Measuring female factor in determinants of entrepreneurship: illustration by case of Côte d'Ivoire through a quasi-experimental ex-post approach

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Abstract

Purpose of this article is to find out whether determinants of women entrepreneurship are different from those of men's entrepreneurship in general and specifically in Côte d'Ivoire. To do this, we conducted a quasi-experimental analysis using non-parametric and parametric approaches to survey data on a sample of 161 entrepreneurs in Côte d'Ivoire, 113 of whom were women and 48 men. Our survey was designed and conducted to neutralize the socio-demographic and conjunctural differences between men and women entrepreneurship in order to produce matched data. Our analysis shows that determinants of male and female entrepreneurship in Côte d'Ivoire are not fundamentally different if rationality matters.

Keywords: Entrepreneurship, female factor, quasi-experimental approach, non-parametric approach, parametric approach.

JEL classification: L26; K28; C81; C14

1. Introduction

Literature on determinants of women's entrepreneurship has two characteristics which are also two limitations: 1) an excess of perspective on entrepreneurial act and 2) a systematic submission of principle of rationality to gender concept. An excess of perspective on act of entrepreneurship because analyses of entrepreneurship are largely dominated by theories of social psychology. In these theories, everything happens as if intention is worth act. For example, Emin (2004), speaking of intentionality models, states that '*the intention to create is a function of the attractiveness of the choice for the individual and his or her perception of the feasibility of the project*'. Thus, almost all analyses of determinants of entrepreneurship are ex-ante, as they place their reasoning before entrepreneurial act. In doing so, the characteristics of an environment favourable to development of entrepreneurship and determinants of entrepreneurial act are confused. Similarly, the quasi-systematic submission of principle of rationality to concept of gender is problematic because rationality, whether substantive or limited, is universal. Such analyses lead to erroneous public policies.

Therefore, it is necessary to ask whether observed differences in determinants of female and male entrepreneurship are relevant. In other words, we ask whether measures of female factor in entrepreneurial act are relevant?

Objective of this work is to measure the gender effect on nature of the determinants of entrepreneurship. Our thesis is twofold. First, we consider that entrepreneurial act is a rational act and ex-post to formulation of entrepreneurial intention. Secondly, we consider that female and male entrepreneurship have same determinants because entrepreneurial act (business creation and/or development) is a rational act. To this end, based on Shapero's (1975) modified model of planned behaviour, we conduct an ex-post analysis of determinants of female entrepreneurship in Côte d'Ivoire.

In this framework, we produce matched data from a survey conducted in Côte d'Ivoire in 2014 with a numerical scale questionnaire. We analyse these data using a non-parametric approach first, then a parametric one. In fact, we apply a biased quasi-experimental analysis of situation of business creation and/or development in Côte d'Ivoire to capture possible female effects in determinants of entrepreneurial act.

Rest of this paper is organised in five sections. Next section presents a literature review of determinants of entrepreneurship in general and determinants of female entrepreneurship in particular. Third section presents theorical and methodological foundations of our work. Fourth section presents their application to case of Côte d'Ivoire. Fifth section analyses and interprets the results. Lessons that follow are drawn in conclusion.

2. Literature review

The determinants of entrepreneurship are both general and specific to female entrepreneurship.

2.1. Determinants of entrepreneurship in general

Historically, first works to address entrepreneurship issues date back to Cantillon (1755), Say (1803), Mill (1848), and Schumpeter (1935). Entrepreneurship is a phenomenon whose concept is very difficult to define (Fayolle and Degeorge; 2012). Fact is that its object is fragmented and its multiple components are observed and analysed by various scientific fields: economics, sociology, history, psychology, behavioural sciences, educational sciences and management sciences. Similarly, concepts used are numerous and their definitions are far from being unanimously shared. This diversity and large volume of work on entrepreneurship often leads researchers to propose a review

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of literature since 1980 (McDonald et al; 2015). These literature reviews are often conducted according to various themes: research methods in entrepreneurship (McDonald et al; 2015, Atherton and McElwee; 2005, Grégoire et al.; 2002), the classification of scientific journals publishing work on entrepreneurship (Romano and Ratnatunga; 1996), etc. Thus, an exhaustive review of literature on entrepreneurship is a challenge, even if it is restricted to its determinants. Regarding determinants of entrepreneurship, literature can be divided into two main categories: 1) general analyses in multidimensional sense and 2) specific analyses.

Several works analyse determinants of entrepreneurship in a general approach: Shapero (1975), Ajzen (1975), Gartner (1985), Reynolds (1994), Covin and Slevin (1991) and Hayton, George and Zahra (2002). In these models, the determinants of entrepreneurship are both objective and subjective factors. These determinants are psychological, sociological, demographic, geographical, cultural, economic, political and institutional. Research on entrepreneurship is multidisciplinary, but it is mainly dominated by social psychological theories. In doing so, it puts entrepreneurial act into perspective in sense that these theories analyse entrepreneurship through: character traits, intention, and feasibility in sense of its contingency to certain life events. Moreover, even when entrepreneurship is approached as a decision-making process (George and al; 2002 or Chabaud and Sammut; 2016), analysis is carried out ex-ante so that it is the probability of creating a business that is analysed, not effectiveness of its creation. One of most comprehensive models is Shapero's (1975). Shapero describes four main groups of factors that he considers to be determinants of entrepreneurship: 1) situational factors (negative, positive or intermediate shifts), 2) perceived desirability of entrepreneurial act, 3) feasibility of entrepreneurial act taking into account social, political, cultural and economic environment and 4) propensity to act. It is combination of these factors that leads or not to creation and/or development of a business by a given economic agent. Shapero's analysis, like other models of social psychological theories, is ex-ante so that it is the determinants of the probability of the entrepreneurial act that are determined.

