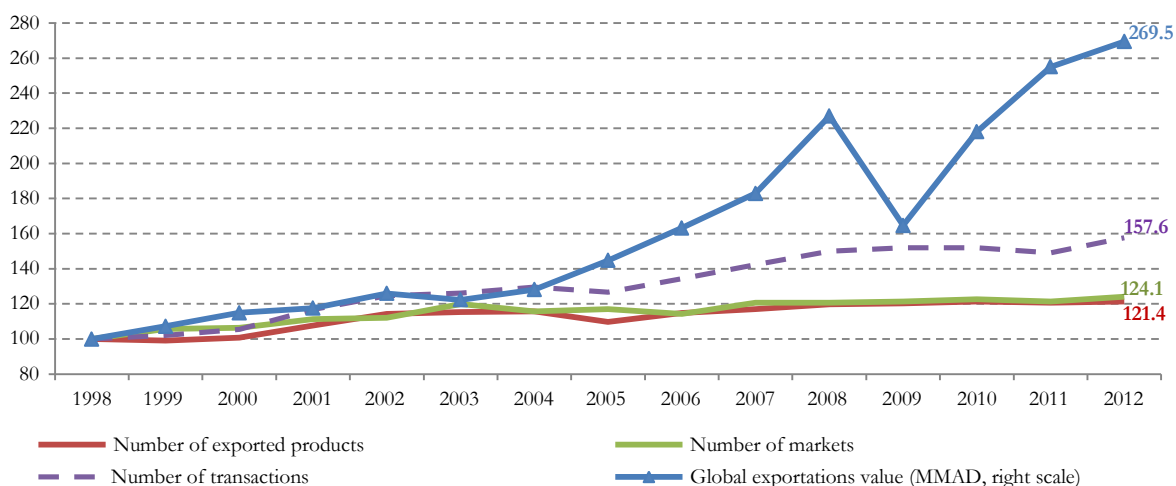
Moroccan Exportations' Profile 1998-2012

Year	Number of exported products	Number of markets	Number of transactions	Average value per product (in MAD)	Average value per market (in MAD)	Average value per transaction (in MAD)	Average number of transactions per product	Average number of transactions per product
1998	2 429	141	11 339	28.2	486.6	6.1	4.67	80.4
1999	2 405	149	11 560	30.6	494.1	6.4	4.81	77.6
2000	2 446	150	11 954	32.2	525.5	6.6	4.89	79.7
2001	2 614	157	13 242	30.9	513.8	6.1	5.07	84.3
2002	2 776	158	14 131	31.1	546.8	6.1	5.09	89.4
2003	2 801	169	14 297	29.9	496.4	5.9	5.10	84.6
2004	2 812	163	14 697	31.3	539.2	6.0	5.23	90.2
2005	2 663	165	14 361	37.3	601.6	6.9	5.39	87.0
2006	2 789	161	15 230	40.2	695.5	7.4	5.46	94.6
2007	2 841	170	16 140	44.2	738.3	7.8	5.68	94.9
2008	2 909	170	17 002	53.5	916.1	9.2	5.84	100.0
2009	2 919	171	17 239	38.7	660.9	6.6	5.91	100.8
2010	2 949	173	17 223	50.7	864.6	8.7	5.84	99.6
2011	2 930	171	16 902	59.7	1 023.4	10.4	5.77	98.8
2012	2 948	175	17 872	62.7	1 056.5	10.3	6.06	102.1
Average	2 749	163	14 879	40.1	677.3	7.3	5.4	90.9
TCAM 98-2012	1.4	1.6	3.2					
TCAM 98-2007	1.8	2.1	4.0					
TCAM 08-2012	0.7	0.6	2.1					

Source: Exchange Office, DEPF calculation

Between 1998 and 2007, the number of exported products and the number of served markets increased in an average annual rate of 1.8% for products and 2.1% for markets, increasing the number of transactions which increased by 4% per year between the two dates. Between 2007 and 2012, the number of transactions continued its increase in a rate of 2.1% per year, while the annual growth rate of the number of products did not exceed 0.7% and 0.6% for that of markets.

