



## Contribution to the Analysis of the Explanatory Factors of the Financing Decision of the Small and Medium Enterprises (PME) Senegalese by the BIMAO (Bank of the Mutualist Institutions of West Africa).

Dr Cheikh Mbacke DIOP<sup>1</sup> Pr Mouhamed el Bachir WADE<sup>2</sup>

<sup>1</sup>professor researcher at the University Alioune DIOP of Bambey member of the FOCS laboratory (UCAD) and ERIM (UAD).

<sup>2</sup> Professor in Management Science at the University Cheikh Anta DIOP of Dakar (UCAD), director of FOCS.

### Abstract:

This paper deals with the problem of financing SMEs. The latter often find it difficult to raise funds and finance their activities. A modest contribution is to analyze the success factors of SME credit applications. An operation of 116 loan application files at the BIMAO level makes it possible to detect variables that can influence the financing decision. An econometric treatment based on a logistic regression leads to a model able to make predictions. Thus, we find that financial guarantees short-term financing requests and service activities facilitate a favorable financing decision. These variables have a positive and significant influence on the financing decision.

**Key Words:** Financing; SME; BIMAO; Guarantees Duration Sector of Activities.

### 1. Introduction

The importance of SMEs in terms of job creation and economic development is recognized in both industrialized and developing countries. In Senegal as in other African countries SMEs form the bulk of the economic fabric by their diversity and their presence throughout the country. They constitute a fundamental element of economic and social development strategy (Wamba 2001) and are considered the main source of employment in certain regions (Tadesse, 2009). In fact, SMEs contribute 25.8% and 25.4% respectively to turnover and added value in Senegal (SME Directorate, 2014). These contributions are insufficient in view of their number (around 90% of companies) which should stimulate a good economic momentum if measures and support are undertaken. The importance that SMEs should have in the economy has favored the creation of structures (ADEPME, the management of SMEs the office of upgrade etc.) the adoption of the SME charter in 2003 followed by its transfer to law in 2008 the sectoral policy letter in 2010 the creation of financing instrument such as FONSI (Sovereign Investment Fund), FONGIP (Guarantee Fund and priority investment), BNDE (National Bank of Economic Development) etc. Despite, their role in contributing to the economic dynamism of countries access to external financing is an important challenge for small and medium-sized enterprises (OECD, 2007; Collier, 2009; Van Pham, et al... 2009). Financial institutions are cited as the main sources of external funding laboratory for SMEs (St-Pierre, 2004). However, the financial sector experienced a severe crisis in the 1980s and has undergone extensive restructuring and liquidation of several banks and majority-owned financial institutions leaving a large gap in the supply of finance for SMEs. The financial sector has been liberalized and major innovations have enabled the creation of microfinance institutions and new banks to contain the demand for SME financing. With the evolution of the financial sector in recent years new financial intermediaries (decentralized financial systems or banks of microfinance institutions such as BIMAO) are trying to take over the needs of companies and are increasingly interested

in SMEs. However, they still struggle to raise funds from these funding structures (Chebil and Tadjine, 2010; Psillaki, 1995)

The difficulties that SMEs may have in accessing bank financing could be linked to a lack or insufficiency of information presented to financial institutions (Janssen and Wtterwulge, 1998). This information deficit often results in a demand for financial guarantees that SMEs can not meet or a rationing of credit (rejection or limitation of amounts requested). SMEs are considered risky by financial institutions due to lack of information on entrepreneurs' repayment capacity and weak guarantees (Kuffmann, 2005). Also the growth attractiveness and performance of the business sector could explain the success of SME financing requests.

Wanting to understand the reasons for the rejection or the acceptance of SME financing requests we are interested in the following question: what factors can improve the success or limit the obtaining of SME financing from BIMA?

This work is not meant to be exhaustive in the analysis of credit success factors not exhaustive in the analysis of the success factors of the credit granted but seeks a modest contribution of certain variables in the financing decision of SMEs. Thus, an analysis of 116 SME credit files at the BIMA level makes it possible to list the following analysis variables: the amount of the credit demand the sector of activity the financial guarantees and the duration of the loan; and to improve the understanding of financing decisions for the needs of SMEs. To better understand the issue we present a review of the literature on the explanatory variables of financing the specificities of Senegalese SMEs the methodology based essentially on a logistic regression and the analysis of the results.

