The impact of women-related determinants on women entrepreneurship in the Maghreb: an econometric analysis

تأثير المحددات المتعلقة بالمرأة على المقاولة النسوية في المغرب العربي: تحليل بالاقتصاد القياسي

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Abstract:

This study attempts to explore the factors that encourage the entrepreneurial activities of women in three Maghreb countries: Algeria, Morocco, and Tunisia. The results will be useful to academics, theorists in the field of entrepreneurship, as well as practitioners and business creation devices in this region.

To do that, the panel data analysis has been used to estimate the relationship between the rate of female entrepreneurs and a set of explanatory variables associated to gender and some macro-environmental variables. The findings show that the impact of the labour force participation rate of women and the level of schooling is positive for the creation of women-led businesses, while the effect of the fertility rate and the inequality index is negative.

Keywords: Female, entrepreneurship, gender, Maghreb.

JEL Classification Codes: L26, B22.

ملخص: تحاول هذه الدراسة استكشاف العوامل التي تشجع الأنشطة الريادية للمرأة في ثلاث دول مغاربية: الجزائر والمغرب وتونس. ستكون النتائج مفيدة للأكاديميين والمنظرين في مجال ريادة الأعمال، فضلاً عن الممارسين وأجهزة إنشاء المؤسسات في هذه المنطقة

. للقيام بذلك، تم استخدام تحليل بيانات البانل لتقدير العلاقة بين معدل النساء المقاولات ومجموعة

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من المتغيرات المستقلة المرتبطة بالعنصر النسوي وبعض متغيرات الاقتصاد الكلي. تبين النتائج أن تأثير معدل مشاركة القوة العاملة النسوية ومستوى التمدرس موجب فيما يخص انشاء المشاريع المسيرة من طرف النساء، في حين أن تأثير معدل الخصوبة ومؤشر عدم المساواة هو سلبي.

كلمات مفتاحية: المراة، المقاولة، الجنس، المغرب العربي.

تصنيفات JEL:L26,B22 .

1. Introduction

According to the OECD report (2014), the economies of the MENA region have the lowest proportions in the world in terme of employed women and female entrepreneurs. Moreover, the lowest level of female total early stage entrepreneurial activity (TEA)[1] may be observed in the MENA countries (Kelley, 2013), whose female entrepreneurship participation remains lower than that of low-income countries in Asia, Latin America and the Caribbean (Reynolds 2010).According to GEM report (2009), the female TEA prevalence rates are 13.4, 11.7 and 5.1 for Algeria, Morocco, and Tunisia respectively (GEM, 2010).

In fact, the Maghreb participation in the previous GEM surveys was limited and irregular, which makes impossible to observe the evolution of women's entrepreneurship activity over time[2]. In recent years, some studies have examined the issue of women entrepreneurs in the MENA region, but few have covered the Maghreb region. This is mainly due to the lack of regional data on the activity of women entrepreneurs (Cawtar, 2007; Cawtar, 2015).In this context, a study conducted by Touzani (2015) for the case of Tunisia shows that contextual factors such as poverty, corruption and war in neighbouring states could significantly affect the decision to create businesses. Another study by Salmane et al., (2011) shows that woman's businesses in Morocco are often affected by administrative obstacles and gender-based discrimination.

Taking into account the multiple socioeconomic effects of women entrepreneurship highlighted in the literature, **the aim of this article is to identify and analyse the macro-level gender factors that encourage or hinder women to develop new businesses in the three countries (Algeria,**

Tunisia, and Morocco) of the Maghreb region.

However, the business environment in this region seems to be unfavourable to business creation. According to the Doing Business report (2018), Algeria ranks 166th out of 190 countries, far below its performance compared with the rest countries of the Maghreb. Tunisia and Morocco are ranked 88th and 69th respectively.

The remainder of the paper is organized as follows: in the section 2, we present the general framework of the literature on female entrepreneurship by focusing on the environmental determinants of entrepreneurship, the gender determinants, female entrepreneurship in the Maghreb region, and the formulation of the research hypotheses. Furthermore, the adopted methodology is explained in the section 3, while the 4th section contains the obtained results, discussion, and the perspectives and limitations of this study. The conclusion is reported in the section 5.