Development of Moroccan exports profile 1998-2012 (1998= base 100)



Source: Exchange Office, DEPF preparation

This data allows having a preliminary idea about the Moroccan exports dynamics. The progress of exports flows on the first period was accompanied by an increase in both the number of products and markets. On the second period, the latter's progress was weak. It was however accompanied by a continuation of increase at the level of the number of performed transactions, giving space to an increase of overall exports in an annual rate of 5.5% against 4.2% during the previous period. This may be explained by the presence of an effect of the diversification manifested by the exportation of some usual products to already explored markets (component 7 defined in the second period).

Nevertheless, the previous figures are to be qualified by the strong concentration of the Moroccan products and export markets. Let us note, for example, that according to the detailed nomenclature (sh6), only 3.5% of exported products and 6.4% of supplied markets (9 countries) account for 80% of the overall exports value in 1998. In 2012, this proportion is even achieved by means of exporting 2.9% of products to 11.4% of markets (20 countries), which shows a kind of drop at the level of products diversification between the two dates against an improvement at the level of market diversification.

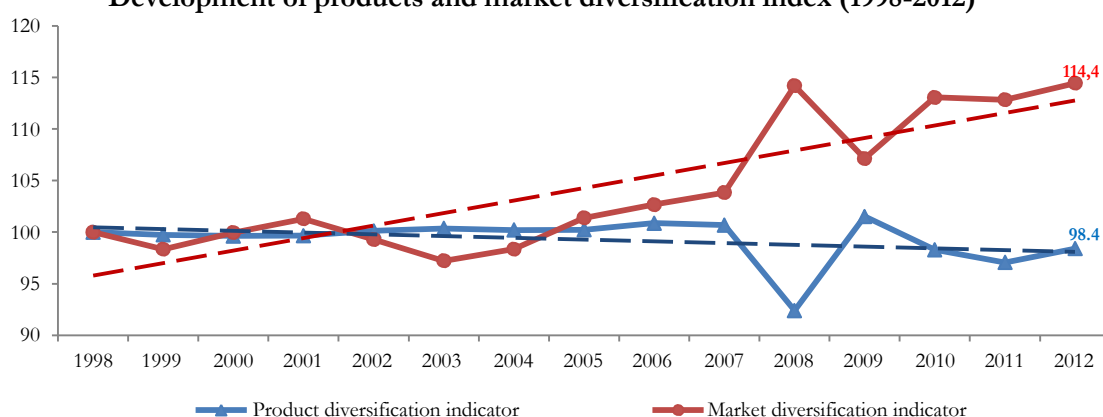
Number of exported products and export markets by decile of the exports value in 1998 and 2012

Decile	1998				2012			
	Product		Market		Product		Market	
	Products number sh6	in % of products exported	Products number sh6	in % of export markets	Number of products sh6	in % of exported products	Number of products sh6	in % of export markets
D1	-	-	-	-	-	-	-	-
D2	3	0.1	-	-	3	0.1	-	-
D3	7	0.3	-	-	6	0.2	-	-
D4	13	0.5	-	-	10	0.3	-	-
D5	19	0.8	3	2.1	16	0.5	4	2.3
D6	29	1.2	4	2.8	27	0.9	7	4.0
D7	48	2.0	6	4.3	49	1.7	12	6.9
D8	86	3.5	9	6.4	86	2.9	20	11.4
D9	172	7.1	21	14.9	177	6.0	36	20.6
D10	2429	100.0	141	100.0	2948	100.0	175	100.0

Source : Exchange Office, DEPF calculation

This structure of exports is confirmed by the products and markets diversification index⁴. Regarding the products, the said index recorded a downward trend on the studied period, stopping in 2012 at a level less than that of 1998. Concerning the market diversification index, it recorded an upward trend making in 2012 a level higher by 14% than that of 1998.