## **2. Review of the Literature on the Success Factors of the Credit Application**

Theoretical analysis of this problematic consists in working on the objective factors that contribute to the decision making of SME financing by the BIMA. These factors will enable SME leaders to properly prepare and edit their credit application files. The analysis of the success factors of financing SMEs depends on the nature of bank or funding institution. One often oppose the "bank commitment" giving a preponderant value to the personality of the individual (human qualities motivations of the customer to "the bank act" which bases es its decisions on objective variables like the plan of financing, contributions or guarantees ... (Chebil and Tadjine, 2010).

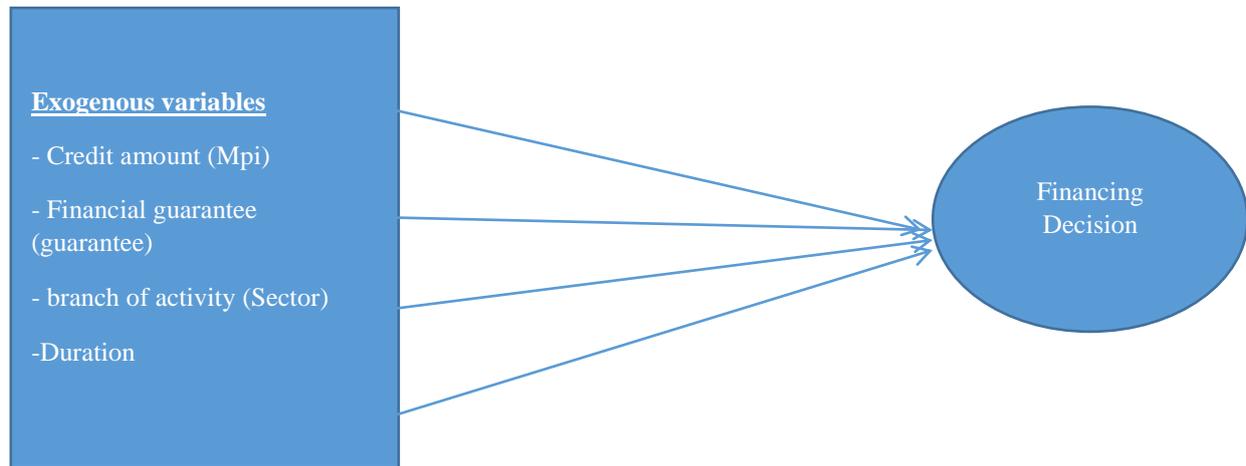
These banks refer to two types of "soft" and "hard" information respectively. The "soft" information is considered as a qualitative data which is reduced to the judgments and opinions of the person who collected it. It is usually collected and used by one person only. This person is supposed to be in direct contact with the SME. It collects this type of information throughout the period of the relationship established with the enterprise and it generally represents the credit officer responsible for monitoring the evolution of this relationship; therefore, this collection is done at the lowest hierarchical levels of the bank. Hard information is a quantitative data; it presents neither a judgment nor an opinion nor an interpretation of the agent who collects it. This person loses all decision-making power and discretion during his treatment: he becomes a simple reporter (Stein, 2002). In fact, this information is impersonal it opposes the other type of information and is based on relatively objective criteria such as ratios and profitability indices. This information must have a unique interpretation by all agents at all hierarchical levels of the bank. Referring to the objective factors and to the bank in action (Lefilleur, 2008) points out that a context marked by a strong asymmetry of information constitutes a barrier to access to finance by SMEs.