2. Literature review

2.1 Female entrepreneurship

However, the number of women-led businesses in MENA countries remains among the lowest in the world. Women own in the formal sector approximately 37% of businesses globally (VanderBrug, 2013), but a survey conducted by the World Bank during the period 2003-2010 shows that the number of women-led businesses in MENA countries does not surpasses 15% of businesses (Cawtar, 2015).

Basically, the role of the woman in the MENA region as a mother and a caretaker is a fundamental cultural principle. Therefore, the priority seems to be given to the family rather than to any commitment in public and economic sphere.

In their study, Dechant et al. (2005) conclude that in two Gulf countries, Oman and Bahrain, the motivating factors which drive women business owners vary according to the circumstances of each country, but they are characterized basically by pull factors (economic and independence motivations). Similarly, Naser et al. (2009) report that women in Golf countries choose entrepreneurship for the raison of self-fulfilment willing to upgrade their socio-economic status in the society. On the other hand, Hattab

(2012) concludes that women entrepreneurs in MENA countries can be described as educated, with post-secondary degrees or higher, between the ages of 25 and 44, married and live in urban areas.

In Latin American countries where economic conditions are relatively similar to those in the MENA region, gender differences are still significant. Clearly, opportunities and incentives are unfavourable for women to get into business (Terjesen & Amorós, 2010). In the same context, Elam and Terjesen (2008) demonstrate that female entrepreneurship rates are affected by both soft institutions (values, beliefs and expectations) and hard institutions (institutionalized norms and practices). Specifically, in the MENA region, women encounter the influence of cultural values and stereotypes that demotivate the development of their businesses (Touzani et al., 2015; Jamali et al., 2005; Naser et al., 2009).

2.2 Environmental determinants

At the macro level, environmental factors play a key role in the decision of starting businesses and expanding them. In fact, individuals make decisions to exploit entrepreneurial opportunities by taking into account the environment characteristics in which they operate. Researchers highlight the environmental factors that can promote or discourage the act of entrepreneurship. For example; Gnyawali and Fogel (1994) propose five categories in their model: government policies, socioeconomic conditions, entrepreneurial and business skills, financial assistance, and non-financial assistance. Verheul et al., (2006) have introduced another list of entrepreneurship determinants in which they distinguish between economic, demographic, institutional, technological, and cultural factors.

In addition, regarding economic factors, the study of Smallbone and Welter (2001) shows the existence of a positive relationship between entrepreneurial decisions and personal incomes. A positive effect of GDP per capita on firm creation was also found by Noorderhaven et al., (2004) who used data from 15 European countries for the period 1978-2000.With respect to demographic factors, countries with a rapidly growing population tend to have a growing number of entrepreneurs, while countries with a low growth of population tend to have a decreasing number of entrepreneurs (Audretsch, 2002).On the other hand, new technologies provide good opportunities for

business creation (Wennekers et al., 2002) and promote the development of new products and services. Information and communication technologies allow businesses to benefit from low transaction costs as well as competitive advantages.

2.3 The determinants of gender

Indeed, very few entrepreneurial studies have examined gender factors. In their study, Verheul et al. (2006) propose a list of determinants of entrepreneurship from different streams of research. Their two gender factors used are maternity leave program and female labor force participation. The both factors are found to influence women entrepreneurial activity rate. In the same way, Kebeissi (2010) examines the impact of gender variables on the level of women entrepreneurial activity in 44 countries during the period 1999-2004. Out of the five examined variables, the author concludes that female educational attainment, women's economic activity, female earnings ratio and fertility rate are statistically significant in all equations. Consequently, we build basically on this last study for the preparation of the empirical part.