Development of products and market diversification index (1998-2012)



Source: Exchange Office, DEPF preparation

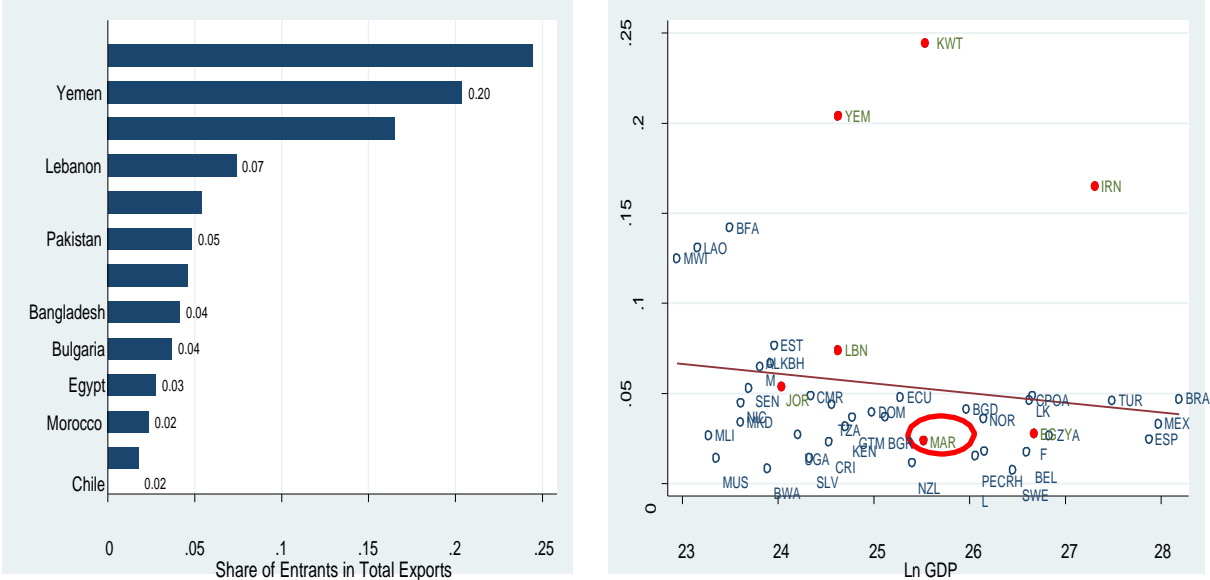
⁴ Diversification index is defined herein as a supplement in relation to the concentration index. The latter, also called Herfindahl-Hirschman index, measures the concentration degree of products (independently from markets) in accordance with the following

$$H_j = \sqrt{\frac{\sum_{i=1}^n \left(\frac{x_i}{X}\right)^2}{1 - \sqrt{1/n}}}$$

formula: where x_i represents the product exports value i (independently from exports to market i), X represents the value of overall exports and n represents the number of products (independently from markets). It shows how exports are concentrated on some products (independently from markets) or distributed in a more homogeneous manner on a series of products (independently from markets).

In addition to products and markets, Moroccan export market is also characterized by a concentration at the level of exporting businesses. This is reflected by a very low share of new businesses in total exports (0.02%). This share is qualified as low in view of the level of the country's growth.

New businesses' share



Source : World Bank

II- Decomposition of Moroccan exports growth: intensive margin versus extensive margin

Decomposing exports dynamics between intensive margin and extensive margin is made in different manners in the literature of analyzing exports diversification. The process selected in this work is based on that of the World Bank⁵ (see the frame below). According to this method, the intensive margin covers the birth of new trade flows, which may appear because of the introduction of a new product, the exploration of a new market or the diversification of products with an existing partner. This margin grows in the case of exporting to new markets, but also thanks to innovation: by exporting new products to one's usual partners or to new destinations. The intensive margin concerns variations of existing flows, and can be divided into three effects based on the nature of the variation (positive, negative or null).

⁵Method adopted for the decomposition of exports growth at the level of Wits database (World Integrated Trade Solution) of the World Bank, and developed in the user manual on trade indices contained in the database.

