EE
E u r o E c o n o m i c a
Issue 2(33)/2014 *ISSN: 1582-8859*

Bankruptcy, financial liberalization, and efficiency of commercial banks in Cameroon

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Abstract. The effects of financial liberalization policy on banking efficiency are backed up neither by theoretical studies nor by empirical studies. The main objective of this study is to analyze the evolution of productivity of Cameroonian commercial banks, following the implementation of the recent financial liberalization measures. For this purpose, we use the DEA (Data Envelopment Analysis) method to measure the evolution of efficiency, and The Malmquist Index to measure and decompose the total factor productivity. The results show that the effects of financial liberalization are mixed because many transmission channels were either insensitive; or they evolved in an unexpected direction due to a decline in loans to the economy. We recommend that institutional measures be taken, so as to improve the business environment and enable banks to overcome difficulties in having reliable accounting and financial information on loan applicants.

Keywords: bankruptcy, financial liberalization, efficiency, Malmquist Index, commercial banks

1 Introduction

Financial intermediation in Cameroon is carried out almost entirely by commercial banks. That is, if they are effective, they will stimulate economic growth through three channels. The first is technological innovation. A banking system that functions normally identifies and funds entrepreneurs who have the best opportunities of success in their innovative activities (Schumpeter, 1912; Brou, 2010). The second is financial innovation that reduces the cost of financial intermediation and thereby stimulates savings (Kane, 1988; Sobreira, 2004). The third channel is the efficiency of factors of production as well as the reducing of individual risks related to investment projects; through diversification and risk sharing (Levine, 1997; Brou, 2010).

But these transmission channels and the financial development itself are strongly influenced by the financial system that can be centered on banks or markets (Diatkine, 2002), bank concentration that reduces competition in the sector and can lead to a misallocation of resources (Guillaumont and Kpodar, 2006), and the legal and economic institutions of the country (La Porta et al, 1996. Levine et al, 2000.). Talking about legal institutions, the financial regulation adopted by Cameroon since its independence was intended primarily to promote the so-called drivers of the economy sectors, through preferential interest rates.

But this policy did not produce the desired effect, and led to a banking crisis in the late 1980s and early 1990s. Measures taken to deal with this situation were geared towards the liberalization of the banking sector. These measures involved the following actions: the withdrawal of the quantitative loan

controls by the State, privatization of public banks; and the selling-off of those that were in bankruptcy, the introduction of market mechanisms in the management of the credit policy, the liberalization of the interest rate, and the creation of an oversight body which is the Banking Commission of Central Africa (COBAC).

But at the theoretical level, researchers are not unanimous on the effects of financial liberalization on the efficiency of banks. According to the neo-structuralists (Taylor, 1983; Van, 1983; Venet, 1994), financial liberalization slows banking productivity because of the risk of inflation and a reduction in the total supply of real bank loan. On the contrast, according to the optimistic approach initiated by McKinnon (1973) and Shaw (1973), financial liberalization has positive effects on the productivity of banks; namely through the setting of conditions for nominal interest rates, the increase in bank deposits, and investment. These theoretical differences have been confirmed in several empirical studies (World Bank, 1989 and Guillaumont-Jeanneney, 1998).

The objective of this study is to clarify the effects that the financial liberalization measures likely had on the efficiency of commercial banks in Cameroon. The theoretical framework is based on the arguments of liberals, which were advanced to justify financial liberalization within the country. The measurement of efficiency aims at determining the extent to which banks provide an optimal combination of financial services from a given set of inputs.

In other words, the ability of banks to effectively produce the necessary services to the financing of economic agents is questionable. For this reason, the DEA (Data Envelopment Analysis) method and the Malmquist Index are used to measure bank efficiency and productivity in banking, and to decompose technological progress and technological efficiency, respectively. They have the advantage of being non-parametric. That is, they do not require an algebraically functional form of productivity.

The work is structured as follows: Section 1 deals with the literature review. Section 2 describes the bank failure in Cameroon and the liberalization measures adopted. Section 3 presents the methodology used for obtaining the estimates and the results. Section 4 deals with the conclusion.

2 Literature review

The purpose of the literature review is to explain the theoretical and empirical differences between financial liberalization and bank efficiency on the one hand; and on the other hand, it discusses the efficiency measures adopted.