These analyses are flawed because they tend to equate the entrepreneurial act with a single-stage process. However, every entrepreneurial act is a three-stage process: 1-formulation (or birth) of intention to act, 2-act itself and 3-observation of result. Act is not necessarily explained by desire, motivation, intention or feasibility, but by a rational decision-making process. Analyses of determinants of female entrepreneurship are no exception.

2.2. Determinants of female entrepreneurship

Gender and women's analyses of entrepreneurship are numerous and diverse, dating back to work of Schwartz (1976). Their importance is such that numerous literature reviews are regularly devoted to them: Unni and Yadav (2016), Henry et al (2015), Brush et al (2009), Fischer et al (1993), Bowen and Hisrich (1986), Popescu (2012). They can be divided into general and specific analyses. General analyses seek to assess relevance of the contribution of scientific research to understanding and vision of women's entrepreneurship: Unni and Yadav (2016), Fischer et al (1993). Specific analyses focus on various aspects of women's entrepreneurship such as their motivation (Moses et al; 2014), intention (Dabic et al; 2012), career choice (Thébaud; 2010), countries' level of development (Herrington, M. F.& al, 2017), women's enterprise networks (Constantinidis, 2010).

Importance of gender in these analyses is such that, according to Bernard et al (2004), there is a female factor in entrepreneurial act that is resistant to socio-demographic and cultural factors. Thus, issues relating to women's entrepreneurship, although a multiple reality (Cornet et Constantinidis; 2004) are gendered, even when microeconomic theory of utility maximisation is used, example Herrington, et al (2017). From this perspective, determinants of entrepreneurship are mainly psychological, demographic, sociological and cultural factors. As a result, they are very sensitive to ethnic factors, angle of approach and contexts. When Bonet et al (2014) talk about women's entrepreneurial motivations in France, Ben Habib et al (2014) talk about determinants of

female entrepreneurial intention in Algeria, Saleh (2011) produces a thesis on female students' entrepreneurial intention in Lebanon, Hassine (2016) analyses indicators and determinants of female entrepreneurship in Tunisia, and Arasti (2008) talks about women's entrepreneurial intention in Iran from the perspective of socio-cultural structures. In sum, models analysing the determinants of female entrepreneurship have very specific characteristics. They differ according to sequence of entrepreneurial act (motivations, intentions, desire or feasibility), according to nature of the entrepreneurial act (creation, takeover or development) but also according to environment. This poses a problem of discrimination against women in gender analysis (Ahl, 2006 and De Bruin et al. , 2007). In fact, since late 1970s, entrepreneurship seems to be conjugated differently for men and women. Such approaches may lead to counterproductive recommendations for female gender Popescu (2012). Indeed, to support existence of a female factor resistant to socio-demographic and cultural factors as Bernard et al. assert is to assume that men and women have different rationalities. Rationality is universal and therefore above gender issue.

Moving away from these very specific considerations of the determinants of female entrepreneurship requires a new approach. From this perspective, to measure the female factor in the determinants of entrepreneurship in Côte d'Ivoire, we place ourselves in a situation in which propensity is acquired, displacement factors are acquired and desirability is satisfied. We are therefore in an ex-post environment model.

3. Theoretical and empirical foundations

3.1. Theoretical reference model

Let us first present intuition and then determinants of entrepreneurship that follow from it.

3.1.1. Intuition of the model

Entrepreneurial act, it should be remembered, consists of three stages: formulation of an intention, taking of action and observation of result. In first stage, individuals may or may not have desire to create or develop a business. Individuals involved in this stage are whole population and there are many occurrences (situational shifts, desirability and perception of agent, etc.). At this stage, uncertainty is king; causality approaches are more relevant. The action stage cannot be unconscious. It is a matter of rationality. Observation of results conditions first and second stages in that it determines nature of occurrences. In this, when reasoning in terms of desirability, intention and/or situational shifts, there is uncertainty at first stage because a bivalent causal relationship is introduced between outcomes and each of these elements. But at second stage, outcomes will be good or bad and there may be a range of good outcomes. Under these conditions, occurrences are only risks.

Adaptation made to Shapero's model is its application to part of population that has already created, taken over or developed its business. Under these conditions, four main groups of determinants of Shapero's model are reduced to the environment alone. Environment conditions entrepreneurial development through: government policies and procedures, socio-economic conditions, business and entrepreneurial skills, financial support for business development and non-financial support for business development (Gnyawalli and Fogel; 1994). Modified Shapero model is as follows (Figure 1).