2.4 Female entrepreneurship in the Maghreb

To our knowledge, there are no macro level studies done on the determinants of female entrepreneurship in the Maghreb region. According to the National Commercial Registry Centre of Algeria, Algerian women managers registered less than 6% of businesses at the end of 2014. A study of a sample of 1228 women entrepreneurs in five MENA countries reveals that the majority of Tunisian women are married (72%) with an average of 1.8 children. They run individual businesses and are the most employment creators (Cawtar, 2007). In MENA countries, Algeria has the least favorable attitudes towards entrepreneurship; only 57% of Algerian adults perceive entrepreneurship as a good career choice (GEM, 2010). On the other hand, traditional cultural norms which assign roles and responsibilities to women in the Maghreb shape patterns of thought and very often influence perceptions and attitudes towards the creation of businesses. Essentially, cultural norms and values are very dominant in the Arab Muslim countries, and as a result, the phenomenon of women entrepreneurship is being

influenced (Jamali et al., 2005).

2.5 Gender variables

The current study is inspired from the study of Kebeissi (2010) and Verheul et al. (2006). It is limited to the availability of data in the three countries of the Maghreb. So, it examines the impact of four gender variables: female education, female empowerment, fertility rate, and labor force women participation.

2.5.1 The level of female education

The education system has greatly improved in the region over the past 30 years. In the Maghreb, education is compulsory and free for both males and females up to the university. Gender inequality has been eliminated in education, and there are now more women than men enrolling at the university. In contrast to the major improvements recorded in education, women have very limited employment opportunities. In general, the literature reports contradictory results about the education effect on entrepreneurship. For instance, blanch flower (2001) shows that the level of education has a negative impact on the probability of selecting self-employment. The same author explains that highly trained individuals may not take any risk associated with entrepreneurship; it was argued that educated individuals are likely to be salaried employees (Van Der Sluis et al., 2005).

On the other hand, the results of a study led by Jiménez et al. (2015) show that individuals with higher education may increase the level of formal entrepreneurship. Likely, in a longitudinal study, Dolinski et al. (1993) conclude that entrepreneurship entry grows with the increase of the level of educational attainment. Accordingly, women with some higher education experience are most likely to start a new business (Minniti, 2009).

The first hypothesis that will be tested is follows:

Hypothesis n°1: *Women education level has a positive influence on the female entrepreneurship activity in the Maghreb region.*

2.5.2 Gender empowerment

All Maghreb countries have implemented reforms and programs to support business creation equally between men and women. For example, in Algeria, young women benefit without any gender discrimination from considerable financial resources within the framework of the mechanisms of

ANSEJ, CNAC and ANGEM[3].

A report of the World Bank on the MENA zone, however, argues that laws that are gender-neutral and gender-blind may be less favorable to women and, by extension, to female entrepreneurship (World Bank, 2007). This report calls for a kind of a positive discrimination in favor of women. In this regard, the Gender Inequality Index (IIG) which is used to measure human development means that the higher the value, the larger the disparities between women and men. Therefore, the second hypothesis can be written as follows:

Hypothesis n°2: Women empowerment has a positive influence on the female entrepreneurship activity in the Maghreb region.

2.5.3 Female labour force participation

The labor force participation rate of women in North Africa remains among the lowest in the world, estimated at 22.5% in 2015 (ILO, 2016). Far fewer women decide to enter the labor market than men in the Maghreb region, where the public sector is the most important employer. Women are more present in education and health. In 2010, 18% of women in the labor force were unemployed in MENA region, compared to 6% in the world; and on average 17% of women versus 68% of men are employed, which is considered by far the lowest rate of female employment in the world (OECD, 2013).

Considering the relative method of the measure of women entrepreneurship, women entrepreneurs are not only important because of their numbers, but also of their contribution to the diversity of entrepreneurship in the economy. In fact, women's participation in entrepreneurial activities may result from their growing participation in the labor market as a whole. In this sense, the increased proportion of women entrepreneurs can result from the discrimination in the labor market and problems of professional promotion "glass ceiling" (Carter and Marlow, 2003). So, the third hypothesis that should be tested can be written as follow:

Hypothesis n°3: *The participation of women in the labor force positively influences the female entrepreneurship activity in the Maghreb region.*

2.5.4 The fertility rate

According to Bedidi et al. (2012), fertility in Tunisia has stopped declining since 1999 and seems to have stood at 2.1 children per woman, and in Algeria after reaching 2.2 in the first half of the 2000s; it has been rising steadily since then, reaching nearly 2.9 in 2010. Meanwhile, in Morocco, the replacement threshold was not yet reached, and the fertility continued to fall rapidly to 2.2.