2.1 Interactions between financial liberalization and bank efficiency

Financial liberalization has been heavily criticized by neo-structuralists such as Taylor (1983), Van (1983) and Venet (1994); who fear inflation risks, the accentuation of dualism in the economy (formal and informal), and a reduction in the total supply of real bank loans. These researchers are supported by international organizations such as the Bank for International Settlements and the United Nations Commission for Africa. They explain that with financial liberalization: (i) the control of interest rates escapes monetary authorities; (ii) the opening of capital markets outside the country exposes the economy to extraversion; (iii) the increase in the intensity of bank savings exposes banks to the decline of their profit margins, due to the high level of payable interest rates; (iv) high deposit interest

rates reduce investment and create inflation, which enhances speculative activities at the expense of productive investment.

In keeping with this logic, Stiglitz and Weiss (1981) show a relationship between asymmetry of information and financial liberalization. In fact, with the increase in deposit rates, banks will rather attract bad borrowers; while their low value is the guarantee of a better quality of loan applicants. From the preceding, it appears that it is the financial repression that increases the efficiency of banks. In deepening research based on this approach, Gonzalez-Hermosillo (1999) argues that banks that take advantage of liberalization to take excessive risks, experience a high rate of bad loans, deterioration in the quality of their commitments, and insufficiency of their capital. Therefore, financial liberalization is more likely to lead to banking crises in the African context (Arestis and Basu, 2003).

Combining DEA with Malmquist's Index, several studies show degradation of banks productivity consecutive to financial liberalization measures; due to excessive increase in real interest rates. These include Wheelock and Wilson (1999) on American banks, Worthington (1999) on a sample of Australian banks, Grifell-Tatje and Lovell (1996) on the Spanish banks, and Ranbart Kaminski (1996), World Bank (1989) and Guillaumont-Jeanneney (1998) in Argentina, Chile, Uruguay, Philippines, and Turkey.

However, according to the Liberals MacKinnon (1973) and Shaw (1973), financial liberalization eases the conditions of formation of nominal interest rates; so that banks offer investors a fair return on deposits, and charge more precisely loans made and the services they offer to their customers. The consequence is an increase in deposit rates: which causes an increase in funds available for investment. This results simultaneously into a decrease in inflation and an increase in savings (Kapur, 1976). In the same logic and according Venet (1994), the increase in credit interest rates consecutive to the liberalization of the financial sector encourages deposits agents, and thereby increases the capacity of the banking sector: and ultimately stimulates investment. Banking intermediation brings about greater efficiency.

Another approach which is used to explain the positive effects of financial liberalization is that of Fry (1997). Fry explains that financial repression keeps the real interest rates (nominal rate minus inflation) at a low level. Three types of consequences are identified: (i) agents with financing capacity prefer to hold real assets rather than to purchase financial assets; (ii) banks are inclined to credit rationing that is, to select the least risky credits; (iii) the behavior of banks induces a bias in favor of the current consumption: which affects savings negatively. According to the author, these three consequences result into: a less productive and under-developed banking system; characterized by the scarcity of savings, low investment, and low capital productivity.

Empirically, the positive effects of financial liberalization on bank efficiency have been proven in two empirical approaches. The first approach is indirect because in this case, the efficiency is assessed through proxies' variables. This approach includes works by: Fry (1981) on a sample of twelve Asian countries, the World Bank (1989) on a sample of 34 developing countries, and King and Levine (1993) on a sample of 80 countries. Overall, the results indicate a positive relationship between financial liberalization and the real interest rate, bankable projects, investments, and services offered by banks. The second approach is direct, and studies in this case measure the efficiency itself. These studies have always been made following a reform of the banking system. The methodology generally combines the DEA and Malmquist's Index. Three cases in point are: works by Chaffai and Dietsch (1997) on Tunisian banks between 1986 and 1988, works by Leightner and Lovell (1998) on Thai banks, works by Kablan (2009) in the countries of the Economic and Monetary Union of West Africa (WAEMU/UEMOA).

Taking into cognizance the fact that the liberalization of the financial sector in Cameroon aroused hopes to rehabilitate the said sector, we draw the liberal theoretical framework for understanding the effects it likely had on the efficiency of commercial banks. This framework identifies the changes in interest income and expense rates, amount of deposits, amounts and quality of loans, and bank concentration, as the main transmission channels of financial liberalization on the efficiency of commercial banks.