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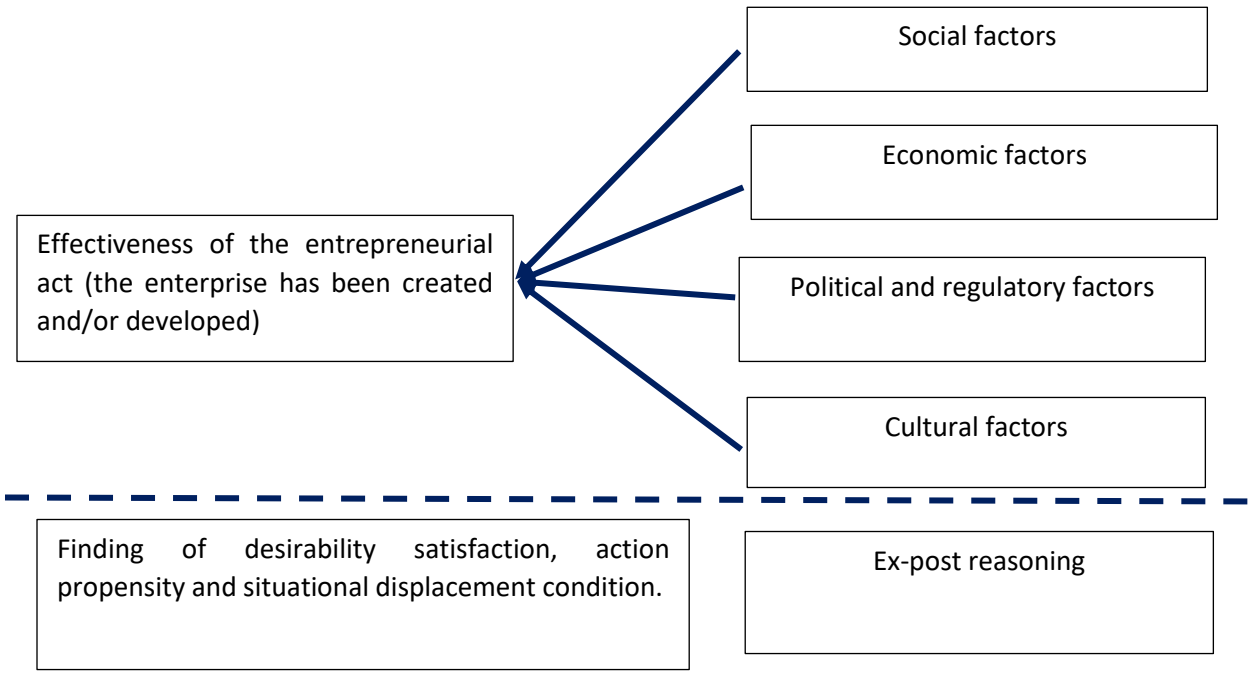
Figure 1*Adapted diagram of the influence of the environments :*



Thus, analysis of determinants of entrepreneurship can be summarised as a decision-making process in a deterministic world. Set of alternatives on which the decision is based is set of potential determinants of decision to act. It is then a question of knowing whether or not a given factor has been taken into account in decision.

3.1.2. Determinants of model entrepreneurship

From above theoretical model, we distinguish fifteen main factors grouped into three categories: political-economic factors, social factors and cultural factors.

Political-political factors are numerous (Colot et al, 2007, Gnyawalli and Fogel; 1994) but main variables are: 1-economic growth, 2-state of labour market, 3-state of market of targeted sector of activity, 4-quality of financial sector of locality, 5-quality of infrastructure, 6-self-financing capacity of entrepreneur, 7-quality of private and public institutions supporting and guiding entrepreneurship and 8-existence and quality of entrepreneurial networks.

Social factors are also be numerous (Gnyawalli and Fogel; 1994), but the main ones are: 9-marital status of entrepreneur, 10-number and/or age of entrepreneur's children, 11-opinions of entrepreneur's close family, 12-opinions of entrepreneur's friends and colleagues, and 13- previous experiences in entrepreneur's family.

Cultural factors take into account aspects related to culture in a general sense, including traditional beliefs, religious convictions of which the main ones are: 14- prescriptions of religion on entrepreneur and 15- habits and customs of entrepreneur's ethnic group or community.

3.2. Empirical modelling

3.2.1. Intuition

Challenge of this work is to assess the impact of the nature of the entrepreneur's gender on his or her choice and the importance given to the determinants of the entrepreneurial act. This amounts to establishing a causal relationship between the determinants of entrepreneurship and the sex of

the entrepreneur. The application of impact assessment approaches is indicated. These approaches are based on causal inference methods. Two types of methods exist: experimental and quasi-experimental. Experimental methods are based on a random draw from the whole population; these are called randomisation approaches. Their advantage is the reduction or absence of selection bias (Montmarquette; 2008 and Fougère; 2010), but they are limited by ethical and deontological considerations. It does not fit our theoretical model as the selection is made among people who have already created their business. We therefore use the quasi-experimental approach. Different types of causal inference exist: constant conjunction, counterfactual, manipulated cause and mechanisms. In our case, the counterfactual analysis seems to be the most suitable. Outcome of male entrepreneur's choice on a given factor is the counterfactual of the outcome of same entrepreneur's choice as a woman. Counterfactual assumes that: 1) selected determinants are considered relevant and 2) causality is subjective. We start with factors that are accepted as determinants of entrepreneurship in the literature and then test whether the choice of these factors is causally related to the nature of the entrepreneur's sex. Causal link between choice of a particular factor as an entrepreneurial determinant and nature of entrepreneur's sex is unobservable.

