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Gamar, Alae and Driouchi, Ahmed

Al Akhawayn University, Ifrane, Morocco

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# **Higher Education and Inclusion of Women in Labor Markets and in Business Development in Morocco**

**By : Alae Gamar & Ahmed Driouchi, IEAPS, Al Akhawayn University, Ifrane, Morocco**

## **Abstract**

This paper focuses on the inclusion of women in the Moroccan labor markets and businesses through the role of higher education. The paper is based on a descriptive analysis of enrollment in the tertiary education, graduation, business creation, employment and school attainment over the period 1990-2012. This research investigates also the dynamic processes pursued by each variable in relation to gender. It then analyzes the relationships between education and the inclusion of women in the labor markets and businesses. The attained results show that higher education has a statistically significant positive influence on the inclusion of women in the labor market and in business creation. Schooling of women with higher education attainment is an important instrument to be promoted for further inclusion of women in the economy of Morocco.

Keywords: Women, School attainment, Inclusion, Labor Markets, Businesses

JEL: J2-I25.

## **Introduction**

According to World Bank (2009) the analytics of the inclusive growth has a “distinct character focusing on both the pace and pattern of growth”. It emphasizes that for a faster and sustainable results regarding poverty reduction the economic growth is a must. It refers to ‘both the pace and the pattern of growth that are interlinked and therefore in need to be addressed together’ World Bank (2009)

On the other hand, this research emphasizes the role of higher education in the inclusion of women in the labor markets and businesses in Morocco. This work was motivated by previous contributions on series of economies including those in the Arab countries. The attained results have been underlying the importance of higher education as a promising instrument for further inclusion of women in the economy.

The current paper is based on Gamar (2014) thesis where feminization and inclusion of women in the labor market and the business creation have been emphasized. It introduces first, a literature review followed by the characterization of the methods pursued and data utilized. These sections prepare to an empirical analysis where the trends related to the inclusion of women in the labor markets and business creation in Morocco are assessed.

## **I. Literature Review**

Several authors have investigated the inclusion of women in the labor markets ad business creation.

Van der Meulen Rodgers and Zveglich (2012) studied the gender inequality in the Asian labor markets. They investigated the structural drivers that lead to the inclusion of women in the labor market. The results show that economic necessity is a significant factor to the employment of women. It indicates that the marital status and the presence of young children affect negatively the employment of women in the Asian countries. In fact the presence of young children affected the inclusion of women over years in Taipei, China. These results show the importance of issuing policies that will include women in the labor market and help them overcome these inhibitors.

One of the most recent researches on the inclusion of women in the labor market is the one of Bukhari and Sharma (2014). It revealed that women do not access top management position easily and that their presence is not as significant as the one of males. This research

bases its findings on a survey of 555 employees and the results show that the women inclusion in India is progressing and points out the importance of policies to include more women in the labor market.

Mohapatra and Luckert (2014) examined the effect of education on the Indian labor market and wage distribution. This research employs nationally representative dataset on labor market in India. The results revealed that there is a significant heterogeneity effect along the wage distribution. It shows that the post primary education benefits more to women. These results show the importance of education in order to reduce gender wage inequality.

The research states that the skill gap between genders does not benefit women. It states that even if the participation of women has increased their presence is underrepresented. The results affirm that the unexploited potential of trained women represent a loss not only to women themselves but also to the whole society. The Latin America faces a lack of information that prevents the researches and policy makers from providing and designing efficient solutions to this problem.

Bordat, Davis and Kouzzi (2011) published “Woman as Agents of Grassroots change: Illustrating Micro-Empowerment in Morocco”. The authors present initiatives like legal rights, economic development and education programs as catalysts toward the empowerment of Moroccan women. This research introduces the education as one of the factors that lead toward the inclusion of women in the labor market in Morocco.

Filali Adib, Driouchi and Achehboune (2013), assert that education is one of the factors that are leading to the feminization of the labor market. This research used variables such as the average years of schooling, the survival rate to the last grade of each level of schooling, and unemployment rates to evaluate the role primary and secondary education play in the inclusion of

women. The findings clearly state that the feminization of the job market in the Arab countries is significant and education is a prominent factor in this positive change.

Sika (2011) analyses the Millennium Development Goals and takes Egypt as an example to evaluate the achievement of these goals. The study focuses on the primary education, the gender equality and the empowerment of women in the Arab World. It highlights also the position of Egypt and its achievement for the Millennium Development Goals. The findings show Arab countries are progressing on achieving Millennium Development Goals mainly in education, gender equality and the empowerment of women. Moreover, the author indicates that many young women still do not have access to schooling in the Arab countries.

Klasen and Pieters (2013) study the decrease in the labor participation of women in India from 1987 to 2009 as it reached 18%. This research uses five cross-sectional surveys to explain this stagnation and the low level of the participation of women. The researchers found that the main reasons behind this low participation to the labor force were the husbands' education level, stigmas around the educated women underemployed and the gender preference in hiring.

In her research paper, Ntuli (2007) investigates the factors that led to the increase of the labor force participation's rate of women in South Africa. The researcher used data from surveys over years from 1995 to 2004. The research is beneficial for the empowerment of women through modifying and issuing new policies to include her in the development. This paper stresses the importance of education as a factor to increase women's labor participation rate.

Brusentsev (2000) examined the variation of the labor force of married women in Australia, Canada and United States of America. The researcher chooses a cross comparison of the three countries because she estimates that their socio-economic development levels are similar. According to the researcher, women joined actively the economic sectors of the labor market between 1970 and 1990. This research emphasizes the importance that higher education

plays on the inclusion of women in the labor market and in hand with age. It also implies that the marital status and the number of young children have also their weight on the women participation in the labor market.

The Educational Attainment in South Africa, Lee (2005) affirms that education is a primary factor to the inclusion of women in the labor market as well as in many other sectors. The results assure that the household situation like the presence of children or elderly individuals are dominant factors along with the educational level.

In their paper, Ranganathan and Mutsuddi (2007) investigate the theory of the “Inclusive growth” as an enhancement of the economic growth theory. The findings imply that there can never be an inclusive growth without an equal distribution of wealth, guarantee for an equitable access to education, sanitation and clean water. This study shows that for an inclusive growth there is a need for education, access to basic rights and the equal distribution of wealth.

All the above researches relate to the inclusion of women in the labor market and business development with on the role of education.

