

Empirical Analysis of Determinants of International Competitiveness

Rafla Hchaichi

PhD Student in Economics at the Faculty of Economic and Management-Tunisia

Teacher at the Institute of Higher Commercial Studies of Carthage-Tunisia

GSM:216 55 82 06 88/97 82 06 08

raflahchaichi@yahoo.fr

Sana Ben Ghodbane

Assistant professor

Higher Institute of Business and Accountancy Bizerta

Tunisia

Abstract

It is now impossible to ensure the competitiveness of enterprises without seeing development strategies. However, innovation, as a key factor, can condition the capacity of firm to maintain sustainable competitive advantages. The objective of this paper is to present the determinants of firm development in a global geostrategic context and seeks to highlight, using a macroeconomic model applied to the case of Tunisia, Morocco and Egypt, the significant effect of variable price and non-price variables on international competitiveness. Several variables prove significant namely innovation, human capital, foreign direct investment and official exchange rates.

Keywords: price competitiveness, structural competitiveness, human capital, innovation.

Introduction

In the actual economic context characterized by increased trade, globalization of markets and the diversification of consumption patterns, investment in human capital and promoting innovation are powerful level of competitiveness and even a fundamental guarantee of sustainability and firm development. Thus, we focus, first of all, in our study on the concept of competitiveness in the economic literature to distinguish the price competitiveness of the non-price (structural) and we also present approaches that based determinants competitive advantage. In the second part we note the main empirical work has treated the problem of determinants of competitiveness. These studies have succeeded to advance a set of factors of competitive advantage based mainly on innovation and human capital. In a last step, we propose a model of price and non-price determinants of international competitiveness through which we proceed to prove or disprove the hypotheses of our research.

I. Competitiveness

Today, the global economy continues to know mutations: economic alliances, GATT agreements which engage the world towards greater liberalization. This leaning on the exchange, never excluded the concept of competitiveness that arises as the subject most distinguished in the modern economy. However, concerns for a better understanding of the concept of competitiveness is intensifying worldwide, but a consensus on the definition of the concept is never reached.

I.1. The concept of competitiveness

The definition of competitiveness is subject to confusion between authors. For some, the competitiveness of a company is seen as the ability to adapt to competition. For others, it is producing at low cost while controlling quality, rather it is considered to profitability, efficiency, productivity and profit. However, the analysis in terms of price was not enough to explain competitiveness. The latter became multidimensional because of the onset of non-price component.

I.1.1. The role of prices in determining firm's competitiveness:

Competitiveness has long been equated to price factor. According to the mechanistic approach, competitive firm is one that has the lowest cost. Indeed lower unit costs allow the company to increase its sales, by the same, market share and thus it happens to improve its competitive position.

This analysis in terms of cost quickly reached its limits with the onset of economic globalization.

I.1.2. The role of non-price component in determining firm's competitiveness:

If the competitiveness of a company is defined as its ability to compete long term, it is clear that we opt for a dynamic and relative concept. Henceforth, the company is required to optimize its quality competitiveness to give a sustainable competitive advantage. Quality's competitiveness, for its part, refers to the ability of a company to differentiate itself from its competitors on factors other than price (Mathis, Mazier et Rivau-Danset, 1988) and the same sustainability.

Hence the fact that competitiveness depends not only on quantitative determinants (cyclical) conveyed by the variable price, but also structural determinants (non-price).

I.2. Competitiveness's approaches:

In the economic literature and in the classical and neo-classical theory, competitiveness is apprehended in terms of competition and comparative advantage: it is a "static" analysis focuses on international trade and its determinants. However, a recent review of this analysis reveals the shortcomings of Economics' International theory which focused exclusively on macro-economic aspect of "competitiveness". The latest analysis has its foundations in the theory of Industrial Economics (M.Porter, B.Bellon) and theory of Industrial Organization that focus on the analysis of firms, the organization of the production system and strategic behavior(G.Dosi ; C.Freeman).

I.2.1. The traditional approach of the concept of competitiveness

I.2.1.1. Classical theory of international economics

It consists mainly of the theory of absolute costs (1776) Smith, the theory of relative costs (1817) Ricardo and the theory of factor endowments Heckscher & Ohlin. Smith (1776) indicates that each country should specialize in the production of goods for which it has an absolute advantage; cost per unit of output is lower than it is abroad. In other words, the nation specializes in what it produces most efficiently at the lowest cost, and carries out the exchange to acquire other good. According to this theory, a country is competitive if it is able to ensure efficient use of resources while producing and selling the goods for which it has an absolute advantage that is to say, a lower absolute cost. However, the exchange allows an increase in the total production of the two countries.