Frame: Decomposition of exports growth

Exports growth can be divided between the expansion of existing trade flows (intensive margin) and the appearance of new products and markets (extensive margin). According to these two dimensions, (product and market), this growth is the result of the following seven effects:

- 1- an increase at the level of the existing products exports on ancient markets;
- 2- a decrease at the level of the existing products exports on ancient markets;
- 3- loss of the existing products exports on ancient markets;
- 4- introduction of new products in new markets;
- 5- introduction of new products in ancient markets;
- 6- introduction of existing products in new markets;
- 7- products diversification: exporting existing products to existing markets with the latter having never been the destination of the said products.

The first three effects are related to the intensive margin and the four last ones are related to the extensive margin.

Let us consider X_{ij} the total value of the origin country's exports i to the partner country j and x_{ijk} the value of exports of product k of the country i to the country j . The products concerned by the previous effects between two dates t_1 and t_2 , will be characterized as follows:

$$(1) X_{ijkt} > 0 \text{ for } t = t_1, t_2 \text{ and } X_{ijkt2} - X_{ijkt1} > 0$$

$$(2) X_{ijkt} > 0 \text{ for } t = t_1, t_2 \text{ and } X_{ijkt2} - X_{ijkt1} < 0$$

$$(3) X_{ijkt1} > 0 \text{ and } X_{ijkt2} = 0$$

$$(4) \sum_j X_{ijkt1} = 0, X_{ijt1} = 0 \text{ and } x_{ijkt2} > 0$$

$$(5) \sum_j X_{ijkt1} = 0, X_{ijt1} > 0 \text{ and } x_{ijkt2} > 0$$

$$(6) \sum_j X_{ijkt1} > 0, X_{ijt1} = 0 \text{ and } x_{ijkt2} > 0$$

$$(7) \sum_j X_{ijkt1} > 0, X_{ijt1} > 0, X_{ijt1} = 0 \text{ and } x_{ijkt2} > 0$$

In order to measure the contribution of the different components to overall exports growth, we have adopted the definition proposed by Davis and Haltiwagner (1992) for the increase rate associated with the creation-destruction of transactions between two periods t_1 and t_2

$$x^i_j = \frac{x_{it2} - x_{it1}}{\frac{x_{it2} + x_{it1}}{2}}$$

where x_{it} represents the transaction value i during the year t (a transaction being defined by a product and a market) and x^i_j represents the growth rate of this transaction between t_1 and t_2 . According to this definition, the creation (destruction) of a transaction induces a growth rate of +2 (-2), whereas the growth rate classical definition would give a growth rate of $+\infty$ and -1 respectively for the creation and destruction of a transaction.

From this is deduced the aggregated growth of total exports X between t_1 and t_2 as follows:

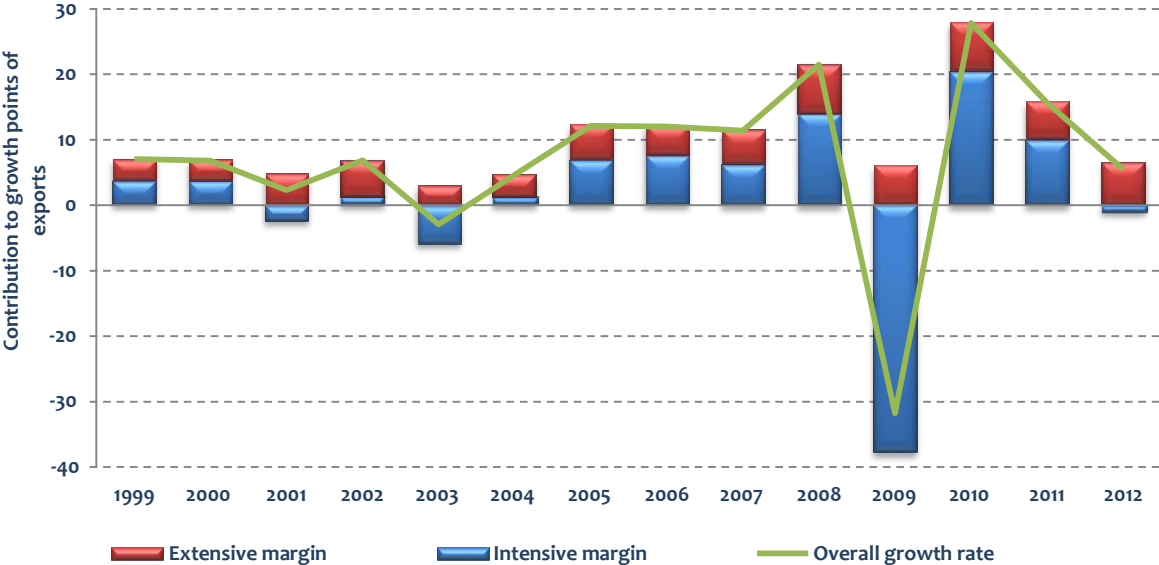
$$X^* = \sum_{i=1}^7 \frac{x_{it2} + x_{it1}}{X_{t2} + X_{t1}} x_i$$