Indeed, women entrepreneurs with children face additional responsibility for childcare. In the Maghreb region, very often, grandmothers who help the working mothers in their double task. According to a survey conducted in Morocco, the majority of women entrepreneurs surveyed had more than one child and claim to have started their business when their children were still young, because their age did not have a negative influence on their entrepreneurial projects (Salmane, 2011).

On the other side, several studies suggest that women tend to engage in entrepreneurship in order to gain time for their children (Williams, 2004). Minniti and Arenius (2003) suggest that low-income countries with high fertility rates tend to have relatively high levels of female firms, because of the flexibility they find in reconciling work and family life. Therefore, we formulate the hypothesis four as follows:

Hypothesis n°4: The fertility rate positively influences the entrepreneurial activity of women in the Maghreb region.

3. Methodology

In view to infirm or confirm the formulated hypothesises, this study aims to identify and analyse at a macro-level the main gender factors to promote the female entrepreneurs by using panel data modelling for the case of three countries of the Maghreb region (Algeria, Tunisia, and Morocco). To do this, we will estimate the relationship between the rate of female entrepreneurs and a set of explanatory variables associated to gender (female education, female labour force participation, fertility, and gender empowerment), and to environment (GDP per capita, demographic growth, technology usage, and taxation). The data are related to Algeria, Tunisia and Morocco, and all the variables are observed throughout the period from 1998 to 2015.

For the case of these three countries, and expressing the variables in terms of Nepierian logarithms, the econometric model can be written as follows:

$$\log (Y)_{it} = \alpha_1 + \alpha_2 \log(SCO)_{it} + \alpha_3 \log(PAR)_{it} + \alpha_4 \log(FER)_{it} + \alpha_5 \log(AUT)_{it} + \alpha_6 \log(GDP)_{it} + \alpha_7 \log(POP)_{it} + \alpha_8 \log(INT)_{it} + \alpha_9 \log(IMP)_{it} + \varepsilon_{it} \quad [1]$$

Where *i*: 1, 2, and 3 are related to Algeria, Tunisia and Morocco and *t* refers to the period from 1998 to 2015. However, the used variables are defined in table 1, descriptive statistics are given in table 2, and correlation matrix is presented in table 3 (see appendices).

The equation [1] will be estimated by taking into account two kinds of models, the fixed effect model and the random effect model where their functional forms can be written as follow:

- The fixed effect model:

$$\log(Y)_{it} = v_i + \alpha_1 + \alpha_2 \log(SCO)_{it} + \alpha_3 \log(PAR)_{it} + \alpha_4 \log(FER)_{it} + \alpha_5 \log(AUT)_{it} + \alpha_6 \log(GDP)_{it} + \alpha_7 \log(POP)_{it} + \alpha_8 \log(INT)_{it} + \alpha_9 \log(IMP)_{it} + \varepsilon_{it} \quad [2]$$

Where v_i is the specific fixed effect related to each country.

- The random effect model:

$$\log(Y)_{it} = \alpha_1 + \alpha_2 \log(SCO)_{it} + \alpha_3 \log(PAR)_{it} + \alpha_4 \log(FER)_{it} + \alpha_5 \log(AUT)_{it} + \alpha_6 \log(GDP)_{it} + \alpha_7 \log(POP)_{it} + \alpha_8 \log(INT)_{it} + \alpha_9 \log(IMP)_{it} + (u_{it} + v_{it}) \quad [3]$$

where $\varepsilon_{it} = (u_{it} + v_{it})$

3.1. The dependent variable

This panel data analysis covers the period from 1998 to 2015 and concerns Algeria, Morocco and Tunisia. The dependent variable represents the annual activity of female entrepreneurship. In clearer terms, it represents the annual rate of registered female businesses in the total registered businesses. Taking into account the importance of its contribution to diversify the economy, female entrepreneurship is measured by "*the relative method*" (the share of women businesses in the overall businesses) (Verheul et al., 2006).