We criticize the restrictiveness of assumptions' theory which assumes that the world is reduced into two nations and that the nation may have an absolute advantage in the production of a single good, otherwise the exchange loses importance. However, to address these shortcomings, David Ricardo in 1817 in "Principles of Political Economy and Taxation" and according to the theory of comparative advantage says that in a context of free trade, each country specializes in production for which it has the highest productivity or the least low compared to its partners. Ricardo assumes full mobility of factors of production at national level contrary to international, a pure and perfect competition with constant returns to scale, lack of technical progress, lack of population growth, full employment achieved, same tastes and preferences of consumers, whence a static analysis. While maintaining the assumptions Ricardo (international immobility of factors of production, CPP and static assumption), Heckscher & Ohlin relies international exchange on the difference in factors endowments. Under this approach, each country partially specializes in the good relatively more intensive factor which the country is relatively better endowed. Thus, considering that countries are unequally endowed with factors of production, a country is considered competitive if produce good intensive factor which is better endowed.

However, these theories of international trade are questionable on several points, are all based on the differences between countries, differences in costs, productivity and factor endowments. It is in fact a static analysis of things in the sense that theories are based on natural advantages acquired.

I.2.1.2. Toward an overrun of the classical approach:

The classical theories of international trade have been widely criticized, the new reality of the global economy has instilled renovation. However, exceeding the static assumption is made, in the first instance at the endogeneity of absolute and relative comparative advantages in the country and a second time at the assumption of pure and perfect competition. Indeed, innovations in manufacturing processes are constantly hitting the market and economies of scale are gaining more and more ground. Also, the pure and perfect competition seems to converge to a rather monopolistic competition because, of course, innovation and product differentiation.

The theory of technological gap called New technology relies international specialization on technological advance and focuses on innovation as the genesis of benefits and therefore introduces a dynamic vision in international specialization. M.Posner (1961) considers that investment and spending on research and development can cause a technological gap, which generates a competitive advantage innovative country for. Thus, according to this theory, the competitiveness gains a dynamic appearance which results from the detention of a technological edge over others. However, the follower country can imitate the product and take away the competitive advantage this innovative country.

I.2.2. The modern approach to the concept of competitiveness: structural competitiveness

Porter (1986) considers competitiveness as a strategic concept which is based on the mastery of four determinants forming the "diamant". It is essentially endowments of factors of production, the nature of domestic demand, the existence of complementary or auxiliary firms and the existence of local competitive structures (strategy, structure and competitive environment). In his book "The Competitive Advantage of Nations", he develops the concept of business (firm) cluster. It is defined as "an interconnected group of companies related by common characteristics.". Porter shows that companies are more successful competitive when there are clusters of competitors (competitive Diamond model Michael Porter).

Bellon (1994) joined Porter (1986) on the strategic nature of the concept and measurement of competitiveness by the adaptability of behavior, anticipation and reaction of each actor to structural changes. The contribution of Bellon lies in the dynamic aspect by imposing an information system able to show clearly and quickly the nature and intensity of change necessary. Bellon cites five dimensions of competitiveness, in addition to the productive dimension, trade dimension, financial and monetary dimension, institutional and political dimension that involves the public capacity to create an environment conducive to the dynamism of productive structures, it put mainly on the technological dimension that reflects the ability to generate new technologies. Indeed, the technological competitiveness is measured by the national expenditure on research and development.

I.3. Determinants of structural competitiveness of enterprises:

The non-price competitiveness mainly due to the innovation, quality products and services, and the skill of the rapid adaptation of the organization to cyclical and structural changes in the market.

I.3.1. Competitive factors related to human capital:

Human capital is central to the issue of non-price competitiveness. However, a company is considered competitive if it will mobilize the most talented, best trained, most capable initiatives. Factors related to human capital can be divided into three elements: the ability to attract talent and to be a "human capital", determination to maintain the capital and enrich it by the experience of others and the concern to disseminate knowledge by sharing ideas. It follows the following factors: recruitment, training, promotion, compensation, hierarchical organization, access to communication technology, openness to ideas, shared goals, the existence of values shared, entrepreneurship, quality spirit.