We have opted for working with the six-digit harmonized nomenclature (sh6), for the period 1998-2012, i.e. an average number of transactions per year of 14880 transactions, resulting from the exportation of 2750 products to an average of 163 countries per year⁶. Furthermore, in view of the specific negative performances recorded in 2009 (decline of exports by 27.4%), we will exclude this year in the following parts. Therefore, the period of the study is 1998-2012 except the year 1999.

It is worth mentioning that the decline of exports in 2009 (-27.4%) is mainly explained by the decline of the value of classical products exports on the traditional export markets. It is particularly about the products of phosphates and two derivatives ("phosphoric acid" and "natural and chemical fertilizers"), whose contribution to the exports decline was respectively 31%, 35% and 12% (for respective annual variations of -75%, -65% and -49%). The price effect is decisive in this decline knowing that, for these three products, the quantities developed, during this same year, respectively by -51%, +17% and +52%.

The extensive margin (amount of the components from 4 to 7) seems to have significantly contributed to the exports aggregated growth, with an average contribution of 48% on the assessment period. This contribution is of 60%, relatively more important compared to the second period where it was nearly 41%.

Decomposition of exports growth (net margins)

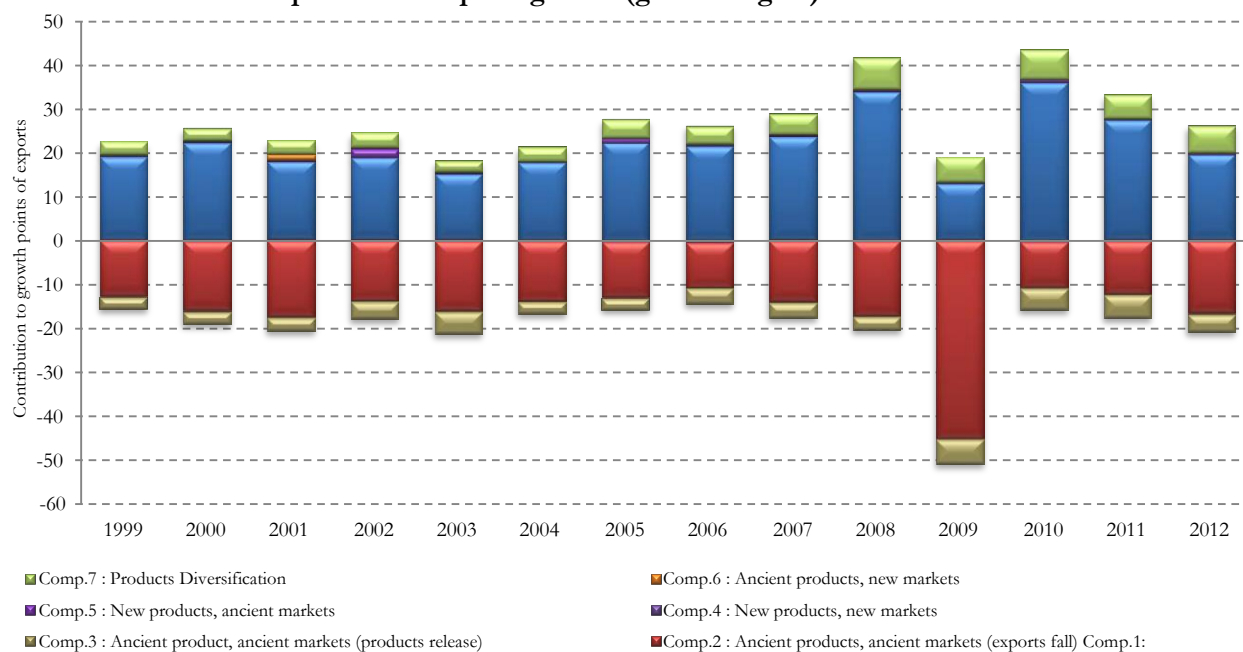


Source: Exchange Office, DEPF preparation

For the intensive margin (amount of the components from 1 to 3), its weight is decisive in exports increase. It manifests itself through an average contribution of 52% on the whole period. This contribution obviously improved on the second period, approaching 62% compared to the previous period (1999-2007) in which it did not exceed 40%. This average contribution was however diminished by the negative contribution of this margin during the year 2012 (-18%). In fact, except this last year, the contribution of the intensive margin to exports growth increased to nearly 68% in average on the second period.

⁶Note that the obtained results depend on the considered disaggregation degree. A finer level of disaggregation, with less relevant distinctions between products, may overestimate the extensive margin forecast.

Decomposition of exports growth (gross margins)



Source: Exchange Office, DEPF preparation

Exports annual contributions' values to growth relating to each of the components of intensive and extensive margins, as defined in the Frame above, reflect positive gross contributions but relatively low from the extensive margin components. The component relating to product diversification (component 7) is distinguished, however, by a relatively important contribution of 42% in average on the whole period of the study and of 50% on the first period.

The contributions of the other components of the extensive margin remain relatively low, not exceeding together 5% in average on the whole period, showing therefore that the extensive margin is further explained by exporting classically exchanged products to a more important number of destinations and not by a higher diversification of products and markets.

Average contributions of intensive and extensive margins per period (in %)

Period	Comp.1	Comp.2	Comp.3	Extensive margin	Comp.4	Comp.5	Comp.6	Comp.7	Extensive margin
1999-2012	211.8	-125.3	-34.2	52.3	0.0	4.4	1.0	42.3	47.7
1999-2007	283.8	-196.3	-47.8	39.6	0.0	7.6	2.4	50.4	60.4
2008-2012	171.6	-85.6	-26.6	59.4	0.0	2.6	0.2	37.8	40.6

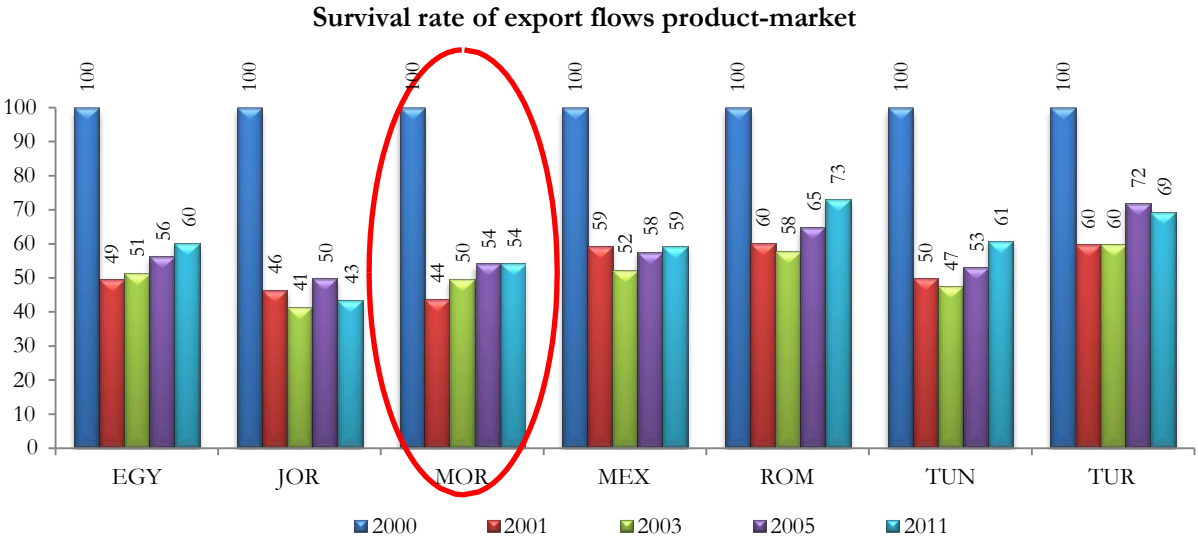
Source : Exchange Office, DEPF calculation