## **II. Methods of investigation and Data**

### **1. Methods of Investigation**

The research will analyze the data gathered following a methodology that uses a variety of techniques. The methodology will include a traditional descriptive analysis and a statistical analysis. It will include also time-series regression analysis as well as a trend analysis. On the other hand, the research will have recourse to the pyramidal analysis of the Barro and Lee data as part of the descriptive analysis. An interesting chapter in Driouchi (2014) has analyzed school attainment in Arab countries using knowledge.

The latter methods will help identify and provide reliable analysis and explanation to the inclusion of women in the labor market in Morocco as well as the contribution that education brings to this phenomenon. The research builds up on a time series regressive models and an analysis of the descriptive data associated to a trend line analysis. In addition, the research will use secondary data and base the analysis on descriptive graphs and regressive models to analyze the behavior of the inclusion of women in the labor market in the recent years. The research will be enriched with secondary data collected from other sources to consolidate the findings.

The regressions will run also for the analysis of a Moroccan data collected about the education and the inclusion of women in the labor market shaped in the Moroccan women creating their own businesses. This regressive analysis will identify the structural changes in the labor market as well as the economic environment. The second part of the empirical study builds on multiple regressive models that will each measure the participation of education in the inclusion of women. These regressive models will quantify each step of the figure 3 and will evaluate the role of higher education in each step.

## **2. Data**

The research uses variables to evaluate the inclusion of women in the Moroccan labor market through higher education between years 1990 and 2012. This part presents the different variables used for the research including definitions, abbreviations used later on for the regression equation in addition to sources from where each variable was extracted. Furthermore, different databases were of great help to the research. The data was collected from the *International Labor Organization (ILO)*, *World Bank database*, *Unesco website*, *Barro and Lee website*, the *United Nations Development Program (UNDP)*, the *Haut commissariat au Plan (HCP)* and the Moroccan *Ministry for Higher Education, Scientific Research and Training of*

*Executives* reports. The variables of interest for the empirical study are the business creation, the employment, unemployment and underemployment, wages, gender related development index and school attainment, the number of enrolled and graduate students from the higher education, the percentage of GDP allocated for tertiary education, the number of teachers in the higher education both public and private schools.

Business Creation: (*Bcreation*)

This variable will measure the degree to which the women have invaded the labor market by creating their own businesses and leading their own companies. It will enable to examine the evolution of the numbers of businesses created by women as a step toward measuring the women's participation in the labor market as a job creator. In addition, the data related to business creation will be extracted from the ILO website as well as the reports posted in the HCP website. These reports are the "Activité, emploi et chômage" and the "La Femme Marocaine en Chiffre".

Employment: (*Emp*)

This variable will measure the participation of the Moroccan women as an employee within variable institution in the Moroccan labor market. It measures the degree of integration of women as a human capital in the companies and their participation in the job market. The employment variable will measure another side of the inclusion of women in the Moroccan labor market. Thus, the data related to the employment was retrieved from the ILO website and HCP reports "Activité, emploi et chômage" and "La Femme Marocaine en Chiffre".

Unemployment: (*Unemp*)

According to the ILO the unemployment refers to people that are actively searching for a job still they have no job. The unemployment variable will measure the extent to which women actively looking for work but could not find a job. This variable will measure how well the

economy is doing and the degree of integration of women as a labor force in the economic market. The unemployment variable will provide an insight of the inclusion of women in the Moroccan labor market. The unemployment variable was retrieved from the ILO website and HCP reports “Activité, emploi et chômage” and the “La Femme Marocaine en Chiffre”.

Underemployment: (*Underemp*)

The underemployment refers to the efficiency in using the skilled labor in the right place for a better productivity. This variable will measure the extent to which highly qualified women as a human capital have been underemployed and thus marginalized. This variable will benefit for some companies that needs to reconsider evaluating their human capital in terms of qualifications and not gender. The underemployment will quantify the losses in human capital that is not working at its full capacity. For instance, the underemployment can be illustrated in a Master degree woman working as a waiter in a restaurant. However, data related to the underemployment are retrieved from the ILO website and HCP reports “Activité, emploi et chômage” and the “La Femme Marocaine en Chiffres”.

School attainment: (*Sattain*)

This variable quantifies the school attainment for Moroccan women. It was retrieved from the Barro and Lee website. The Barro and Lee data set is a data that ranges from 1950 to 2010 and provides the school attainment by sex and in a five years interval. This data set gathers information about 146 countries for populations aged more than 15 and 25 years old for 4 levels of schooling ranging from the informal education to the tertiary one. This variable will quantify the school attainment of Moroccan women within the labor market. Data related to this variable are obtained directly from Barro and Lee website. School attainment for Moroccan women aged 15 years and plus for the level of tertiary school is used. The Barro and Lee website only contains the data for female and total.

Enrollment: (*Enrol*)

The enrollment variable quantifies the number of female students enrolled in tertiary school programs. It will measure the contribution of high education of females to the inclusion of women in the labor market. Data from the UNESCO website and the Moroccan Ministry for Higher Education, Scientific Research and Training of Executives report “Etudiants tous les Cycles” are used. This variable will capture the changes in the numbers of women enrolled for tertiary education and link this with the inclusion of women in the labor market as a major variable contributing into this phenomenon. The tertiary education refers to the female students enrolled for higher education like bachelor degrees, masters and doctorates. These will categorize women as labor with higher qualification in the labor market.

Graduation: (*Grad*)

This variable quantifies the numbers of female students that graduated from higher education establishments. It is of a good help to quantify the numbers of women that enrolled and finished their schooling programs within the higher education establishments. The research will quantify the numbers of female student that enrolled and graduates with a higher education then released to the job market. In fact, it will give a sort of benchmark to compare the numbers of female students that graduated with the number of women in the labor market. This variable will be retrieved from the UNESCO website as well as the Moroccan Ministry for Higher Education, Scientific Research and Training of Executives reports “Diplomés tous les cycles”.

Gender Inequality Index: (*GII*)

This variable will measure the relative empowerment of women in Morocco. It is a measure used to quantify the gender inequality and discrimination for different countries. According to the UNDP, this factor emerged to overcome the criticism on the GEM and GDI indexes. A composite

index quantifies the losses resulting from gender disparities. It is computed based on reproductive health, empowerment and labor market participation. This variable is for a great help to our research, as it will measure the empowerment of women as a last step after they are released to the job market. The researcher will retrieve this data from the UNDP website.

#### GDP for Tertiary education: (GDP)

The GDP for tertiary education is an education related variable that will measure the importance the government gives to the tertiary education. This variable represents the percentage of expenditure of the government on education in general. The variable will give a proper insight to the percentage allocated for tertiary education and the importance the government gives to higher education. The expenditure for tertiary education is an additional variable to evaluate the importance of higher education in the inclusion of women in the labor market. This variable will be retrieved from the World Bank database.