Marshall (1906) is one of the first authors to have focused on the effects of the heterogeneity of entrepreneurial talent. A more effective entrepreneur manages to draw more outputs the same amount of inputs and talented business man usually sees the capital he manages grow in long-term in proportion to its capacity. More recently, Porter (1993) studied empirically the determinants of business success. In line with Schumpeter, it presents the talented entrepreneur as one who knows how to innovate in the broadest sense, which knows how to take the right decisions in their environment and implement, through its ability to plan, control, coordinate and animate. In addition, upgrading of skills in society is such as to promote competitiveness.

Successfully adapted to the Tunisian context from 1995, this type of program upgrade is currently presented as a response to the lack of competitiveness of the southern countries, on the eve of the opening of borders. Attempts to transpose these programs are underway in economies very few industrialized.

I.3.2. Competitiveness factors related to innovation:

In a competitive environment and face the perpetual changes of their environment, companies are reflecting on innovation that is essential for their growth and development. In fact, companies can develop through innovation sustainable competitiveness. Porter emphasizes that innovation is the key to business competitiveness because it affects their ability to maintain sustainable competitive advantages in evolving markets.

Innovation is defined as the ability to develop ideas, new methods and processes. However, in most companies, this ability will result in differentiation capacity. Innovation enables companies to improve their competitive position in the markets. Indeed, it allows them to increase their productivity, improve the quality of their products or their services and develop key skills.

Innovation is a key factor in the competitiveness and profitability of companies and is therefore an essential element of business strategy. Thus, innovation allows the company to have a competitive advantage in terms of cost or product offering. When the innovation affects production processes, it gives the company an advantage in terms of cost. In this case, the company will be implementing a strategy of lower prices or a strategy to increase margins. When innovation focuses on products, the company differentiates itself from its competitors. Differentiation strategy is often adopted by innovative SMEs that can co-exist alongside large groups.

II. Literature review of the determinants of competitiveness

An exhaustive review of the literature on competitiveness reveals that new developments of economic growth theory (Grossman and Helpman, 1990) and industrial organization theory (Jacquemin, 1987) have shed light on the determinants of competitiveness in response to limits of the neoclassical model.

Brinkman (1987), in a study focused on the competitive position of Canadian agriculture, provides a conceptual framework integrating the various determinants of competitiveness. According to him, competitiveness is the result of a combination of both domestic and international factors. At the national level, natural resource endowments and human capital are key determinants of competitiveness. Technical progress acts on factor productivity and consequently determines comparative advantage. However, research and developments, requiring large investments, give the companies a better competitiveness. At the international level, competitiveness depends on several factors such as exchange rates, transport costs and country preferences. However, macroeconomic theory considers that decline in real exchange rate stimulates exports, in the sense that the devaluation of the currency of a country relative to its competitor is reflected in an expansion of export products become cheaper for the importing country whence an improvement of competitiveness.

Morris (1985) emphasizes the non-price competitiveness and gives it a crucial role in determining the exchange of economy. Structural competitiveness or "non-price" indicates the ability of an economic entity to stand out from the competition by other means than price. Desired differentiation is done primarily by the quality of goods and services, image and reputation. However, the ability of differentiation depends on its ability to innovate. In fact, innovation is determined by the allocation of resources towards increasing and improving factors such as research and development and human capital. Specification, quality, marketing of goods and services are all part of competitiveness besides the price. Nevertheless, fiscal and monetary policies (taxation, interest rates, inflation), the interventionist policy of the State (grant) and the policies of trade with the outside (tariffs, quotas) affect competitiveness.

In Tunisia, according to a survey on the competitiveness of Tunisian companies during 2011 directed by the Tunisian Competitiveness and Quantitative Studies Institute, 53% of companies say that their competitive position is maintained during the first half 2011. The statements emphasized that quality is considered the most important factor on both internal and external market. La formation a été également évoquée comme un facteur clé de la productivité. En effet, le dispositif d'éducation et de la formation s'avère indispensable pour améliorer la productivité. La formation aussi bien professionnelle qu'universitaire ne répond toujours pas suffisamment aux besoins requis selon une proposition non négligeable des chefs d'entreprises. The training was also mentioned as a key factor in productivity. Indeed, the system of education and training is essential to improve productivity. Professional and university training do not always adequately meet the needs required by significant proposal from managers. Moreover, the period required for a new recruit is in average of 19 weeks for graduates and 15 weeks for skilled workers.

Furthermore, interviewees noted the preponderance of theory over practice (69%) and general character of training (51%). In this sense, 54% of companies want to be involved in the development of training programs.