The asymmetry of information refers to the disparity between information available to credit-seeking firms and fund providers that are usually assumed to be informational disadvantages. The traditional channels of communication are often deficient because the entrepreneurs diffuse erroneous financial information in order to escape the taxation or the banks do not control the payment behaviors of the new customers (lack of history). (Lehman and Neuberger, 2002) state that asymmetry of information exists more at the level of SMEs in developing countries or that property rights poorly protected lead entrepreneurs to keep their information confidential. These situations expose banks to the risk of adverse selection or moral hazard. Banks anticipate risk coverage by requiring real guarantees from SMEs or working with guarantee funds (public or private) to cover outstanding payments. The existence of a material or financial guarantee plays a large role in the granting of credit (Berger and Udell 1995 Bester 1994 Ngongang 2015). However, in some areas such as Central Africa fund-based financing experiments failed because the provision of a guarantee was a vector for lower repayment rates and poor investment project choices (Kuffmann, 2005). The personal guarantees asked of the leaders constitute a rationing instrument frequently used especially for the structures that have just been created (Baroin and Fracheboud 1983). The market position of firms is also a key variable in financing decisions for financial institutions (Levratto, 1990). The sector of activity of the project is a determining factor in the survival of the projects (Zidani and Jarbouli 2011). Thus, industrial firms except those belonging to the meat and dairy products sector are more profitable than service firms particularly for business services and transport (Vassile, 1982). This profitability is decisive in obtaining credit. Indeed "The profitability of SME borrowers is also an important criterion for lenders the realization of a high turnover to minimize the risk of bankruptcy and thus increase the chances of repayment » (Levratto, 1990, p207).

Analyzing the financial structure of SMEs, there is a higher proportion of debt compared to other sources of financing and moreover a preponderance of financial debts in the short term (Levratto, 1990). This suggests that financial

structures prefer short-term credit which is naturally less risky over time. The success of much of the decentralized financial systems (DFS) is due to the short-term nature of the credits granted. These short maturities make it possible to detect payment difficulties very early and initiate recovery procedures (Zidani and Jarbouï 2011). Also DFIs are finding it increasingly difficult to grant long-term loans because they can not refinance with the central bank and have limited or no access to the financial market for the most part. They only recycle in the short term the savings collected mostly on sight. This review of certain explanatory variables makes it possible to propose a model which is not exhaustive but which reflects certain levers to be targeted in order to facilitate the obtaining of SME credit from financing structures such as BIMAO.

Figure 1: Conceptual Model



### 3. Specificities of Senegalese SMEs

National Law No. 2008-29 of 28 July 2008 defines SMEs as any physical or moral entity producing goods and / or market services whose distinctive criteria are based on: workforce annual turnover excluding taxes transparency in bookkeeping net investment. In these articles 3 and 4 small businesses are identified according to the following criteria and thresholds:

- effective between one (01) and twenty (20) employees;
- annual turnover excluding taxes not exceeding the limits provided to be taxable to the Single Global Contribution (GTC) set by the General Tax Code.

Enterprises (ME) are those that meet the following criteria and thresholds:

- employees between twenty-one (21) and two hundred and fifty (250) employees;
- annual turnover excluding taxes between the upper limit of the article 3 above and 5 billions CFA francs.

SMEs in Senegal are mostly informal and are made up of micro and very small businesses. They suffer from a lack of financial technical and integration support in multilateral trade due to a lack of competitiveness. Added to these obstacles are the beginnings of a free trade swapping customs (Economic Partnership Agreements) making SMEs vulnerable to the onslaught of better prepared and often subsidized European companies.

They are strongly characterized by a very modest size a concentration in Dakar and a small capitalization necessitating external financing whose access modalities pose a serious problem. Faced with these difficulties hindering the development of SMEs relevant levels of intervention are identified and we find among other things an unavoidable financing component which is the subject of a strategic axis of the 2010 sectoral policy letter. The summary review of the literature accompanied by a presentation of the profile of SMEs in Senegal made it possible to make a theoretical state of the place on the variables chosen in the analysis of the financing decision of Senegalese SMEs. This part is confronted with an empirical part requiring a specific methodology of treatment of information collected and an analysis of the results.

### 4. Methodology

The methodology adopted is based on the following points: the source the nature of the data collected the method of collection used and the method of treatment chosen. To obtain the information needed to deal with the problem it was important first to discuss the year 2017 with a credit officer of BIMAO. This allowed the exploitation of credit application files submitted to this structure. Careful long-term work led to a batch of 116 files filed by SMEs to find

funding resources. The analysis of these files one by one reveals recurring variables that have attracted the attention of the evaluators of credit application files. Thus, the amount of credit required the sector of activity the financial guarantees and the duration of the loan were targeted and retained in order to see their influence on the financing decision of the BIMAO. These variables are mobilized on 116 files in order to establish a database. This reasoning leading to this mass of information can be assimilated to a reasoned type of sampling. For a better treatment of the information of the base a coding is done on each variable.