2.2 Discussion of the DEA method as efficiency measurement

The idea of measuring the efficiency of a production unit goes back to the work of Farrell (1957). According to this author, efficiency means minimizing as much as possible the inputs that allow the production level of the output (output-oriented measurement); or to maximize as much as possible the output for a given level of inputs (input oriented measurement). Today, this idea is extended to any organization; whether commercial or not, since the output can be defined as any objective that a business wants to attain including profit, revenue, or any other results. The input is then understood as a coercion of quantity or price. Whatever the case, the more effective the company is, the more it approaches its efficiency boundary: which is the set of points which optimally combine the inputs to achieve an output unit. The literature offers two approaches to build this boundary, so as to measure efficiency namely, the parametric approach and the non-parametric approach.

The parametric approach often consists of specifying the boundary following a translogarithmic function. This is particularly the case of English et al. (1993) on the U.S. banking system of the 1990s, Allen and Rai (1996) who compared the efficiencies of banks installed in countries with different regulatory environments, and Dietsch and Lozano-Vivas (2000) who have the same goals as Allen and Rai (1996). But the latter include environmental variables in their measurement of efficiency. Whatever type of function, the formulation of the boundary can be deterministic. In this case, all deviations from the boundary are attributed to inefficiency. It can also be stochastic; as it is possible to distinguish between random errors and inefficiency. In the latter case, the stochastic cost boundary is written as follows, according Kablan (2009):

$$\ln C = f(w, y) + v_c - u_c \quad (1)$$

where C is the total cost, and f the functional form chosen for the cost function. Here, w is the vector of input prices, y the vector of outputs, vc the vector of noises independently distributed according to the normal law $N(0, \sigma_v^2)$; and u_c the inefficiency defined positively: with an asymmetric distribution which is independent from v_c. Despite its interest, the results obtained in the parametric approach vary with the estimation of the boundary function selected. This shortcoming is more pronounced in the case where the researcher is working on a sample with a plurality of individuals; for they are not supposed to have the same functional form of the boundary.

The nonparametric approach or mathematical approach; known as DEA method, assesses the boundary through linear mathematical programming; without the need for a functional form. The implementation of DEA however relies on one or the other of two models. The model with constant profit scale developed by Charnes et al. (1978) and Lovell (1994) is based on the assumption that all banks operate in an environment of perfect competition. On the other hand, the model of variable profit scale developed by Banker et al. (1984) is based on the most relevant assumption that banks operate in an environment of imperfect competition. We follow this approach in this research.

3 Bankruptcy and liberalization in Cameroon

3.1 The banking crisis of the 1980s and 1990s and the content of liberalization

The banking crisis of the late 1980s and early 1990s, in Cameroon, was directly attributable to the monetary policy adopted since independence; and strengthened by the regulations of 1973 reformation. In its monetary principles, this policy sought to promote the so-called vital areas through preferential interest rates, and resulted into a strengthening of the State supervision on banks through participation purchases in their registered capital. But the officers appointed by the government; and sometimes without proper qualification, granted loans under pressure from influential politicians, officials or members of their tribe (Sandretto and Tiani, 1993). It was observed that even public companies which were financially unbalanced received financial supports from banks. In a nutshell, the frequent interferences of the State in the management of banks had heavily skewed economic criteria for granting credit.

A project in a non-priority sector could be more profitable than another in an area called a "priority sector", and not find financing. Similarly, some unprofitable projects could find funding because of policies of preferential interest rates. Under these conditions, the market mechanisms which were supposed to play the role of regulator of the banking system could not operate, and the banking system could not contribute to economic growth (Kablan, 2009). It is in this context that the bank failure occurred.

This bankruptcy was linked to multiple causes including mismanagement, economic difficulties, and a low degree of financial increase (Mathis, 1992 Kane and Tara, 2001). According to the results of investigations conducted by the inspection teams COBAC, more than 90% of bank failures stemmed from internal deficiencies and mismanagement. The weakness in the internal control system was evidenced notably through a lack of reliable accounting in some institutions, an inefficient administrative organization, a low-skilled staff, lack of innovations in banking products, lack of alert tools such as the management control.