3.2.2. Formalisation

Our baseline model can therefore be formally summarised as follows. N total number of entrepreneurs in our sample. Treatment received by each individual in this sample is T_S with $T_1 = 1$ being a female entrepreneur and the non-treatment $T_2 = 2$ being a male entrepreneur. For each individual i , there is a set of potential outcomes denoted Y_i which can take two possible values: value $Y_1 = 1$ when factor is taken into account by individual and value $Y_2 = 2$ when factor is not taken into account by individual. It is clear that a given factor cannot be both taken into account and not taken into account as a determinant of entrepreneurship by same individual. All fifteen factors, potential determinants of entrepreneurship, are represented by vector $X_j = \left\{ X_{1,\ldots\ldots\ldots\ldots,} X_{15} \right\}$. In this way, our model is given by triplet $\left(Y_i, T, X_j \right)$. It is therefore as if our model consisted of evaluating effectiveness of same treatment applied under fifteen different conditions to same patient, while keeping same counterfactual.

3.2.3. Econometric tools

Two types of econometric approaches are available: non-parametric and parametric.

Non-parametric approaches require aggregating survey data and checking whether behaviour of participants varies according to treatment (nature of sex). Order of importance of factors is then determined, taking into account sex of entrepreneur. A complete probability distribution system must be established and scores calculated.

Probability distribution. In order to allow a probability distribution over all responses, a numerical scaled questionnaire in form of a decision tree should be designed in each of its parts (Figure 2).

Scores are then **calculated** according to two different formulas, depending on whether or not factor in question was taken into account as a determinant of act. Let us assume that : N , is total number of responses received to question of whether or not a given factor was taken into account in decision to start a business; n is total number of positive responses to this question; n_f is total number of positive responses from female entrepreneurs; n_h is total number of positive responses from male entrepreneurs, I is number of disaggregation of degree of importance given to consideration of factor under consideration in decision to start a business, and V_m is maximum

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value of the degree of importance. Let us also assume that N_f and N_h are, respectively, total number of female and male entrepreneurs in total sample N then we have $N = N_f + N_h$. Similarly, we have $n = n_f + n_h$.

Firstly, if a particular factor was cited as being important to the entrepreneur's decision to start a business, then factor score is calculated as $Poids = \frac{1}{2}\left[\frac{n_i}{N_i} \times \frac{1}{I}\right] \times Vm$ with $i = \{f; h\}$. The maximum value of this value will be $Poids = \frac{1}{2}\left[\frac{N_i}{N_i} \times \frac{1}{I}\right] \times V_m = \frac{V_m}{I}$.

Secondly, if factor under consideration is not taken into account in decision to set up business, then score of factor is calculated as follows: $Poids = \frac{1}{2}\left[\frac{(N_i - n_i)}{N_i} \times 1\right] \times I$ with $i = \{h; f\}$ but this value will always be equal to zero because $I = 0$ since it is not applicable.

Thus, scores for each factor will take on a value between 0 and $\frac{V_m}{I}$ regardless of sample size.

Results obtained from these analyses will be an ordinal ranking of data by calculating differences and therefore exploratory results. Indeed, this approach constitutes exploratory statistics in sense that it identifies factors that contain the seeds of differential treatment between female and male entrepreneurs. However, it does not allow us to judge whether potential differences found in determinants of male and female entrepreneurship are significant or not. Therefore, in order to judge the relevance of these possible differences, results of comparison of probabilistic analysis will have to be statistically tested on specificity or otherwise of responses of female entrepreneurship.

Results of non-parametric approach should be complemented by those of a parametric approach of which there are a large number such as probit and logit models that can be used in case of latent or discrete variables. They can be used to understand individual decisions while controlling for treatments (Montmarquette; 2008). Their use only requires that density of the decision variable in each of fifteen different situations and for their mean follow a normal distribution.

4. Application to Côte d'Ivoire

This involves explaining sampling, questionnaire construction, data processing, and application of non-parametric and parametric models.

4.1. Sampling

Survey was restricted to the Autonomous District of Abidjan because it contains more than 84% of country's total businesses and more than 90% of women's businesses. To do this, information contained in Banque des Données Financières (BDF) 2010 was used. In sum, survey was conducted in five stages: identification of businesses; constitution of a base of target individuals (75% female entrepreneurs) and a base of control individuals (25% male entrepreneurs); calibration to standardise socio-demographic environment and economic contexts; random conduct of surveys in each of ten communes of Abidjan; and consideration of businesses in operation and those that have ceased operations. In short, a sampling methodology for matching in a quasi-experimental approach.