**Table 1: Coding of Endogenous and Explanatory Variables Retained**

Variables	Nature variable	Codage
Acceptance of the financing	Qualitative	1 = yes ; If Not
Credit amount (Mpi)	Digital	Value Presented in Credit Files
Financial Gurantee	Digital	Value Presented in Credit Files
Branch of activities	Qualitative	First, 1 = btp et 0 If not Same thing for trade and service
Duration	Qualitative	1 = Cterm ; 0 If not

The treatments reserved for the collected data are of two natures: a logistic regression based on a logit / probit model and an estimate of the percentage of prediction and the marginal effects. The first estimate incorporating all the explanatory variables indicates the existence of a multicolinearite between the guarantee and the amount of credit demand. A correlation test gives a coefficient of about 0.70 (appendix 1) confirming the multicolinearite (even if it is not perfect). And therefore it is more rigorous to opt for two regression processes that separate the « guarantee »; and « demand credit amount »; variables separately.

## 5. Results and Discussion

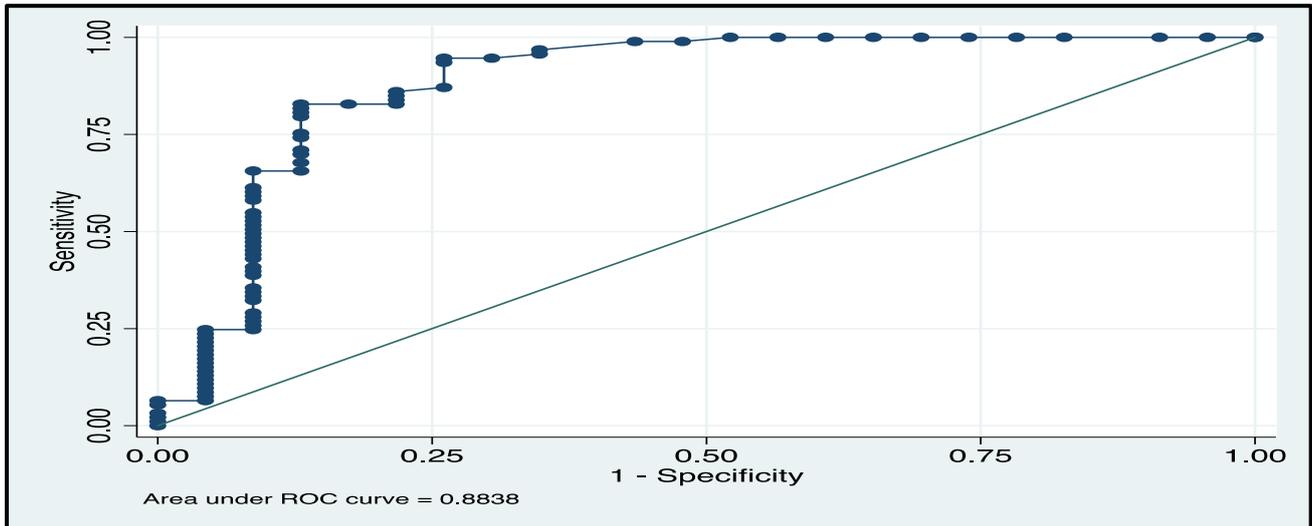
Following the detected multicolinearity the regression process including exogenous variables (log credit duration and active sector) leads to a globally insignificant model with (Prob>chi2) of 0.1107, >0.2020 and 0.1745 (Annex 2). Thus, these variables grouped in this model do not explain the credit financing decision for the benefit of SMEs. However the second regression process incorporating as exogenous variables (the log guarantee the duration and the sector of activity) leads to globally significant models (3) with respective R2 pseudonyms of 0.4285 0,441 and 0.4211 (Appendix 3). We can say that on average 42% of credit granting fluctuations are explained by the variables (guarantee credit duration and sectors of activity). For the first regression (Appendix 3) the p-value ( $P > |z|$ ) and the assigned coefficients underline that the guarantee (in logarithm) and the duration have a significant positive influence. Here we have short-term code in 1 the coefficient being positive; this means that short-term files are more likely to have a favorable opinion on the decision. Similarly credit files with a large financial guarantee amount are more likely to be accepted for funding. But the sector of activities « BTP »; has no influence on the financing decision because the « p-value »; is greater than 5%. With the second regression in appendix 3 (taking into account the second coding modality of the sector of activities) the results on the guarantee and the duration are confirmed but we note that the commercial activities influence negatively the decision of financing. The more trade-related the credit application files the greater the rejection propensity. The negative coefficient means that the trade sector has a downward influence on the likelihood of being awarded and those in the other sectors are more likely to receive funding. The third regression (Annex 3) to integrate service activities in place of « construction » ; and « Trade » ; also confirms the results on the guarantee on the duration and shows that the services positively influence the decision of financing. A credit application file for service activities has an upward impact on the likelihood of credit being granted.