The bankruptcy manifested itself by a high stiffness of cash, an accumulation of deficit management balances, and significant credit losses (the Black, 1992; Sandretto and Tiani, 1993). According to Nembot and Ningaye (2011), the rate of bank profitability was almost negative or close to zero in Cameroon; as in all other states of the Economic and Monetary Community of Central Africa (CEMAC), between 1990 and 1996. Many banks could not resist in the face of this suffocating situation, and went bankrupt. These banks include the Cameroon Bank Corporation (SBC), the Bank of Credit and Commerce Cameroon (BCCC), the National Fund for Rural Development (FONADER), the Cameroon Development Bank (BCD), the bank Paribas -Cameroon (PARIBAS), and the Cameroon Bank (CB), in 1989 alone.

To cope with this situation, financial liberalization which was undertaken in Cameroon was based on five main components. The first component was the removal of credit controls, and it aimed at removing restrictions on building banks portfolios. The second was privatization or the closing public banks and the withdrawal of the State capital from the banking sector. These first two measures resulted into the closure of Crédit Agricole and the privatization of the Cameroon international Bank for Savings and Loans (BICEC). The third measure was the freedom granted to banks, to negotiate interest rates with their customers within the Maximum Debtor Rate (MDR) and the Minimum Creditor Rate (MCR) adopted by the BEAC. As to the interbank market rate, they are totally free and their values are hence forth determined by the law of supply and demand; without the intervention of

the BEAC. The fourth measure adopted by the State was free access to the national financial system: which gave rise to foreign ownership of national banks, on the one hand; and the other hand, to the establishment of foreign banks in the national financial system. The fifth measure was the creation of COBAC, followed by the Harmonization of the Banking Regulations in Central Africa, to control the banking business while giving them greater managerial autonomy and a safer legal environment. The implementation of all these measures was effective from 1993 with the start-up of COBAC. This financial liberalization conveyed the hope of spearheading a dynamic of competitiveness and efficiency, that would foster the achievement of the goals of development.

3.2 The current state of the Cameroonian banking system

In Cameroon, four types of financial structures may qualify for financial intermediaries: (i) the *tontine* belongs to the informal sector, and one hardly has reliable information about their inputs and outputs; (ii) the Douala Stock Exchange (DSX) is a recent stock market as it was created on November 1, 2001; (iii) microfinance institutions (MFIs) whose activities are expanding. According COBAC, there were 490 MFIs in 2009. This is a decline, when one considers the 652 MFIs recorded in 2000. But these 490 MFIs had 1052 branches; against 700 recorded in 2000. On the other hand, the number of members / clients is in great increase: 849,030 members / clients against 219,410 recorded in 2000. But the MFIs are sponsored by a conventional bank, and it does not seem appropriate to consider them as separate entities in the sample. The fourth type of financial structure that may qualify for financial intermediary in Cameroon is commercial banks. There are twelve of them: Afriland First Bank (First Bank), International Bank of Cameroon for Savings and Loans (BICEC), Citibank N.A. Cameroon (Citibank), Commercial Bank of Cameroon (CBC), Commercial Bank Corporation - Cameroon (CA-SBC), Ecobank Cameroon (Ecobank), National Financial Credit Bank (NFC Bank), Société Générale de Banques au Cameroon (SGBC), Standard Chartered Bank Cameroon (SCBC), Union Bank of Cameroon Plc (UBC Plc), United Bank for Africa (UBA), and Atlantic Bank Cameroon (BACM). Some recent indicators of the performance of Cameroonian commercial banks are listed in Table 1 below.

Table 1 Some recent indicators of the performance of Cameroonian banks

Year	2004	2005	2006	2007	2008	2009
Customer deposits *	1238201	1366357	1549549	1772651	1971603	2159448
Net loans	776191	867253	894920	956799	1179930	1283496
Gross doubtful loans	99677	104123	123137	120998	142578	140158
Long-term loans	2721	9142	12952	20183	30257	31816
Medium-term loans	249091	321984	332511	356527	420751	527043
Short-term credit	227348	260956	303140	304833	361363	421706
Net banking	122418	125567	132402	139055	163131	171477
Earnings	21111	21772	23868	25678	26411	-5769
Average yield credit	10,55 %	10,39 %	10,53 %	9,41 %	8,25 %	8,13 %
Equity accounting	102103	116541	147471	155369	145286	131739

Income ratio	52,41 %	54,78 %	55,81 %	57,70 %	54,44 %	60,68 %
Number of banks	10	10	11	12	12	12
Number of agencies	96	103	118	128	129	142

Source: Annual Reports of the COBAC

*Note: * Values are in millions of CFA francs except % data, the number of banks and the number of branches.*

Table 1 shows that from 2004 to 2009, the level of customer deposits and net loans rose by 74.40% and 65.35%, respectively. This increase can be justified by the increase in the number of banks from 10 in 2004 to 12 in 2009.