4.2. Questionnaire

A three-part questionnaire was designed. First part deals with general information: gender and nationality of entrepreneur, year of creation, status of enterprise (active or closed), number of permanent employees, turnover, nature and sector of activity. Second part deals with choices for each of fifteen variables selected. Third part deals with importance given to each of selected variables. Two target groups of entrepreneurs were subjected to same questionnaire.

4.3. Data processing and missing variables

Survey data was processed by coding, probability distribution and calculation of scores. Coding was done at two levels: choice of factors (yes= 1; no= 2), importance of factor in the choice (0-not applicable, 1-low importance, 2-medium importance and 3-determining importance). Resulting data shows following statistics. Total number of entrepreneurs who responded to questionnaire 161 of which 113 were women (70.19%) and 48 men (29.81%). Minimum rate of respondents on each of fifteen variables selected was 98.14%, i.e. 158 complete responses out of 161. Of seventeen (17) sectors of activity defined by the Ivorian nomenclature, 11 responded, i.e. a coverage rate of 64.71%. Of 161 entrepreneurs, 24 went bankrupt between 2010 and 2015; in addition, 19 were of non-Ivorian nationality compared to 142 of Ivorian nationality. Finally, of 161 respondents, all had a business with SME status[1] .

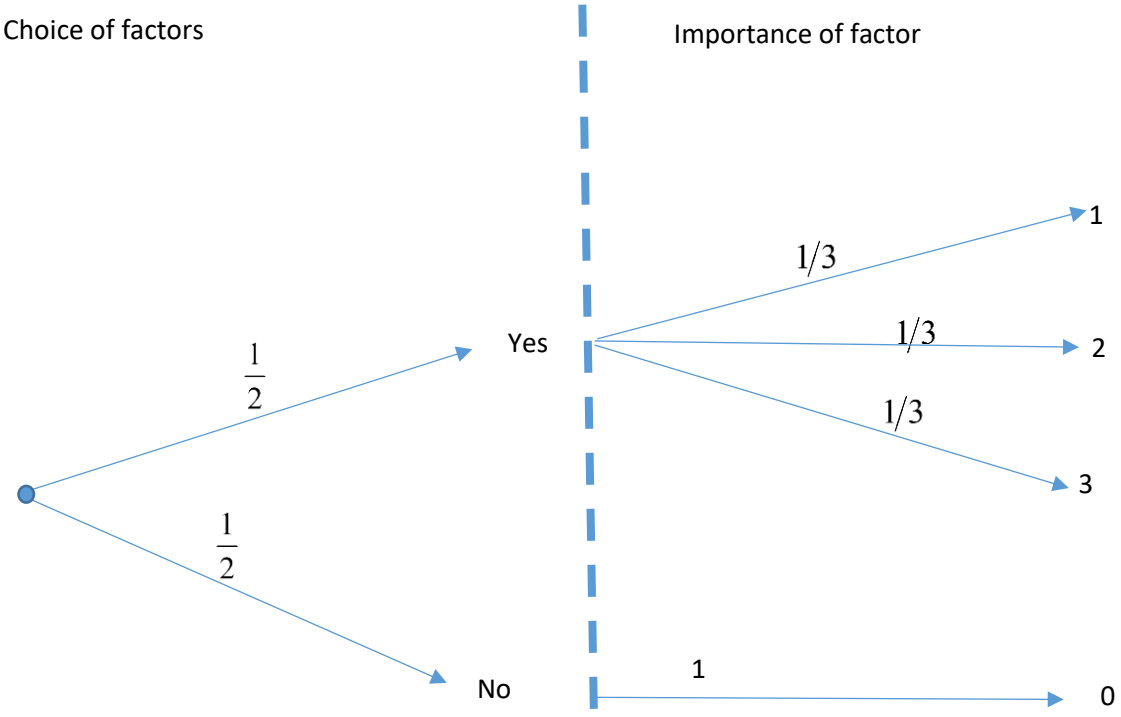
In econometric approaches, responses with missing data were excluded.

4.4. Econometric approach

4.4.1. Non-parametric approach

A probability distribution of all responses was made as follows (Figure 2).

***Figure 2:* Choice tree of factors and their importance in entrepreneurs' decisions**



[11] According to Ivorian legislation in force at time, an SME is less than 200 permanent employees and less than 30 million CFA francs per year, i.e. less than 45735 euros per year in turnover.

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Maximum value $Poids = \frac{1}{2}\left[\frac{N_i}{N_i} \times \frac{1}{3}\right] \times 3 = 0,5$; minimum value is 0.

Three statistical tests were applied: Sign test for paired samples, Wilcoxon rank test for paired samples and Kendall's concordance test for paired samples.

Paired-sample sign test is used here to check whether differences resulting from weights allocated to determinants of female and male entrepreneurship for same factor are, overall, more in favour of female entrepreneurship (+ sign) or against male entrepreneurship (- sign).

Wilcoxon rank test is used here to test whether differences resulting from differences in importance given to factors considered in entrepreneurial act by female and male entrepreneurs, for same factor, are, on whole, more important for female entrepreneurship than for male entrepreneurship.

Kendall's concordance test is used here to check whether order of importance, in terms of importance of determinants of entrepreneurial act, is same for women and men.