In summary, 42 of SME financing decisions by the BIMAO are explained by the guarantee the short duration of the object of financing and the activities of services. The larger the guarantees the shorter the credit period and the more service-oriented the records have a high likelihood of acceptance. In addition, the analysis of the coefficients of each of these variables shows that the short duration of the projects (coef: 3.15) influences the funding decision more than the other variables.

However, BTP activities have no significant influence and the beginning influences negatively. The reasons for the rejection of trade finance can be well explained by interviews with the BIMAO agents and this requires a different but complementary data collection approach to that used in this work.

The coefficient of determination (Pseudo R2) does not reach 50% and it confirms the objective of contributing to the explanatory factors of the financing decision announced in the introduction. It is so important to point out that the weakness of (Pseudo R2) is a characteristic of micro-economic data. However, to convince on the robustness of the model with the variables of positive and significant influence (guarantee short duration and service) we estimate the percentage of prediction and the marginal effects. Appendix 4 allows us to say that the scoring model incorporating the variables (guarantee short duration and service activities) is robust because it has a prediction capacity of 90.52%. And therefore out of 98 accepted files the model manages to predict 90 and out of 18 rejected files the model has predicted 15. The ROC curve confirms the robustness of the model and the propensity of prediction.

Figure 2: Curve of ROC



The rock curve gives a value close to 1 indicating an acceptable discriminating value. Therefore, we can say that the model can be used as a basis for a scoring. Taking into account the marginal effects makes it possible to see in what proportion will be the probability of acceptance of the files if the amount of the guarantees varies. Annex 5 gives the sensitivity (eg elasticity) of the financing decision in relation to exogenous variables. For example we see here that an increase in the guarantee of 1% results in an increase in the probability of granting the credit of 18%; all things being equal.

## 6. Conclusion

The analysis of the context shows a contribution of SMEs to the creation of turnover and the added value up to 25% on average. SMEs are also dynamic in creating jobs. The importance of SMEs in the economic fabric led to the creation of ADEPME the SME Directorate the Office of Upgrade the adoption of the SME Charter and the sectoral policy letter. Added to this, the creation of financing instruments such as FONSI (Sovereign Investment Fund) FONGIP (Guarantee Fund and Priority Investment Fund) BNDE (National Bank for Economic Development) to meet the needs of financing of project promoters and SMEs. This financing component constitutes a real constraint for the development of SMEs. Certain elements required by the bank or certain characteristics related to the activity of the SME constitute blockages for the financing. Faced with this problematic an analysis of 116 SME loan application files made it possible to make a modest contribution of certain variables to the financing decision.

A logistic regression on the variables of the credit files makes it possible to note those which influence significantly and positively the decision of financing. Thus, we arrive at a robust model capable of making good predictions from the « guarantee »; « short-term »; variables of the projects to be financed and; « service activities ». The credit applications that are more likely to be accepted are those with a high financial guarantee a short duration and active services. The duration variable influences more than the other variables because it is affected by a higher coefficient. However, the results show that the activities of « BTP »; do not have significant influence. Thus, a funding file referring to such activities can be funded or rejected. Trade activities have a negative influence on the financing decision. The more a credit file relates to such an activity the less likely it is to be accepted.