In this study, the data is obtained directly from the three business registration organisations of the countries (for Algeria: National Commercial Registry Centre; for Morocco, The Moroccan Office of Industrial and Commercial Property, for Tunisia: Ministry of Justice). Women-led businesses include all companies whose leader is a woman. As a result, individuals and informal companies are excluded from the study.

3.2. Explanatory variables

For explanatory variables, data is collected from a variety of sources. Fertility rate, female labor force participation rate, GDP per capita, population growth rate, and internet usage rate are extracted from the World Development Indicators (WDI), provided by the World Bank. Gender empowerment index and female education rate are collected from the United Nations Development Organization (UNDP). In addition, Doing Business database was used to collect tax rates.

In order to assess the gender determinants given in equation [1], we use adequate proxy indicators. The education level represents the percentage of women enrolled in secondary school. Gender empowerment is represented by an inequality index. It evaluates gender equality in a given country. The female labor force participation rate measures the share of working population in the age group of 16-64 in the economy currently employed or seeking employment. Finally, the fertility rate reflects the number of children that would be born to each woman if she were to live to the end of her child-bearing years. Whereas, the control variables are the environmental variables, namely: GDP per capita (economic factor); the growth rate of population (demographic factor); the tax rate (institutional factor), and the internet rate (technological development factor).

4. The obtained results

The method of generalized least squares (GLS) has been used to estimate the equation [2] and [3]. On the basis of the Hausman test (1978), the appropriate model to identify the main gender factors to promote the female entrepreneurship in the Maghreb region is the random effect model. Consequently, the obtained results are given below in table 4 (see appendices).

The variables included in column (A) are those related to gender. We observe that the female education variable is positive and statistically significant at the level of 5%. This means that the education of women has a positive influence on female entrepreneurship. Concerning the variable of labor force participation rate, its influence appears positive and very significant as well (at 1%).

Contrary to the formulation of hypothesis 4, the fertility variable

appears with a negative sign. This variable is significant at the level of 1% and means that the case that having more children would decrease the likelihood of engaging in an entrepreneurial activity. However, the gender empowerment variable is not significant in this regression.

With respect to the columns (B), (C) and (D), the aim was to introduce at each stage a new control variable into the regression. The variable of education loses its significance this time, suggesting that its impact is less important, compared to other gender variables. In the three models, the fertility rate variable appears again negative and very significant. The same goes for the labor force participation rate, which remains positive and very significant. In addition, the gender empowerment variable is statistically significant at the level of 5% (column D), but with a negative relation which means that the entrepreneurial activity increases with the decline in the gender inequality index. It is important to remember that a decline in the index reflects an improvement in gender equality. On the other hand, the level of GDP per capita is positively related to female entrepreneurship and statistically significant in the three estimates. However, the coefficient associated to Internet (the variable of technological development) does not appear significant, neither in column D, nor in Column E.

Finally, the introduction of all variables (in column E) shows that the both variables: labor force participation and gender empowerment are very significant at 1% level. The female labor force participation rate is positively related to female entrepreneurship, however, the association of the variable of gender empowerment is negative. These two results validate both the hypotheses 2 and 3. Concerning the fertility rate variable, the column shows that it is negative and statistically significant at the 5% level, and this leads us to reject the hypothesis n°4. However, female education variable does not appear significant in this model.

Despite the hypothesis 1 is validated to a certain degree the female school rate variable is significant in the model (A), the impact seems to be less important on female entrepreneurial activity compared to the other gender variables. On the other hand, the only environmental variable that is statistically significant is the institutional variable. Taxation appears with a

negative sign, and therefore reflects relatively the unfavourable business climate to the creation of female businesses in the Maghreb.