Regarding the components of the intensive margin, the overall exports growth seems essentially driven by the increase of the value of the existing products exports on ancient markets (component 1), with an important contribution of 212% in average on the whole period.

The other two components of the intensive margin, by their definition, exercise a negative effect on the overall exports growth. In fact, the decline of the existing products exports value on the ancient markets (component 2) significantly contributed to the decline of overall exports; a decline of 125% in average on the whole period. The weight of this component was very strong during the first period 1999-2007 with a contribution of -196% against -86% for the second period.

The loss of exports flows of existing products on ancient markets (component 3) has also contributed to contraction in exports on the period of the study up to -34% in average.

This effect can be partly explained by the relatively low survival rate of the exports flows product-partner. Comparison with other countries reveals that in Morocco the exports market remains particularly difficult to penetrate for the new comers as only 44% of export flows persist one year after their first appearance against 60% for Turkey and Romania and 59% for Mexico.



Source: Source: Wits database (World Integrated Trade Solution), World Bank

In this regard, it is important to precise that the survival rate provides an assessment of trade flows in terms of number, and does not reflect the value or importance of the said flows. In fact, the downward shift of a high-export-value flow can have a more important repercussion than the total loss of a low-export-value flow. Regarding Morocco, the negative impact of the contribution of component 2 to the exports dynamics, on the whole period, is 3.7 times more important than that of component 3. The weight of this latter component remains, however, remarkable as it neutralizes the positive effect of the appearance of new trade flows (amounts of the contributions of the extensive margin components).

Conclusion

The microeconomic analysis of the exports dynamics at the level of products and markets allowed identifying the sources of the Moroccan exports dynamics based on the different components of intensive margin and extensive margin. At the end of this analysis, the following are the main points to be retained:

- The Moroccan exports are characterized by a significant concentration of products and markets: Only 3.5% of exported products and 6.4% of export markets (9 countries) cover 80% of the exports' overall value in 1998. This concentration relatively diminished for markets in 2012 at the time when products diversification did not improve (11% of markets (20 countries) and 2.9% of products for 80% of exports);
- In average for the whole period of the study (1998-2012, without including 2009), the exports growth was essentially backed by intensifying the sales of exports products existing on already explored exports markets (component 1), up to 212%, and by component 7 (export of existing products to already explored markets but which have never been the destination of these products) up to 42%;
- The positive effect of these two components is counterbalanced by the decrease and loss of exports of products existing on ancient markets (component 2 and 3), up to -125% and -34% respectively;
- The contribution of intensive margin (amounts of the components 1 to 3) in exports growth (52%) is more important than that of extensive margin (48%) in average for the whole period. This importance is more obvious during previous years (60% in 1999-2007) compared to the last years (40% in 2008-2012);
- The results of the exports microeconomic analysis show the presence of substantial profits to be explored by means, in particular, of the reinforcement of the ability to launch new products and target new markets as well as the increase of the survival rate of the new comers on exports markets.