In terms of involvement SMEs must foresee short-term less risky projects and have a financial resource as a guarantee to limit the credit rationing they suffer. Service SMEs can take advantage of their situation and the sector in which they operate to raise funds and finance their activities. In the absence of meeting these requirements they must be supported if there is a state policy to make them viable and sustainable. Bank-backed guarantee funds or instruments such as FONSI FONGIP or BNDE could be very useful in supporting the raising of funds and the improvement of assets in terms of revenue generation value-added and employees. This work presents a limit on the limit number of exogenous variables

and the consideration of other variables (gender managerial experience age of the SME) could be very useful and reinforce the quality of the model.

**Annexes**

**Annexe 1 :**

. pwcorr lmpi lguarantee

lmpi lgaran~e

-----+-----

lmpi | 1.0000

lguarantee | 0.6885 1.0000

**Annexe 2:**

**Regression 1:**

Logistic regression

Number of obs = 116

Wald chi2 (3) = 6.02

Prob > chi2 = 0.1107

Log pseudolikelihood = -54.618556

Pseudo R2 = 0.0545

-----

| Robust

Acceptance | Coef. Std. Err. Z P>|z| [95% Conf. Interval]

-----+-----

lmpi | -.525045 .3221528 -1.63 0.103 -1.156453 .1063629

cterm | -.0306709 .6677275 -0.05 0.963 -1.339393 1.278051

btp | .5776089 .8000563 0.72 0.470 -.9904727 2.14569

\_cons | 10.58401 6.049292 1.75 0.080 -1.272385 22.44041

-----

we see that the model is not globally significant (Prob > chi2=0.1107)

**Regression 2:**

Logistic regression

Number of obs = 116

Wald chi2 (3) = 4.62

Prob > chi2 = 0.2020

Log pseudolikelihood = -54.861716

Pseudo R2 = 0.0503

-----

| Robust

Acceptance | Coef. Std. Err. z P>|z| [95% Conf. Interval]

-----+-----

lmpi | -.5260739 .3233159 -1.63 0.104 -1.159762 .1076137

cterm | -.0012554 .664542 -0.00 0.998 -1.303734 1.301223

Trade | -.1418801 .5005545 -0.28 0.777 -1.122949 .8391887

\_cons | 10.73898 6.036791 1.78 0.075 -1.092911 22.57087

-----





Positive predictive value	Pr( D  +)	91.84%
Negative predictive value	Pr(~D  -)	83.33%
-----		
False + rate for true ~D	Pr( + ~D)	34.78%
False - rate for true D	Pr( - D)	3.23%
False + rate for classified +	Pr(~D  +)	8.16%
False - rate for classified -	Pr(D  -)	16.67%
-----		
Correctly classified		90.52%

**Annexe 5 : Effets marginaux**

Marginal effects after logit

$$y = \text{Pr}(\text{acceptation}) (\text{predict})$$

$$= .90665846$$

Variable	dy/dx	Std. Err.	z	P> z	[	95% C.I.	]	X
-----+-----								
lgaran~e	.1850959	.04279	4.33	0.000	.101225	.268967		16.7815
cterm*	.4787294	.16326	2.93	0.003	.158746	.798712		.75
Services*	.0807299	.03681	2.19	0.028	.008578	.152881		.146552