6. Discussion

There is relatively a positive association between female education and the level of entrepreneurial activity. To some extent, the result is consistent with that of Kobeissi (2010). In her study, Kobeissi demonstrates the existence of a positive relationship between the two variables for both developed and developing countries and that education is a factor which favors the identification of entrepreneurial opportunities. In this sense, education improves individual skills for business creations (Honig, 2004) and cognitive skills would assess market opportunities (Detienne & Chandler, 2004).

In the same context, the authors Jiménez et al. (2015) testify that secondary education boosts entrepreneurial activity through the reduction of perceived risk, the strengthening of human capital and the acquisition of more self-confidence. At this level, the women of the Maghreb find in education a space for the development of knowledge that allows launching entrepreneurial activities. Similarly, the teaching of values and ideals in school could give them a sense of individual aspiration and a willingness to succeed. Furthermore, education enables the emergence of potential entrepreneurs who would be attracted by the immaterial benefits of entrepreneurship, such as independence and self-fulfilment (Jiménez et al., 2015). In conclusion, according to a study covering eight Arab countries including Algeria and Morocco, women entrepreneurs are described as educated and holding post-secondary certificates or higher (Hattab, 2012).

Regarding the female labor force participation, this variable positively influences entrepreneurial activity. Clearly, the rate of entrepreneurship increases with the growth of female labor force participation. Intuitively, if the women participation rate in the labor force -including both female employees and entrepreneurs-increases, it would systematically lead to an increase in the female entrepreneurship rate. This reasoning, however, contradicts that of Verheul et al. (2006) which rather explains a negative relationship between the two variables due to the large share of informal firms located in certain countries such as India and Russia. On the other hand,

Black et al. (2014) show that the participation rate of married women in the labor force is negatively correlated with metropolitan travel time. As a result, Patrick et al. (2016) admit that entrepreneurship would offer these women the opportunity to significantly reduce travel time by working from home and therefore benefit from flexible programme.

The authors Mujahid and Zafar (2013) confirm that female education remains a key indicator of female labor force participation. At this stage of analysis, it turns out that the probability of women to participate in the labor force increases with the evolution of their level of education in the Maghreb. In this regard, we know that the population of working women has become increasingly educated in this region. And, their work would enable them to acquire know-how and experience that can be considered as potential assets for launching future projects (Taniguchi, 2002). In the Maghreb, despite the young educated female population tends to have a professional behavior that is close to that of men, a significant proportion is still obliged to invest in informal activities (Bouzina-Oufriha, 2016). Indeed, according to a recent study of the European Bank for Reconstruction and Development, the informal market accounts for a very large share of growth in Morocco (40% of GDP in 2014) where the informality is important among young people and women in rural areas perceive it as the only alternative to finding jobs (Zgheib, 2015).

In the same vein, another category of active women that can positively influence the level of entrepreneurial activity is unemployment. Indeed, the latter is important among women in the region. Large sums of money have been allocated to them through microcredits to create businesses in the image of the ANGEM in Algeria. Yunus (2007) testifies that the creation of businesses by women in Madagascar was mainly motivated by unemployment and poverty.

With regard to fertility, the results of the various estimates show a negative and very significant association between the fertility rate and the entrepreneurial activity of women. However, Noseleit (2014) who uses instrumental variables obtains an opposite result. Also, Kobeissi (2010) finds that women with children rely on entrepreneurship to meet their different

needs. However, we deduce that in the Maghreb, woman entrepreneur is different in the sense that she is less inclined to entrepreneurship in the case of having more children. This picture is similar to the situation of women in OECD countries in the 1960s and 1970s when their entry into the labor force was accompanied by low fertility rates. The low interest of married women to entrepreneurship in the Maghreb can be justified by the difficulties faced in finding childcare centers, especially for those women who live outside the urban areas. Nevertheless, the size of Maghrebi families tends to be larger, and older girls tend to take care of their younger siblings and help do housework (Taniguchi, 2002), also often grandmothers help working mothers by raising their children.

In a similar way, the empowerment variable has a negative effect on the activity of women entrepreneurs. In fact, gender equality and gender empowerment that are constitutionally approved in the Maghreb have eventually contributed to the growth of women's businesses. By way of comparison, the study of Kobeissi (2010) shows however contradictory results between countries.