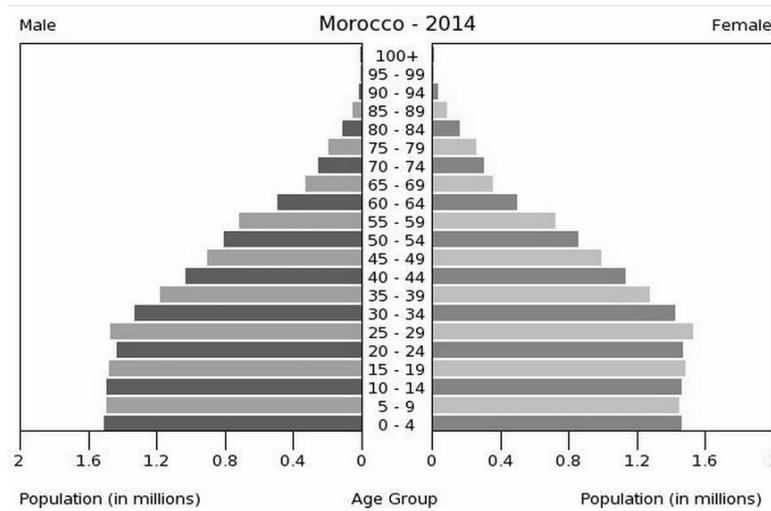
### **III. Empirical Analysis and Results**

After a brief presentation of the major trends characterizing the Moroccan economy in relation to education and signals of inclusion of women, a descriptive statistical analysis besides the determination of the dynamic processes of each variable are conducted before the assessment of the inclusion trends through education.

#### **1. Major Facts about Education and Inclusion of Women in Labor Markets in Morocco**

According to recent estimations (World Factbook, 2013) based on the 2004 population census (HCP, 2005), Morocco counts approximately 33 million people where 27.1% are aged between 0-14years, 18% aged between 15-24years, 41.7% between 25-54years, 7% between 55-

64 years old and 6.3% are aged 65 and over. The following illustrates the above numbers and describes the Moroccan population structure by gender.



**Figure 1: Moroccan population by gender (source: World Factbook CIA)**

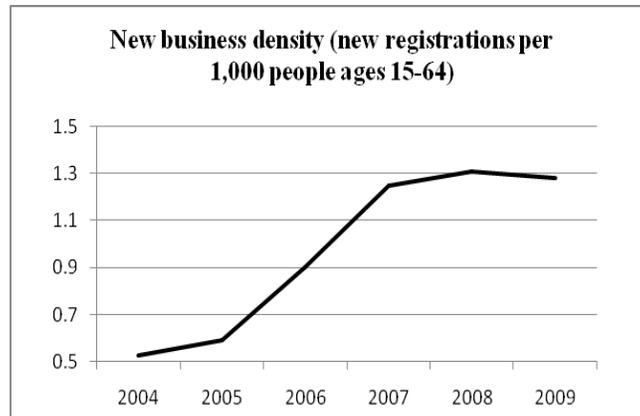
As the graph is clearly showing, Morocco has a young population that includes both males and females. The inclusion of women and her participation in the development of the country is tightly related to education. In fact, according to the World Bank data, the public spending on education stagnated around 5.6% of the GDP for the last ten years when it used to be higher in the eighties where it reached 7.2% in 1983. According to the UNESCO statistics, the percentage of accomplishing primary school was about 60% in 2000 and increased by 30% in ten following years.

This research will focus on the tertiary education as a major factor leading to the economic emancipation and to the inclusion of women in the labor market and business development in Morocco. In addition, the literacy rate of males is higher (51%) than the one of females (42.5%) (World Factbook, 2013). According to the TIMSS encyclopedia, there are 14 public universities in Morocco in addition to a number of private universities (2007). The Moroccan government is

determined to eradicate illiteracy through adopting national literacy and non-formal education strategy (United Nations, 2004).

Moroccan women represent approximately half of the local workforce still they are subject of salaries inequalities. According to HCP over the 33 millions of Moroccans, 16.5 million (about 50.9%) are women. Woman is a valuable human asset that each society needs to empower and encourage to participate in the economic life. The inclusive growth theory relates the importance of women as human capital. It will not only benefit the economy but also their prosperity, children and families. Furthermore, education is known to be an important source of inclusion, growth and development. According to World Bank data, the percentage of seats held by women in the national parliaments went from 0.6% in 2002 to 17% for the last three years. However, these numbers are less impressive when it comes to the ministerial positions where women got only 3.3% of the positions in 2012 when it reached 19.2% in 2008. Women can be empowered by encouraging her to become an entrepreneur. The difficulties to start new businesses are huge because of the high number of procedures and time required. Hopefully, it decreased from six in the past years to only five in 2013 likewise for the time required to start a business went from 12 days in the past years to 11 in 2013. On the other hand, on a scale from 1 to 185 the index of the ease of doing business for morocco went from 95 in 2012 to 87 in 2013. (World Bank data)

Figure 2 illustrates the increase of the new business density in Morocco. It considers the new registrations per 1000 people aged between 15 and 64. It clearly shows an increase in the new registrations of businesses between 2004 (0.53) and 2007 (1.31). Women have their share in this increase in business creation. The percentage of female employers went from 0.6% of the employment in 2007 to 0.8 in 2008 approximately the quarter of the percentage of male employers for the same year. Furthermore, the percentage of female as top managers is approximately stable around 2.6% for the last ten years.



**Figure 2: New business density - new registrations per 1,000 people ages 15-64 (source: World Bank)**

On the other hand, a lot needs to be done for education; an essential area can promote a rapid and sustainable inclusion of women. One of the big problems that push women away from schools is poverty and the need to increase the family income. The GINI is the index that measures the degree of inequality in the distribution of family income in a country. It is computed from the Lorenz curve. An index equal to zero would denote that the Lorenz curve coincide with the 45 degree line, however, an index equal to 100 denotes a curve that coincides vertical or the horizontal axis. According to World Bank data, the GINI index for morocco is increasing as it went from 39.46 in 1999 to 40.88 in 2007.