III. Modeling of the determinants of competitiveness

III.1. Research hypothesis

We present in this section the hypotheses of our research as follows :

H1 : Competitiveness is positively influenced by research and development cost.

H2 : Competitiveness is positively influenced by education expenditure.

H3 : Competitiveness is positively influenced by export of high technology.

H4 : Competitiveness is negatively influenced by taxes on international trade.

H5 : Competitiveness is negatively influenced by the official exchange rate.

H6 : Competitiveness is positively influenced by net flows of foreign direct investment.

H7 : Competitiveness is positively influenced by gross capital formation.

III.2. Sample and study period

Our study focuses on a sample of three countries that are Tunisia, Morocco and Egypt. We also chose a study period from 1995 to 2010. Our data were collected from the World Bank.

III.3. Definition of variables

Defined as the ability to conquer internationally market share, competitiveness can be assimilated to the export share. In this case, we use the export volume of goods and services as an indicator of international competitiveness.

Among variables of competitiveness we choose investment as a determinant of comparative advantage that stimulates innovation and improves productivity factors. Gross capital formation and foreign direct investment are the used indicators.

Innovation that is at the center of competitive advantage, the long-term growth and differentiation companies will be measured by research expenditures and development and education spending. However, the export of technologically intensive products such as computers proves an important factor of competitiveness that is measured by exporting high technology.

Price competitiveness is associated with the official exchange rate and taxes on international trade.

- **EXP** : Exports of goods and services in current dollar: it is an indicator of competitiveness: the dependent variable
- **RD** : Expenditure on research and development (% of GDP): an indicator of structural competitiveness : explanatory variable.
- **EE** : Educational expenditure in current dollars: an indicator of structural competitiveness: explanatory variable.
- **HTE** : The export of high technology in current dollar: an indicator of structural competitiveness : explanatory variable.
- **TIT** : Taxes on international trade (% turnover) : indicator of price competitiveness.
- **OER** : The official exchange rate (LCU per US\$) : indicator of price competitiveness.
- **IDE** : Net flows of foreign direct investment in current dollars : an indicator of structural competitiveness.
- **FBC** : Gross capital formation (% GDP) : an indicator of structural competitiveness.

Thus, we present the model used to test empirically research hypothesis :

$$EXP_t = a_0 + a_1 RD_t + a_2 EE_t + a_3 HTE_t + a_4 TIT_t + a_5 OER_t + a_6 IDE_t + a_7 FBC_t + e_{it}$$

III.4. Analysis of Main results

The model formulated for this purpose expresses a simple linear regression. We conduct a regression of our data by the fixed effects method to test the phenomenon of heterogeneity in our sample. Then we will opt for the method of random effects to study the errors terms in order to avoid that error from the same countries is correlated with the explanatory variables. With Hausman test (1986) we can choose between these two methods and ensure that the approach can provide blue estimators.

In this sense, we had recourse to the correlation matrix to study the nature of the relationship between variables in the model. For this purpose, no significant correlation was found between explanatory variables to be included in the statistical model to test our hypotheses. Thus, we have been able to avoid the problem of information redundancy through the use of variables with same informational input.

At this stage, and considering the results of statistical regressions of the fixed and random effects method, Hausman test (1986) has allowed us to retain the results of a single method. In fact, Hausman test (1986) is performed under the following null hypotheses:

H_0 : The difference between the coefficients generated by the two methods is not significant.

H_0 is rejected, whence absence of correlation between the error term and explanatory variables, which allows us to retain the fixed effects method. This method gives us blue estimators. For this purpose we rely on the results generated by the first method used to test our hypothesis that is fixed effects method. The following table (table 1) summarizes the obtained results.

The adopted model is the following :

$$EXP_t = a_0 + a_1 RD_t + a_2 EE_t + a_3 HTE_t + a_4 TIT_t + a_5 OER_t + a_6 IDE_t + a_7 FBC_t + e_{it}$$

	Sign of coefficient	T value	Significance of T
RD	+	2.26	0.030
EE	+	9.25	0.001
HTE	+	0.50	0.622
TIT	-	-0.92	0.361
OER	-	-2.22	0.033
IDE	+	4.56	0.001
FBC	+	0.59	0.560
$R^2 = 0.9393$			
Test of homogeneity of the constants			
F of Fisher = 83.94			
significance = 0.000			
$\alpha = 0.05$			

Table 1 : Results of fixed effect method

Legend: **EXP** : Exports of goods and services in current dollar; **RD** : Expenditure on research and development (% GDP) ; **EE** : Educational expenditure in current dollars; **HTE** : Exports of high technology in current dollar; **TIT** : Taxes on international trade (% turnover) ; **OER** : The official exchange rate (LCU per US\$) ; **IDE** : Net flows of foreign direct investment in current dollars; **FBC** : Gross capital formation (% GDP).