Male stereotypes of entrepreneurship can hinder women from attempting the idea of creating new businesses (Bird & Brush, 2002) in the absence of a regulatory framework that motivates their empowerment. Indeed, given the reality of the scarcity of women entrepreneurs in the Maghreb, female entrepreneurs should not be content with regulatory and legislative acts, but they need more institutional work aimed at changing perceptions and stereotypes. It is well known that cultural norms and values are very dominant in the Arab Muslim countries, and consequently the phenomenon of female entrepreneurship remains always influenced (Jamali et al., 2005).

Our study focuses on gender variables, however, the role of environment remains a catalyst in entrepreneurial activities. Environmental factors demotivate the entrepreneurial act of women except the economic variable (GDP per capita). Using the example of 2008 (situated in the middle of the study period), GDP per capita was $4,041; $3,759 and $2,720 in Algeria, Tunisia and Morocco respectively. In these countries where GDP per capita is relatively low, any improvement in the economy followed by wage

growth seems favor women to start their own businesses (EIM / ENSR, 1996). Undoubtedly, at low levels of GDP per capita, the entrepreneurship sector might provide employment and business opportunities (Audretsch, 2007). Practically, the service sector is the most attractive sector for the Maghreb women entrepreneurs. Wennekers et al. (2005) testify that an increase in wealth tends to be very common accompanied by another increase in the size of the service sector.

Looking for another variable, it is observed that the variable of technological development is not significant. The use of internet in commerce is still very limited in the region due to the limited payment possibilities on the Net.

Another insignificant variable is the population growth, which was supposed to drive up demand for goods and services, but seemingly, this factor does not capture the interest of women. Because the latter are less likely to be entrepreneurs than men (Delmar & Davidsson, 2000) and perhaps the choice to start a business is more complex for them than for men (Minnit, 2009). Interestingly, the process of identifying opportunities is more difficult for women than for men in the Maghreb region.

Concerning taxes, they are demotivating and discouraging for women entrepreneurs in the Maghreb. According to Bruce (2006), some causality tests confirm that taxes can have a significant influence on the level of entrepreneurship.

6. Conclusion

Understanding the factors influencing the development of female businesses in the region will help stakeholders in implementing incentives for female entrepreneurship. For example, secondary education must be accompanied by entrepreneurship education and the lack of such education in the Maghreb may discourage women to some extent from becoming entrepreneurs. It is therefore recommended to schools, professional centers, and universities to introduce entrepreneurship courses and trainings in order to remedy this lack.

On the other hand, the results of environmental variables that broadly reflect an un favorable business climate corroborate the studies of Doing

Business's ranking. The Maghreb business environment which discourages women from investing in the economy, prevents the region from valuing its full economic and human potential.

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[4]

Appendices

Table 1 : Variables definition and data sources

Variables	Definitions	Sources and studied period
Female entrepreneurship level **(Y)**.	The number of new businesses created by year / the overall number of new businesses created by year	Algeria : the National Center of the Trade Register, 1998-2015. Morocco: Moroccan Office of Industrial and Commercial Property,1998- 2015. Tunisia: The IT department within the Ministry of Justice,1998-2015.

SCO	Female school rate (secondary level expressed in %)	UNESCO Institute of Statistics http://hdr.undp.org/reports/global
Gender Inequality Index. (AUT)	GII index measures Inequality according to three dimensions	GII : 2008-2015 . IPF:1998-2007. http://hdr.undp.org/reports/global
Fertility rate (FER)	Number of children per women	World development Indicators (WDI) – World bank. 1998-2015.
Fertility rate (FER)	Number of children per women	World development Indicators (WDI) – World bank. 1998-2015.
Female labour force participation (PAR)	Percentage of women in the labor market.	World Development Indicators (WDI) - World bank. 1998-2015.
Economic developement (GDP)	Gross domestic product (GDP) per capita (in US dollars at current prices)	World Development Indicators (WDI) - World bank. 1998-2015.
Population growth (POP)	Annual population growth rate (%).	World Development Indicators (WDI) - World bank. 1998-2015.
Technological development (INT)	Internet usage rate (%)	World Development Indicators (WDI) - World bank. 1998-2015.
Taxation level (IMP)	Tax rate (income %)	Data base "Doing Business"2006-2015.