## **2. Analyzing Single Variables**

### **a. Descriptive Analysis and Results**

This Empirical study gathers a descriptive analysis of the previous variables for a clear view about the changes education and the labor market faced in the past years. In other words, this section will provide an insight into the fluctuations each variable made through years, a comparison between both genders to show the disparities and their evolution through time. This analysis is intended to step forward in order to understand better the role higher education plays in the inclusion of women in the labor market. This descriptive analysis will present an

interpretation for the evolution of each variable for the period between 1990 and 2012 and an analysis of the trend line equation for more reliable conclusions.

Employment:

The employment numbers show an increase for both gender compared with the previous years. The number of women employed increased from 817 thousands in 1990 to 2.7 million in 2012. However, the number of women employed in the labor market is lower than the one of males that was 2.5 million in 1990 and increased to 7.8 million in 2012. The number of female and male employment seems to follow an approximately similar pattern with a higher number for male. It increased gradually starting 1990 to reach a pick with 1.3 and 5.7 million for females and males respectively in 1994. Then, these numbers decreased and remained relatively stable for seven years around 920 thousands for females and 3.3 million for males. In 2002, the employment of males and females recorded another pick where the employment numbers increased considerably. The female employment increased from around 950 thousands in 2001 to 2.4 million in 2002 while the male employment increased from around 3.5 million in 2001 to 7.1 million in 2002. The employment rate continued to increase steadily for both genders as they reached 7.7 million and 2.7 million for males and females respectively. However, the increase in the numbers of females employed have significantly increased from 817 thousand in 1990 to 2.7 million in 2012 it remains significantly lower than the numbers of employed males. The above analysis of the figure shows that the presence of female in the labor market is lower than the one of males as they represent only the third of the number of males employed.

Gender	coefficient	t-stat
Female	118.0522**	9.0143
Male	288.8673**	8.5469
Total	406.9180**	8.8147

**Table 1: The Trend coefficient and t-stat for the employment**

Table 1 presents the trend line equation's coefficient and its t-statistic for female employment, male employment and the total employment between years 1990 and 2012. All the coefficients for the trend line equations' coefficients are significant at 5%. This means that the employment of female is increasing by 118 each year, which falls far behind the one of males that increases by 289 each year. This shows that the number of female in the job market is increasing significantly but not at a pace that will grant them to be equal with males.

Unemployment:

The evolution of unemployment for both genders between shows that the figures follow approximately the same pattern. The increase of unemployment is slight compared with the previous numbers of employment and its increase through the years. The unemployment of females increased from around 200 thousands in 1990 to 300 thousands in 2012. This means that it only increased by 100 thousands in the late 20 years for females and about 300 thousands for males as it increased from 400 thousands in 1990 to around 740 thousands in 2012. This increase is less impressive than the employment numbers and increase for both genders tremendously. The unemployment numbers knew a pick in the end of the 20<sup>th</sup> century. This increase in unemployment rose to a million between 1999 and 2000 but it soon started to decrease to around 740 thousands in 2012. On the other hand, the number of unemployment for women recorded an increase in 1995 where it reached its highest record 480 thousand. The fluctuations of female unemployment soon started to decrease and stabilize its number around 300 thousand in the previous years.

Gender	coefficient	t-stat
Female	(2.12715)	1.07657
Male	15.70365**	2.99428

Total	17.97674*	2.70358
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**Table 2: The Trend coefficient and t-stat for the unemployment**

This table presents the coefficients of the trend line equations for the unemployment for females, males and the total between years 1990 and 2012. The coefficients of the trend lines show clearly that, as we increase by one year the unemployment for females increase by 2.12 however, this coefficient is not significant at 5%. On the other hand, the coefficient of the trend line for males is significant at 1% and increases by around 16 as we increase by one year. On the other, hand the total unemployment increases by about 18 as we increase by one year. This coefficient is significant at 5%.

Underemployment:

For matters of illustration, the research chose to split the evolution of underemployment of women and men. The above figures show that the underemployment of males and females follow a similar pattern with a slight difference in numbers. The female numbers are much lower than the ones of males and represent the 10<sup>th</sup> of the numbers recorded for male. This low numbers may be explained by the low number of female present in the job market compared to males' presence. Figure 3 shows that the number of underemployed females fluctuated between the years 1999 and 2011. It increased from 191 thousands in 1999 to reach its highest value in 2002 with around 230 thousands then started to decrease for the following years. The underemployment of women reached its lowest value in 2007 with 120 thousands then fluctuated for three years to reach 143 thousands in 2011. These numbers showed that the underemployment of women in Morocco decreased through years yet it remains lower compared with females in the labor market. On the other hand, male underemployed represent the third of the employment of males. Like for females, the male underemployment reached its highest value in 2002 with 1.25 million underemployed males. These numbers decreased in the following to reach 878 thousands

ten years later. The underemployment of males stabilized their numbers around 963 thousands in 2011, which represents approximately the seventh of employed men in the labor market. The underemployment for both genders is following a decreasing pattern that will benefit the labor market and help it use the most of its human resources.

Gender	coefficient	t-stat
Female	-6.5088**	-3.6643
Male	-22.2808*	-2.7659
Total	-28.7896*	-3.0080

**Table 3: The Trend coefficient and t-stat for the underemployment**

The above table presents the trend line's coefficients for females, males and total underemployment of the Moroccan labor market between years 1999 and 2011. The coefficients of underemployment for all three categories, this denotes significant decrease in the numbers of underemployment in the Moroccan labor market. However, the rate of decrease in the male underemployment is higher than the one of females. This can be explained by the difference in the number of underemployed males and females. The female underemployment decreases with 6.51 as we increase by one year this coefficient is significant at 1%. On the other hand, the coefficient for the total underemployment and male underemployment are significant at 5% and denotes a sharp and more rapid decrease in the underemployment numbers. The underemployment decreases by 22 and 28 as we increase by one year. The underemployment decreases significantly to profit the Moroccan labor market.