For all three tests, working hypothesis is that determinants of entrepreneurship among women are fundamentally different from determinants of entrepreneurship among men. This is in line with idea that decision to start a business is influenced by gender of entrepreneur. Null hypothesis is that determinants of entrepreneurship for women and men are not fundamentally different.

4.5. Parametric approach

Rank tests allow us to infer causality between nature of entrepreneur's gender and determinants of entrepreneurial action taken as a whole. However, taken in pairs, certain determinants of action could be sensitive to nature of the entrepreneur's gender. To capture this, a parametric approach is used. To do so, we apply a multimodal logit to survey data, as latter concern fifteen different determinants. In practice, we test the robustness of our approach by first regressing on choices of determinants alone and then on choices of determinants combined with importance given to each determinant by entrepreneur. Aim is to neutralise possible bias introduced by differences in numbers between female and male entrepreneurs in our sample.

5. Results and interpretation

We first present the results of the descriptive statistics and then those of the econometric tests.

5.1. Descriptive statistics

The analysis of the scores shows that self-financing capacity is the primary determinant of the decision to start a business in Côte d'Ivoire, both overall and individually by gender (Tables 1 and 2). This can be explained by the difficult access and high cost of bank financing and other financial institutions, so that self-financing becomes the main determinant of business creation. In the same sense, the quality of the financial sector in terms of cost and access only appears in the 7ème rank of the determinants of the act of starting a business in Côte d'Ivoire both globally and individually for women and men.

Second most important factor is outlook for business sector. This is intuitively logical, as a good outlook represents existence of business opportunities. This factor occupies same place both at the overall level and individually for women and men.

Marital status, age and number of children do not appear to be essential determinants of entrepreneurship in Côte d'Ivoire as they appear respectively at 11ème and 14ème place at global level and their rank does not vary fundamentally when scores of determinants are broken down according to gender of entrepreneur. For women, marital status ranks 11ème while age and number of children rank 12ème . In same vein, state of the labour market appears to be a determining factor (4ème from all angles), but it comes after opinion of family (3ème). This result is in contradiction with that of Boissin et al (2009) according to which social norm is not significantly determining for intention to create a company for students in Grenoble.

The country's economic performance does play a role in decision to start a business, but this role does not appear central. Taken as a whole, scores for economic growth rank it 9ème out of 15 factors in terms of importance. It ranks 8ème for both women and men. This result seems to be in line with what Emin (2004) argues about general environment when she states that regional markets and overall economic conditions seem to have less effect on academic spin-offs than on other high-tech entrepreneurial firms in general.

Business networks are not an essential determinant of decision to start a business in Côte d'Ivoire, neither at global level nor for women and men. At global level, existence and quality of business networks is ranked 13ème while for women it is 14ème , but 10ème for men.

Religion and customs are not essential determinants of entrepreneurial act in Côte d'Ivoire, either globally or individually for women and men. Religion ranks 12ème overall, 13ème for women and men individually. Habits and customs rank 15ème overall, 15ème by women and men. This result is contrary to Ouattara's (2007) finding that religion and customs are major obstacles to creation of SMEs by women in Côte d'Ivoire. It is similar to Arasti's (2008) finding that of five socio-cultural factors, namely peer optimism, traditional beliefs, presence of role models in society, balance between family and work, and social catalysts, only peer optimism is conducive to female entrepreneurship in Iranian context. Other factors have no effect.

Analysis of scores and rankings of determinants of action by gender of entrepreneurs shows that there are differences. Differences between ranking of determinants of entrepreneurship for women and men are not very pronounced. Indeed, besides fact that out of 15 factors, 7 of them have same rank for women and men, there is also fact that ranks of other 6 factors only diverge three levels at most except for factors "existence and quality of business networks" and "knowledge and experience". Furthermore, differences in weights given to factors by male and female entrepreneurs are almost zero (table 3). These differences are certainly indicative of a probable female factor, but it remains to be proven that they are fundamentally related to the gender of entrepreneur.

5.2. Rank tests

Rank tests show that there is no female factor in determinants of female entrepreneurship in Côte d'Ivoire overall. Admittedly, there are differences in their ranking order depending on whether entrepreneur is female or male, but these differences are not sexual. Indeed, sign test can only accept our working hypothesis at 100% significance level, while Wilcoxon test only accepts it at 49.5% level and Kendall's concordance coefficient only accepts it at 79.6% level (Table 4). Whether we are talking about signs of differences in the weights of determinants of entrepreneurship according to men and women or rank occupied by each determinant according to men and women, these are on average same taken as a whole.

This result appears to be in contradiction with those of the literature, in particular that of Bernard et al (2013), but it is consistent with that of Boissin et al (2007). Indeed, Bernard et al (2013) show that there is indeed a 'woman factor', all other things being equal, which is resistant to the

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consideration of sociodemographic and contextual elements. However, Boissin et al (2007) show that, among the variables of gender, university courses followed, having at least one parent who has created a business and advancement in studies, only this last variable proved to be significant in terms of the intention to create a business.