Table 2 : Descriptive statistics for panel data

Variable	Obs	Mean	Std, Dev,	Min	Max
LnY	54	-0,46	1,53	-1,93	2,77
LnSCO	54	3,88	0,06	3,77	3,94
LnPAR	54	3,33	0,32	2,73	3,63
LnFER	54	0,90	0,12	0,69	1,11
LnAUT	54	-0,95	0,29	-1,43	-0,37
LnGDP	54	7,90	0,43	7,14	8,63
LnPOP	54	0,22	0,24	-0,11	0,64
InINT	50	2,00	1,72	-2,30	4,04
InIMP	54	4,12	0,17	3,79	4,34

Table 3: Corrélation Matrix

	LnY	LnSCO	LnPAR	LnFER	LnAUT	LnGDP	LnPOP	InINT	InIMP
LnY	1,00								
LnSCO	0,59	1,00							
LnPAR	- 0,95	- 0,47	1,00						

LnFER	0,46	- 0,40	- 0,47	1,00					
LnAUT	0,28	0,08	- 0,22	0,19	1,00				
LnGDP	0,35	0,56	- 0,08	- 0,04	0,34	1,00			
LnPOP	0,77	0,20	- 0,69	0,69	0,26	0,34	1,00		
InINT	- 0,13	0,08	0,30	- 0,15	0,46	0,70	- 0,12	1,00	
InIMP	0,90	0,81	- 0,86	0,12	0,05	0,34	0,58	- 0,21	1,00

Table 4: The obtained results with respect to the equation [3] by taking into account different specifications

	Dependent variable:				
	log(y2)				
Explanatory variables	coefficients				
	A	B	C	D	E
C	-16,22***	-3,70	-2,97	1,28	-6,65
	(4,08)	(6,92)	(7,34)	(9,10)	(9,58)
log(SCO)	1,83**	-1,35	-1,51	-2,65	1,40
	(0,85)	(1,67)	(1,75)	(2,36)	(3,21)
log(PAR)	2,36***	1,88***	1,88***	1,59***	1,31***
	(0,16)	(0,26)	(0,27)	(0,33)	(0,34)
log(FER)	-0,94**	-1,99***	-2,11***	-2,42***	-1,76**
	(0,41)	(0,62)	(0,74)	(0,83)	(0,86)
log(AUT)	-0,001	-1,16	-0,16	-0,19**	-0,31***
	(0,08)	(0,11)	(0,11)	(0,09)	(0,11)
log(GDP)	-	0,28**	0,27**	0,46*	035
		(0,12)	(0,13)	(0,26)	(0,26)
log(POP)	-	-	0,06	-0,08	-0,0001
			(0,20)	(0,20)	(0,20)
log(INT)	-	-	-	-0,03	-0,02
				(0,03)	(0,03)
Log(IMP)	-	-	-	-	-1,62**
					(0,79)
FixedEffect	/	/	/	/	/
Randomeffect	yes	yes	yes	yes	yes
Wald Test	957,79	1037,14	1017,94	1170,49	1264,20
Prob (Wold)	0,0000	0,000	0,000	0,000	0.000
Nb .Obs	54	54	54	50	50
R squared	0,95	0,85	0,95	0,96	0,96

Note: Standard errors in brackets. *** denotes significance at 1%, ** at 5% and

[1]Total Early Stage Entrepreneurial Activity (TEA) refers to the total rate of early-stage entrepreneurial activity among the adult population aged 18–64 years.

[2] The first participation of these three countries in the GEM survey goes back to 2009. Algeria and Tunisia participated 4 times and Morocco 3 times.

[3] ANSEJ: National Agency to Support Youth Employment
CNAC: National Unemployment Insurance Fund
ANGEM: National Agency for the Management of the Microcredit

[4]