Business creation:

Once again, the graphics show the huge inequality between both genders. The numbers of business created in the previous years by women never went beyond the five thousands while it exceeded the 2.5 million for men. The business creation had a weak period for males as it

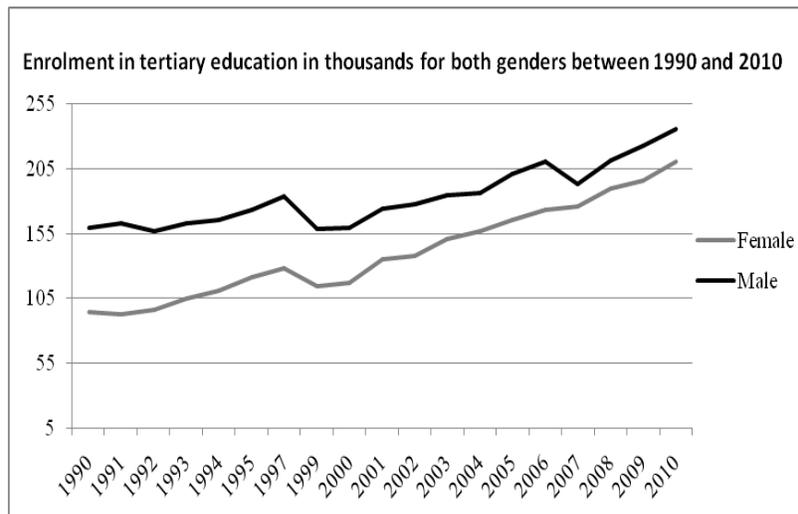
decreased from 1.7 million in 1994 to 943 thousands in 2001. These numbers did not stay low for long as it increased dramatically in the following years to reach 2.2 million in 2002. This increase continued to reach 2.6 million businesses created in 2012. On the other hand, the number of businesses created by women is increasing steadily. These businesses doubled their numbers in 18 years they went from 208 thousand to 451 thousand businesses created by women. Furthermore, the number of businesses created by women fluctuated between 1994 and 2012. Similar to the male pattern the number of businesses created by females reached its lowest value in 2001 with 138 thousand businesses. Then, they continued to increase steadily to reach their highest record in 2012 with a 451 thousand businesses created by women.

Gender	coefficient	t-stat
Female	18.10516**	5.79183
Male	77.82276**	3.41576
Total	95.93394**	3.78245

**Table 4: The Trend coefficient and t-stat for the business creation**

The coefficient to the trend line equation for female has a coefficient of 18.1 while the one of males has a coefficient four times higher. The coefficients are significant at the 1% and shows that the rate of growth of businesses increases more rapidly for males with a 77.82\*\* than females that only increase by 18.1 as we increase by one year. These numbers show once again the inequality between the genders however; these numbers denote some increase of the inclusion of women in the labor market even if it is still lower than the presence of men.

## Enrollment:



**Figure 3: Enrollment in tertiary education (thousands) for both genders between 1990 and 2010**

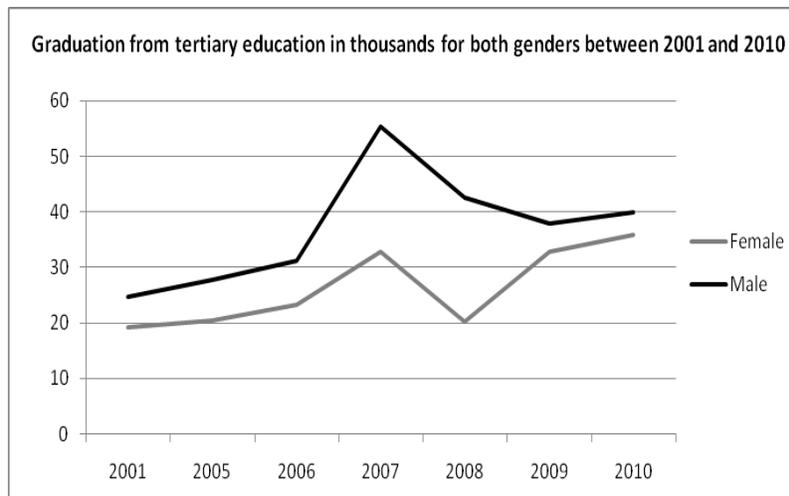
The figure above shows that the numbers of people enrolled increased gradually between 1990 and 2012. This figure shows the numbers of enrolled students in tertiary education for both genders. The gap between two curves diminishes through years. It means that the number of males and females enrolled in tertiary education is converging toward being equal. In 1990 the number of males enrolled in the tertiary education was 160 thousand while the one of females was 95 thousand which makes a difference of about 65 thousands. This difference was reduced to only 25 thousand in 2010 where the number of males enrolled in tertiary education was about 235 thousand for 210 thousand females enrolled in tertiary education. The graphic shows an increasing pattern for both males and females. There was a slight decrease for both genders in years 1999 and 2000 but it did not affect the increasing scheme of the enrollment for both genders.

<b>Gender</b>	<b>coefficient</b>	<b>t-stat</b>
<b>Female</b>	5.46075**	14.52909
<b>Male</b>	3.17981**	7.22928
<b>Total</b>	9.70051**	9.88793

**Table 5: The Trend coefficient and t-stat for the enrolment**

The table above presents the coefficients of trend line equations for the enrollment of male, female and total. The table shows that the enrollment of female students in tertiary education is growing faster with 5.46\*\* than the one of males that only grows at 3.18\*\*. On the other hand, the total shows a rapid growth in the enrollment of students of both genders in tertiary education. These numbers denote the awareness that females and males developed for higher education. This increase in number is more important for women for which the number of enrollment is increasing significantly. Moreover, it profits the society and the labor market that will gain a high skilled human resource.

Graduation:



**Figure 4: Graduation from tertiary education (thousands) for both genders between 2001 and 2010**

The above figure presents the graduation number of students from tertiary education as a sign of their accomplishment of this level of education. This graphic shows an increasing pattern for both males and females. The number of graduates from tertiary education increase steadily for both genders. This increase is disrupted in 2007 where the number of graduate student increased dramatically for males as it reached its highest value 55.4 thousands. The male graduate numbers soon started to decrease and take a steady growth rate. Similarly, the number of female graduates

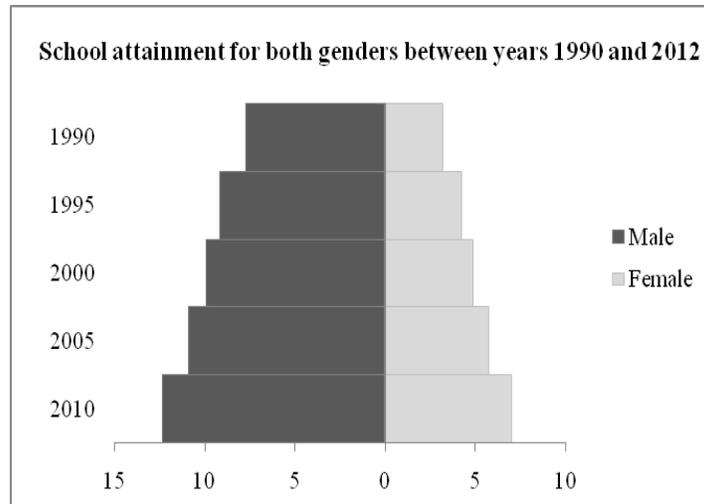
from tertiary education increased in 2007 to reach its highest number with 32.7 thousands. However, this number did not decrease to continue its growth steadily. On the contrary, it decreased to 20 thousands the following year and then increased in 2009 to reach it highest with 32.7 and continue its growth. The number of female student graduating from tertiary education denotes perseverance and the government's efforts to train appropriately women and make them a highly skilled labor force for better chances of joining the labor market. These increasing numbers are low compared to the high amounts that enrolled in tertiary education. The dropout rates and the numbers of students failing can explain this.