(\*) dy/dx is for discrete change of dummy variable from 0 to 1

**Bibliographie**

- [1] Baroin, D. et Fracheboud, P. (1983). Les P.M.E en Europe et leur contribution à l'emploi. Notes et Etudes Documentaires, n° 4715-4716, Paris, La Documentation Française.
- [2] Berger, A N. et Udell, G F. (1995). Relationship lending and lines of credit in small firm Finance. The Journal of Business, vol. 68, Issue 3, July, pp. 352-381.
- [3] Bester, H. (1994). The Role of Collateral in a Model of Debt Renegotiation. Journal of Money, Credit and Banking, n° 26, pp. 72-86.
- [4] Chebil, A. et Levy-Tadjine, T. (2010). Décision d'octroi de crédit bancaire aux PME et diversité des critères d'évaluation par le banquier. <https://hal.archives-ouvertes.fr/hal-00847575>
- [5] Collier, P. (2009). Repenser le financement des petites entreprises en Afrique. Revue de Proparco, Volume 1, N°1.
- [6] Janssen, F. et Wtterwulgh, R. (1998). L'influence de l'interpénétration du dirigeant et de son entreprise sur l'endettement bancaire des PME: État de la question.  
[www.researchgate.net/profile/Frank\\_Janssen/publication/267854963](http://www.researchgate.net/profile/Frank_Janssen/publication/267854963)
- [7] Kuffmann, C. (2005). Le financement des PME en Afrique ; Repères n°7 Revue du centre de développement de l'OCDE [www.oecd.org/dev/pea](http://www.oecd.org/dev/pea)
- [8] Lehman, B. et Neuberger, D. (2002). Do lending relationships matter? Evidence from bank survey data in Germany. Journal of Economic Behavior and Organisation, vol. 45, pp. 339-359.
- [9] Lefilleur, J. (2008). Comment améliorer l'accès au financement pour les PME d'Afrique subsaharienne ?. Afrique contemporaine 2008/3 (n° 227), p. 153-174.
- [10] Levratto, N. (1990). Le financement des PME par les banques : contraintes des firmes et limites. Revue internationale P.M.E. 32 (1990): 193-213.

- [11] Ngongang, D. (2015). Asymetrie d'information et rationnement du credit bancaire dans les pme camerounaises. *Journal of Academic Finance (J.A.F.)* N° 5, ISSN 1923-2993
- [12] Psillaki, M. (1995). Rationnement du crédit et PME: une tentative de mise en relation. *Revue internationale P.M.E.* 83-4 (1995): 67–90. DOI: 10.7202/1008359ar
- [13] Stein, J.C. (2002). Information production and capital allocation: Decentralized vs. Hierarchical firms. *Journal of Finance*, vol. 57, n° 5, octobre, pp. 1891-1921.
- [14] St-Pierre, J. (2004). *La gestion du risque: comment améliorer le financement des PME et faciliter leur développement.* ISBN 978-2-7605-1304-4 Presses de l'Université du Québec. Québec, Canada
- [15] Stiglitz, J. (1985). Information and economic analysis: a perspective. *Economic Journal, Conference Papers, Supplément*, vol. 95, p. 137-152.
- [16] Tadesse, A. (2009). Quelles perspectives de financement pour les PME en Afrique. *La Revue Proparco*, 1, 17-19.
- [17] Van Pham, et al. (2009). Les déterminants de l'accès au financement bancaire des PME dans un pays en transition: le cas du Vietnam. Colloque international sur la vulnérabilité des TPE et des PME dans un environnement mondialisé, 11es Journées scientifiques du Réseau Entrepreneuriat, 27, 28 et 29 mai 2009, INRPME, Trois-Rivières, Canada, [http://www.entrepreneuriat.auf.org/IMG/pdf/A14C45\\_FINAL.pdf](http://www.entrepreneuriat.auf.org/IMG/pdf/A14C45_FINAL.pdf).
- [18] Vassile, L. (1982). Les P.M.E. : fragilité financière, forte rentabilité. *Economie et Statistique*, octobre, n°148, p.21-37.
- [19] Wamba, H. (2001). L'impact de l'asymétrie d'information dans l'optimisation de la valeur de l'entreprise : exemple de la PME Cam, *SC SE*, Montreal, 15P.
- [20] Zidani, H et JARBOUI, A. (2011). L'impact des facteurs socio-économiques sur le financement des microprojets par la Banque Tunisienne de Solidarité : cas de la Tunisie. *Revue Libanaise de Gestion et d'Economie* No 6.

### **Rapports :**

- [1] Direction des PME. (2014). Rapport provisoire de l'enquête nationale sur les petites et moyennes entreprises. <http://anads.ansd.sn/index.php/catalog/64>.
- [2] OCDE (2007). *Rapport annuel 2007.* Les éditions de l'OCDE. Paris, France.
- [3] Rapport du groupe d'experts, Bruxelles. (2006). L'accès au financement pour les PME dans la région d'Afrique du Nord et du Moyen Orient. Ares (2014)2778022 - 25/08/2014.