5.3. Results and interpretation of regressions

Regression on determinants alone (Table 5) shows that results of non-parametric approach are robust in sense that difference in choice of determinants of entrepreneurship by women and men is significant for only two variables. Variable age and/or number of children does not reject our null hypothesis. Indeed, change in gender of entrepreneur from female to male has a positive coefficient with a probability (0.002%) lower than probability (0.0077%) of accepting null hypothesis. Similarly, opinion of colleagues and/or close friends appears to be more important for women than for men. Also, the impact of change in the entrepreneur's sex, for variable opinion of colleagues and/or close friends, is not only positive but also significant (0.009%).

Taking into account relative importance given by each entrepreneur to factor considered as a determinant shows a minimal difference in probability distributions. For eleven of fifteen variables considered, impact of change in entrepreneur's sex certainly gives coefficients different from zero, but not significant. Thus, our null hypothesis is rejected for these variables with the exception of the variables: quality of financing, quality of infrastructure, age and number of children and parents' opinions. This supports results of non-parametric approach. Taking into account importance attributed to each factor as a determinant by each individual requires that importance of negative responses be recoded. Indeed, for this consideration, calculations of average weights no longer concern all choices in decision tree (Figure 2) but only last part. In doing so, if importance given to negative responses in first part is not recoded to zero, there will be a bias.

Conclusion

Objective of this paper was to verify existence or not of a female factor in determinants of entrepreneurship in general, in Côte d'Ivoire in particular. This female factor, according to Bernard et al (2004), cannot be reduced to differences arising from differences in social, economic and geographical conditions of entrepreneurs. In sum, the aim was to analyse an unobservable causal link.

To do this, we conducted a quasi-experimental analysis using non-parametric and parametric approaches to survey data on a sample of 161 entrepreneurs in Côte d'Ivoire, 113 of whom were women and 48 men.

Our analysis shows that determinants of male and female entrepreneurship in Côte d'Ivoire are not fundamentally different if rationality matters. Also, if women are victims of sexist or anti-gender behaviour, this does not stem from a difference in female rationality but from acts that counteract implementation of rationality in women.

Thus, an effective and sustainable policy to combat gender discrimination will have to intervene upstream of economic activities, in particular in education, in terms of equality of rights in principle and in practice.

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Appendix

Table 1: Ranking of factors according to average importance in the decision to start a business

Variables	Weight	Rank
Self-financing capacity	0,064715	1
State of the market in the planned sector of activity	0,054688	2
Parents' opinions	0,043285	3
State of the labour market	0,042859	4
Opinions of friends and/or colleagues	0,041047	5
Knowledge and experience	0,025599	6
Quality of the financial sector	0,024265	7
Quality of Infrastructure	0,023768	8
Economic growth	0,023024	9
Quality of support institutions	0,017113	10
Marital status	0,014425	11
Religion	0,011905	12
Company networks	0,011669	13
Age and/or number of children	0,009349	14
Uses and customs	0,002273	15

Sources: our calculations

Table 2:Ranking of factors by gender of entrepreneurs and by average importance in the decision to start a business

Woman			Male		
Variables	Weight	Rank	Variables	Weight	Rank
Self-financing capacity	0,0628788	1	Self-financing capacity	0,0665509	1
State of the market of the sector of activity	0,0520833	2	State of the market in the planned sector of activity	0,0572917	2
Parents' opinions	0,0477978	3	Opinions of friends and/or colleagues	0,0434028	3
State of the labour market	0,0423157	4	State of the labour market	0,0434028	4
Knowledge/experience	0,0391865	5	Parents' opinions	0,0387731	5
Opinions of friends and/or colleagues	0,0386905	6	Quality of Infrastructure	0,0289352	6
Quality of the financial sector	0,0248888	7	Quality of the financial sector	0,0236407	7
Economic growth	0,0240575	8	Economic growth	0,0219907	8
Quality of Infrastructure	0,0186012	9	Quality of supervisory institutions	0,0156250	9
Quality of support institutions	0,0186012	10	Company networks	0,0127315	10
Marital status	0,0172222	11	Knowledge and experience	0,0120120	11
Age and/or number of children	0,0146465	12	Marital status	0,0116279	12
Religion	0,0133929	13	Religion	0,0104167	13
Company networks	0,0106061	14	Age and/or number of children	0,0040509	14
Uses and customs	0,0022321	15	Uses and customs	0,0023148	15

Sources: our calculations

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Table 3: Differences in the average importance of factors in the decision to start a business between female and male entrepreneurs

Variables	Woman	Male	Gap (Female-Male)
Age and/or number of children	0,01464646	0,00405093	0,010595539
Opinions of friends and/or colleagues	0,03869048	0,04340278	-0,004712302
Parents' opinions	0,0477978	0,03877315	0,009024650
Self-financing capacity	0,06287879	0,06655093	-0,003672138
Knowledge and experience	0,03918651	0,01201201	0,027174496
Economic growth	0,02405754	0,02199074	0,002066799
State of the market in the planned sector of activity	0,05208333	0,05729167	-0,005208333
State of the labour market	0,04231568	0,04340278	-0,001087098
Quality of Infrastructure	0,01860119	0,02893519	-0,010333995
Quality of supervisory institutions	0,01860119	0,01562500	0,002976190
Quality of the financial sector	0,02488881	0,02364066	0,001248151
Religion	0,01339286	0,01041667	0,002976190
Company networks	0,01060606	0,01273148	-0,002125421
Marital status	0,01722222	0,01162791	0,005594315
Uses and customs	0,00223214	0,00231481	-0,000082672