Gender	coefficient	t-stat
Female	(1.7336)	2.3487
Male	(2.1401)	1.7392
Total	3.971*	3.073

**Table 6: The Trend coefficient and t-stat for the graduation**

The table above presents the trend line equations' coefficients for males, females and total graduation from tertiary school. The coefficients for these trend line equations seem not to be significant except the one for total graduation that is significant at 5%. The coefficients of the trend line equation show a slow growth in the numbers of graduates in genders, 1.7 for female and 2.14 for males. These coefficients are less impressive than the ones of the enrollment in tertiary education. The insignificance of the numbers may be due to the scarce amount of data about the Moroccan graduates from tertiary schools.

School attainment:



**Figure 5: The pyramid for males' and females' school attainment from 1990 to 2010**

The figure represents the pyramid for the school attainment of females and males for the 20 past years. This school attainment represents the percentage of males and females aged 15 years and more. This pyramid shows the progressive increasing of school attainment for both males and females. The school attainment for males is higher compared with females' school attainment. The record shows that males scored 7.7 while the females scored only 3.3. The numbers continued to increase gradually and proportionally for both genders. The numbers for males' school attainment represented the double of those of females. In 2010 the school attainment of women approximately doubled from 3.18 in 1990 to 7.01 in 2010. This school attainment remains lower than the one of males that reached 12.3 in 2012.

GDP for tertiary education:

The figure above represents the allocation made for tertiary education as a percentage from the expenditure on education. This figure shows an increase in the percentage of education expenditures allocated to the tertiary education. This amount increased from 16.3% in 1998 to reach 18.5% in 2000. However, this percentage from education expenditures allocated to tertiary education changed the following years to values fluctuating between 15% and 16%. This

percentage of the allocation to tertiary education increased in 2009 to reach its highest value 20.2%. The analysis of the trend line equation showed that the coefficient of 0.084\*\* is significant at 1% and presents an increasing pattern. This coefficient is small but denotes a slow increase of the percentage allocated to the tertiary education.

#### The Gender Inequality Index:

This index denotes the degree of inequality between the genders in a society and her empowerment. Along with the Gender Empowerment Measure (GEM), it quantifies the degree of inclusion of women in the labor market and the decision-making in a country. Unfortunately, data for these indexes are scarce for morocco and not computed. The GII includes dimension like the empowerment, the reproductive health and the labor market participation for women. The graphic above shows the evolution of the Gender inequality index between 2000 and 2012. The GII recorded its highest value in 2008 with a 0.693 and decreased to its lowest rate in 2012 to reach a 0.444. This index has a decreasing pattern that continues up to now. This denotes a low inclusion of women regarding her empowerment, the involvement in the labor market.

This part shows that the numbers of enrollment of females in tertiary education is increasing rapidly but remain lower than those of males remain. The women employment is increasing but the labor market remains dominated by males. On the other hand, unemployment increased through the previous years but it is not significant when compared to the number of females employed in the labor market. The underemployment of both genders is following a decreasing pattern that shows an effective and efficient allocation of the human labor force. The high numbers of enrolled students in tertiary education is linked to the increasing percentage the government allocated to tertiary education. In addition, the gender inequality index shows the inequality between genders and the low empowerment of women. The GII along with the

graduate student from tertiary education affirms that the women are less empowered and the numbers of graduating women from tertiary education is low but these contradicting results may be linked to scarce amount of data available on Morocco. Furthermore, the school attainment for males dominates being twice the school attainment of women.

#### b. Dynamic Processes

The following section intends to illustrate the process underlying the behavior of each variable for both males and females. It will investigate the effect time has on variables and their behavior with regard with their previous records. This part bases its findings on the four most relevant variables to our topic. Enrollment, Business creation, graduation and the three components of the labor market: employment, unemployment and underemployment are the main variables used for the analysis. We will start by looking at the female process for each variable and compare them to the male ones. We investigate the process of development of each variable through time and compare it to male process to understand the difference or similarities with males. For this purpose, we will evaluate the following functions for each variable:

$$Var_t = \beta_0 + \beta_1 Var_{t-1} + \varepsilon_t$$

“Var” will be substituted by the different variables used in the following part namely enrollment, graduation, business creation, employment, unemployment and underemployment. Appendix A gathers the results for the four regressions.

#### Enrollment:

The enrollment process needs a closer insight into its development through years. The enrollment process for women is analyzed to understand the evolution of the enrollment and its development process using the following equation:

$$Enroll_t = \beta_0 + \beta_1 Enroll_{t-1}$$

A regression was performed on the data related to the business creation to understand the flow of the process and its evolution. The resulting equation is the following:

$$\text{Female: } Enroll_t = 1.551 + 1.044 Enroll_{t-1}$$

$$\text{Males: } Enroll_t = -0.466 + 1.034 Enroll_{t-1}$$

The above regression equations present positive and significant coefficient that indicate an increasing trend in the process of enrollment for both males and females. The coefficients for females and males respectively are significant at 1%. They indicate that the enrollment process is increasing. The equation shows that the enrollment of females in tertiary schools increases every year by 1.5 thousand female students.

#### Graduation:

The enrollment is not the only component of tertiary education to be investigated. Another side of higher education is the graduation as a sign of accomplishment of this level of education. The graduation process based is then estimated as in the following equation:

$$Grad_t = \beta_0 + \beta_1 Grad_{t-1}$$

After processing the data and performing the regression, the following equations are obtained:

$$\text{Females: } Grad_t = 31.165 - 0.087 Grad_{t-1}$$

$$\text{Males: } Grad_t = 44.51 + 0.096 Grad_{t-1}$$

The results of the regression show a decreasing pattern regarding the number of graduating student from higher education for females. However, the number of males graduating takes an increasing pattern with a 0.096 however this coefficient as well as the one for females is not

significant. It denotes that the process of graduation is a very slow declining process that decreases by 9% of the previous year's numbers for females and increasing with 9.6% for males. These results are mainly due to the low number of data available about the numbers of graduate female students in the different sources.