We find no correlation between the error term reflecting the existence of country-specific effects and explanatory variables, so that we end up with an homogenous sample. The explanatory power obtained is considered important with a rate of 93%.

Through our results, we note that research and development and education expenditure variables are positively and significantly related to the dependent variable at a significance level of 5%. This allowed us to validate the first and second hypothesis of this study. Thus, we concur with previous studies claiming that innovation "is the preferred way to create or recreate a potential long-term development" (Saporta, 1989).

Similarly, the net flow of foreign direct investment influence positively and significantly firm competitiveness at a significance level of 5%. This also allowed us to validate our sixth hypothesis in this study. Moreover, we validated the existence of a negative and significant relationship at a significance level of 5% between the official exchange rate and export, which enabled us to confirm our fifth hypothesis. In this sense, any decrease in the official exchange rate is likely to boost exports and increase competitive advantage.

In addition, other explanatory variables seem insignificant in explaining the observed phenomenon. These variables are exports of high technology, taxes on international trade and gross capital formation. This led us to reject the third, fourth and seventh hypothesis.

Conclusion

Face of globalization, the logical has imposed thinking that the world is a business fabric, which is composed of many regions and competing nations. However, public's investments in support of innovation and quality education are all factors that can reconcile the interests of nations and their firms. In fact, competitiveness is primarily a matter of price and non-price factors. Our study supports the idea that innovation is more than a strategic option but it's seems a necessity. We noted the importance of innovation in firm's development which affects international competitiveness. Moreover, in a globalized context, innovation is the preferred means to stimulate exports and earn a competitive advantage.

It appears clearly that also the promotion of innovation process proceeds through the accumulation of expenditure on research and development and investment in human capital. Incentives to foreign investment and currency devaluation also prove as a spearhead to seize market share in a global competition.

In conclusion, structural factors will certainly seem to be able to create and increase the export volume in order to be located face unpredictable changes in demand.

References

- Aglietta M. (1997), « Macro-économie Internationale », Montchrestien.
- Bellon B. (1994), « Innover ou disparaître », Economica, Paris.
- Brinkman G. (1987), "The competitive position of Canadian agriculture". *Canadian Journal of Agricultural Economics*, 35, pp. 263-288.
- Dejardin M. (2006), "Compétitivité structurelle". *Reflets et perspectives de la vie économique*, vol.1, Tome XLV, pp. 5-13.
- Freeman C. (1991), "Networks of Innovators: A Review and Introduction to the Issue", *Research Policy*, Vol .20, n°5, pp. 499-514.
- Gaffard J.L. (1990), « Économie industrielle et de l'innovation », Dalloz.
- Johnson G., S. Smith (2000), "Microprocesses of institutional change in the context of Privatization", *Academy Management Review*, 25, pp. 572-580.
- Landau, R. (1992), "Technology, capital formation and U.S. competitiveness". Dans: *International Productivity and Competitiveness*, Hickman, B.G. (éd.). Oxford University Press, New York.
- Latreille, T., Varoudakis, A. (1997), « Les Facteurs Structurels de la compétitivité Manufacturière : Une Analyse en Données de Panel pour le Sénégal ». *Revue Economique*, vol 48, n° 3, mai, p. 471-480.
- Morris D. (1985), "The Economic System in the UK". Oxford University Press, Oxford.
- Porter M. (1986), "Changing partners of international competition". *California management review*, Winter.
- Porter M.E. (1982), "Choix stratégiques et concurrence", *Economica*.
- Porter M. (1990), « L'avantage concurrentiel des nations », Londres, Macmillan.
- Ricardo D. (1984), « Des Principes de l'Economie Politique et de l'Impôt », réédition de l'original de 1817, Flammarion, Paris.
- Saporta B. (1989), "Stratégies des petites et moyennes entreprises", *Encyclopédie de gestion*, Coordonnée par Joffre P. & Simon Y., *Economica*, pp. 2729-2754.
- Schumpeter J. A. (1934), "The theory of economic development". Harvard University Press, Cambridge, MA.
- Smith A. (1976), "An Inquiry in the Nature and Causes of the Wealth of Nations, R.H. Campbell and A. S. Skinner", edition, Oxford Clarendon Press