Sources: our calculations

Annex 2: Results of non-parametric approach

Table 4 :Rank tests

N°	Null hypothesis	Test	Sig.	Decision
1	The median of the differences between women and men is 0	Test for signs with associated samples	1,000	Retain the null hypothesis
2	The median of the differences between women and men is 0	Associated sample signed rank test	0,495	Retain the null hypothesis
3	The distributions of Female and Male are identical	Kendall's coefficient of agreement with associated samples	0,795	Retain the null hypothesis

The significance level is 0.05 (5%)

Annex 3: Results parametric approach

***Table 5* :Regression on determinants only**

```
Multinomial logistic regression                 Number of obs   =        156
                                                LR chi2(17)     =      34.29
                                                Prob > chi2     =     0.0077
Log likelihood = -79.142642                     Pseudo R2       =     0.1781
```

gender	*Coef.*	*Std. Err.*	*z*	*P>z*	*[95% Conf.Interval]*	
1	(base outcome)					
2						
area	-.0836941	.0797261	-1.05	0.294	-.2399545	.0725663
act	.125828	.0683001	1.84	0.065	-.0080378	.2596938
growth	.1910537	.4976518	0.38	0.701	-.7843259	1.166433
emartra	.4847989	.4838016	1.00	0.316	-.4634348	1.433033
emchsec	-.6293029	.5604798	-1.12	0.262	-1.727823	.4692174
qltefinan	1.259261	.5588875	2.25	0.024	.1638616	2.35466
qlteinfra	-1.293739	.5143934	-2.52	0.012	-2.301931	-.2855461
capfipr	.1999055	.8226541	0.24	0.808	-1.412467	1.812278
qlteinc	.3313738	.5898824	0.56	0.574	-.8247744	1.487522
rseent	-.823156	.6953798	-1.18	0.237	-2.186075	.5397633
matrimo	-.5765342	.5628602	-1.02	0.306	-1.67972	.5266515
agnbenf	**2.366175**	**.7804107**	**3.03**	**0.002***	**.8365983**	**3.895752**
avfp	1.183794	.5161514	2.29	0.022	.1721558	2.195432
avacol	**-1.38743**	**.5339714**	**-2.60**	**0.009***	**-2.433995**	**-.3408654**
conssexp	-.2077526	.4524263	-0.46	0.646	-1.094492	.6789868
rgl	.4164676	.6335102	0.66	0.511	-.8251896	1.658125
uscout	-.5480373	.9677453	-0.57	0.571	-2.444783	1.348709
_Cons	-3.52897	2.28954	-1.54	0.123	-8.016385	.9584448

* Significant at the 0.77% level (the null hypothesis that the determinants of male entrepreneurship are different from the determinants of female entrepreneurship is accepted).

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Table 6:Regression on the combination of factors and their importance

```
Multinomial logistic regression                 Number of obs   =        156
                                                LR chi2(16)     =      19.44
                                                Prob > chi2     =     0.2466
Log likelihood = -86.570992                     Pseudo R2       =     0.1009
```

Gender	*Coef.*	*Std. Err.*	*z*	*P>z*	*[95% Conf.Interval]*	
1	(base outcome)					
2						
area	-.0445992	.0732839	-0.61	0.543	-.188233	.0990347
act	.0617901	.0636446	0.97	0.332	-.0629511	.1865312
ncroiss	-.543126	.5975562	-0.91	0.363	-1.714315	.6280626
nemartra	-.0775798	.5657529	-0.14	0.891	-1.186435	1.031276
nemchsec	.2075823	.5300224	0.39	0.695	-.8312426	1.246407
nqltefinan	-1.477766	. 6785117	-2.18	0.029**	-2.807624	.1479073
nqlteinfra	.9781689	.5580483	1.75	0.080*	-.1155857	2.071924
ncapfipr	.1473356	.6650925	0.22	0.825	-1.156222	1.450893
nqlteintenc	-.4566473	.7069831	-0.65	0.518	-1.842309	.9290141
nrseent	.6709955	.862952	0.78	0.437	-1.020359	2.36235
nmatrimo	-.1005112	.6552003	-0.15	0.878	-1.38468	1.183658
nagnbenf	-2.613114	1.128301	-2.32	0.021**	-4.824544	-.4016839
navfp	-.9797672	.5600988	-1.75	0.080*	-2.077541	.1180063
navacol	.7772797	.5780657	1.34	0.179	-.3557084	1.910268
nconssexp	.1905239	.4907176	0.39	0.698	-.7712648	1.152313
nrgl	-.2167673	.6825742	-0.32	0.751	-1.554588	1.121054
nuscout	-.152854	1.11271	-0.14	0.891	-2.333726	2.028018
_Cons	-1.121956	1.045935	-1.07	0.283	-3.17195	.9280387

* Significant at the 24.66% threshold (the null hypothesis that the determinants of male entrepreneurship are different from the determinants of female entrepreneurship is accepted).