### Business creation:

Business creation process is estimated to follow the equation:

$$Bcreation_t = \beta_0 + \beta_1 Bcreation_{t-1}$$

The resulting equations are:

$$\text{Females: } Bcreation_t = 95.94 + 0.775 Bcreation_{t-1}$$

$$\text{Males: } Bcreation_t = 984.41 + 0.597 Bcreation_{t-1}$$

The tables resulting from the regression indicate that the coefficients of regression 0.775\*\* and 0.597\*\* of females and males respectively are significant at 1%. They indicate that the process of development of the business creation is increasing for both genders. Concerning females, each year the number of businesses created equals to approximately three quarters of the businesses created the previous year in addition to 96 thousand businesses. On the other hand, males' process for business created increase by half of the number of businesses created the previous year in addition to 984 thousand businesses. These numbers denote that the process of development of the businesses created by women take an increasing trend. The process of development of businesses created for females (0.775\*\*) is more important than the one of males (0.597\*\*).

### Employment

The first component of the labor market evaluation is the employment factor. This will be evaluated through the following equation:

$$Emp_t = \beta_0 + \beta_1 Emp_{t-1}$$

A regression was performed on the data of related to the business creation to understand the flow of the process and its evolution. The resulting equation is the following

$$\text{Females: } Emp_t = 212.09 + 0.928 Emp_{t-1}$$

$$\text{Males: } Emp_t = 970.93 + 0.857 Emp_{t-1}$$

The above equations present the development of the employment process for both males and females. The coefficients of 0.928\*\* and 0.857\*\* for both females and males respectively are significant at 1%. It shows that the process of employment of women is higher by 212 thousand businesses from the number employed in the previous year. The process of employment of female workers in Morocco is increasing through years. Like the business creation process, the employment process for both males and females denote an increasing pattern with a highly significant coefficient that describes a fast development of the employment of women in Morocco.

#### Unemployment:

Another side of the labor market in Morocco and the inclusion of women in the job market is the unemployment. Its process is an important factor to evaluate the degree of inclusion of women in the labor market and evaluate the degree of their marginalization. The following equation is used to describe the process of unemployment for women in Morocco:

$$Unemp_t = \beta_0 + \beta_1 Unemp_{t-1}$$

The above equation will help to describe the process of development of both males and females. It presents a valuable indicator to the degree of integration of the women and the inequality they may experience.

$$\text{Females: } Unemp_t = 185.47 + 0.382 Unemp_{t-1}$$

$$\text{Males: } Unemp_t = 145.86 + 0.814 Unemp_{t-1}$$

The unemployment process in Morocco is an increasing process for both genders. The equation shows significant coefficients 0.382\*\* and 0.814\*\* at 1% for females and males respectively. The higher coefficient for the development process for males (0.814\*\*) is mainly proportional to the high numbers of males' employment. These coefficients describe the unemployment process as an increasing trend. The number of unemployed women increases by 38% from the previous year while the one of males is increasing by 81.5% from previous years. The unemployment process is an increasing one for Morocco for both genders. The pace of the process of development of males presents a bigger coefficient than the one of females but this comparison will be addressed later in the research.

Underemployment:

The last component for the labor market inclusion of women is the underemployment. The underemployment of women denotes the inequality of chances in the labor market and the misuse of the labor force and a deficient allocation of human resources. The below equation is used to understand the underemployment process:

$$Underemp_t = \beta_0 + \beta_1 Underemp_{t-1}$$

A regression analysis was performed to substitute the numbers and understand the underemployment process for both genders.

Females:  $Underemp_t = 26.74 + 0.830 Underemp_{t-1}$

Males:  $Underemp_t = 201.93 + 0.803 Underemp_{t-1}$

The equation presents a coefficient of 0.83\*\* for females and 0.803\*\* for males that are significant at 1%. The coefficients denote an increasing trend for the underemployment of women and males in Morocco. The number of underemployed women increases by 83% of the

previous year's number while the one of males increase by 80%. Then, the underemployment process is an increasing trend for both genders.

This part shows that the process of development of variable related to the previous years. The results show that the processes of development of all the variables are increasing ones except for the graduation process that denotes a decreasing trend. The enrollment and employment present coefficient of 1.044 and 0.928 respectively. They are significant at 1% and show that the increase in their numbers is stable but continuous one. They increase by 1.5 thousand and 212 thousand respectively for enrollment and employment every year. The Unemployment, Underemployment and Business Creation have an increasing process. However, their coefficients 0.382\*\*, 0.83\*\* and 0.775\*\* significant at 1% are less than one which means that their increase remains low. On the other hand, the Graduation from the tertiary education presents a negative coefficient that denotes a decreasing trend. These results may be due to scarce number of data found in the different databases. However, the following section will allow the researcher to compare the regression coefficients of these processes with those of males to see if they are similar or different.

After analyzing the processes of both genders, we were concerned to understand if the growth pace for each variable is equal for both genders or not. This section intends to compare the processes' coefficients to evaluate how the process of development of each component evolves for males and females. In order to compare how similar or different the processes' coefficients performed a regression on the variables used for the process analysis and adding two other variables. The first variable is a dummy variable called "female" that takes 1 in case it is female and 0 otherwise. The second variable is the product of "female" and the X variable in each of the six cases. The hypothesis that we want to test for is that if the coefficient of the regression for processes for females are equal to those of males or are they significantly different.

$$H_0: Coef_{females} = Coef_{males}$$

$$H_1: Coef_{females} \neq Coef_{males}$$

The regression results show that the second variable created for each of the six variables is not significant. The latter means that the difference between the regression coefficients for males and females is not significant. The enrollment, graduation, business creation, employment, unemployment and underemployment are growing at same pace for both genders. The difference in the process of development of males and females is not significant. Then even if the numbers are bigger for males but the rhythm of development for each variable is the same and the process of development is equal for both genders.

### **3. Inclusion of women in Labor Force and Businesses through Education**

The following part relates education to the different components of the labor market. Enrollment in the tertiary schooling represents education in the evaluation of its relationship to the labor market. On the other hand, labor market is divided to three components the business creation, the employment, unemployment and underemployment. This part of the research uses a regression model to evaluate the contribution of education through enrollment to the different labor market components. We will first evaluate the relationship between enrollment and business creation, employment, unemployment. The equation for the different regressions is designed as follows:

$$Var_t = \beta_0 + \beta_1 Enroll_t + \varepsilon_t$$

where “Var” is substituted by business creation, employment, unemployment and underemployment.

#### **Business Creation:**

The first relationship we will investigate is the one between the business created by women as one side of their inclusion in the labor market and the enrollment in tertiary education

representing the education component. The following equation is the result of a regression analysis used to describe this connection between the two components:

$$Bcreation_t = -143.46 + 2.757 Enroll_t$$

This equation presents significant coefficients of -143.48\* and 2.757\*\* significant at 5% and 1% respectively. These coefficients show how tertiary education is important to women that want to integrate the labor market through the creation of their own businesses. The coefficient of the enrollment shows that every time we increase the number of enrolled women in the tertiary education by a thousand the number of businesses created triple its number approximately. On the other side, the -143.46\* coefficient that is null shows that when there is no woman enrolled in the tertiary education there is no business that could be created. This reveals the strong relationship between tertiary education and the business creation.

#### Employment:

The second component of the labor market is the employment component. This relationship will be tested through the equation below. A regression was performed to get the coefficients of the equation used to describe the relationship between employment and education.

$$Employment_t = -1360.61 + 22.16 Enroll_t$$

The coefficients of the equation denote a straight relationship between higher education and the employment as a mean to enter the job market. Both coefficients -1360.61\*\* and 22.16\*\* are significant at 1%. These coefficients make it obvious that without tertiary education integrating the labor force becomes difficult for women. The enrollment coefficient shows that every time we increase the number of enrolled women in the tertiary education by a thousand the number of the employed ones increases by 22.16. On the other hand, the other coefficient shows that the

number of women employed becomes null and their chances to be employed are decreasing if no woman is enrolled in higher education.

### Unemployment:

The third side of the labor market is the unemployment component. This variable shows the degree of exclusion of women from the labor force. A regression is performed to determine the coefficients of the equation and define the relationship between the unemployment and education.

The higher impacts the unemployment only three years after the enrollment as it shows not significant before the three years period. In order to investigate deeper, the relationship between the education and unemployment a lagged regression is estimated with a lag span of three years.

The obtained equation is the following:

$$Unemp_t = 355.12 + 3.720 Enroll_t + 3.155 Enroll_{t-1} + 0.762 Enroll_{t-2} - 2.228 Enroll_{t-3}$$

Three years after the enrollment in tertiary education, the factor of unemployment is significant.

The equation presents coefficients 355.12\*\* and -2.228\* are significant at 1% and 5% respectively all the other coefficients are not significant. The coefficients show the higher education is a significant factor to the decrease of unemployment in Morocco. The coefficient of the enrolment after three years is significant at 5% and shows that as the number of tertiary female students increase by a thousand the number of unemployed women decreases by 2.228. However, if no female student is enrolled in the tertiary education the number of unemployed females is positive and equals 355.12 thousand women. The three years that the unemployment took to be sensitive to the enrollment in higher education indicates the period of time that the enrolled student takes to be the minimum qualified with a higher education degree. Thus, the three years is the time period that the student takes to graduate and obtain a higher education degree.

### Underemployment:

The underemployment is the last component of the labor market that is investigated. Underemployment denotes the inefficiency in using the skilled female labor force in the Moroccan job market. The relationship between underemployment of women and higher education in Morocco is described through the following equation:

$$Underemp_t = 297.85 - 0.73 Enroll_t$$

Both the coefficients 297.85\*\* and -0.73\*\* are significant at 1%. The enrollment coefficient is -0.73\*\* and shows that as the number of enrolled women in the tertiary education increases by a thousand, the number of underemployed women decreases by 73%. On the other side, the 297.85\*\* coefficient shows that if there is no female student enrolled in the tertiary education the number of underemployed women is positive and equals approximately 298 thousands. This equation shows how related the higher education to reduce the number of women underemployed.

This part clearly shows that the enrollment in higher education is a direct factor that acts on the inclusion of women in the Moroccan labor market. Higher education affects the labor market as it participates to the increase in the number of business created by women and their employment number. Furthermore, higher education factor decreases the number of unemployed and underemployed women. It reduces the inefficient use of the labor force and helps to reallocate the skilled labor force for a better productivity. The unemployment is responsive to higher education only three years after the enrollment. The three years represent the period necessary to the graduation from higher education and joining the labor market to reduce the unemployment of women.

## Conclusion

This research paper intends to investigate the relationship between higher education and the inclusion of women in the labor market and thus empowerment. As a first step, the research consulted a number of papers that listed education as an influent factor to include women and empower.

Second, the research investigated the behavior of each variable directly linked to the educational and the labor fields through time. The descriptive analysis shows the numbers of females enrolled in tertiary education and the ones employed are increasing but they remain lower than those of males. On the other hand, the numbers of unemployed women are increasing through time but this increase remains insignificant compared to the increasing numbers of women employed. On the other hand, the descriptive analysis shows that the numbers of underemployed women is decreasing through years. This indicates a more efficient allocation of the women labor force in Morocco. Furthermore, the descriptive analysis shows that the percentage of GDP allocated to tertiary education increased in the last 20 years. Yet, the descriptive analysis indicates that the numbers of graduates from tertiary education decreased in the last 20 years. It also indicates the inequality between males and females using the Gender Inequality Index (*GII*).

The third step is the evaluation of the process of development of seven variables. This part uses variables like the Enrollment from tertiary education, graduation from tertiary education, the business creation, the employment, unemployment and the underemployment. The process of development of all the variables has positive and high coefficients that indicate an increasing trend except for the graduation variable. The enrollment and the employment variables have significant coefficients at 1% and close to one. The equations indicate that the two variables

have a stable increase of 1.5 thousand and 212 thousand respectively. On the other hand, unemployment, underemployment and business creation presents positive coefficients significant at 1% and that are less than one, which denote a low increasing process of development. The graduation is the only variable that has a negative coefficient that shows a decreasing process of development. The comparison between male and females processes shows that their respective development processes increase at the same rate even if the numbers of males are higher than those of females.

The fourth step investigates the relationship between education and the different components of the labor market. It shows that higher education participates in the inclusion and empowerment of women in Morocco. It also indicates that higher education has a significant impact in the employment, unemployment, underemployment and business creation. It increases employment and business creation and helps to reduce the unemployment as well as underemployment. The responsiveness to higher education for unemployment required three years, which are the necessary period to be qualified and join the labor market.

The above results show that higher education in Morocco participates to the acceleration of including women in the labor force and in business creation. All the results converge toward the role that higher education does either for males or females.

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