As to the management and profitability of banks, Table1 shows that from 2004 to 2007, the operating income ratio increased from 52.41% to 57.70%. This increase shows a recovery in bank management. The analysis of the net banking income shows an increase of 40.07%. In addition, the net income increased from 21.11billion to 26.411billion, between 2004 and 2008. Conversely, from 2008 to 2009, there was deterioration in profitability: which dropped from 26.411 billion to a deficit of 5.769 billion.

All this information enables us to assess; through statistical tools, the effects of financial liberalization on the efficiency and productivity of commercial banks, and to break it down into pure technical efficiency and pure efficiency. To achieve this purpose, the data used in this research are secondary and are collected at the National Institute of Statistics (INS) and COBAC.

Table 2 Aggregate data before and after the implementation of financial liberalization measures (in million FCFA)

Year	Total loans‡	Net result‡	Total deposits †	Staff costs†	Net Fixed Assets†	Number of branches†
1987	980018	2172	674587	17857	106323	.....
1988	991750	795	655723	18185	113002	.....
1989	948013	-638	618654	18151	110784	....
1990	695050	-52884	558197	20399	99389	79
1991	586347	-3589	549810	14539	104022	82
1992	503428	-3305	488507	18600	97310	84
1993	486491	75	475597	19063	98852	82
1994	425415	-14293	479017	15989	24347	78
1995	475299	-51533	618818	19836	51543	79
1996	461859	-3266	583891	16326	28803	74
1997	276303	12438	552490	10550	191658	68
1998	376269	17368	582390	14855	198354	57
1999	417759	15395	662055	17631	203315	60
2000	457897	12775	784069	17696	201746	64

Year	Total loans‡	Net result‡	Total deposits †	Staff costs†	Net Fixed Assets†	Number of branches†
2001	598717	14581	910008	20640	174559	65
2002	725690	11070	1150713	14634	129332	88
2003	790143	22164	1150739	25877	165261	91
2004	812238	21112	1217481	28144	46235	96
2005	871565	27807	1315379	29238	171924	99

Source: Data collected by authors

Note: ‡ are the outputs and † are the inputs

Financial liberalization measures were effective in 1993, with the implementation of control mechanisms of the COBAC. So, we have a reasonable period before liberalization (1987-1993), and a reasonable period after liberalization (1994-2005). Variables available in all banks are divided into inputs and outputs, and are shown in Table 2 as well as their values.

4 Methodology of estimates and results

4.1 The DEA method of variable profit and the Malmquist Index

The model with variable profit scale is appropriate to the environment of Cameroonian commercial banks, because it is based on the assumption that they operate at different sizes which are not necessarily optimal: due to imperfect competition, State regulations, and or various constraints. The principles of DEA are stated as follows: Suppose there are *K* inputs and *M* outputs for each of the 12 banks (N) of the sample. Let *xi* and *yi* be inputs and outputs vectors of the *i*th bank. The input matrix X (K N) and the output matrix Y (Mr N) represent banks data. The objective is to measure the performance of each bank relatively to the best practice observed in the sample. Thus, the weights are attached to the inputs and to the outputs of each bank so as to solve the problem:

$$\text{Max } u, v \ (yi / v\ xi), \qquad (2)$$

Under constraint (U / C) $uyj / v\ xj \leq 1$, j = 1, ... , N, $u, v \geq 0$

where u and v are vectors (M.1) and (K 1) of the inputs weights and outputs weights, respectively. This involves finding the values of u and v, such that the measure of the efficiency of the *i*th bank is maximized, under the constraints that all efficiencies are less than or equal to one. A problem with this particular ratio formulation is that there are an infinite number of solutions. To avoid this, you can pose vxi = 1, which gives:

$$\text{Max}_{u,v} \ (uy_i) \qquad (3)$$

$$S/C \quad vx_i = 1$$

$$uy_j .v\ x_{j \leq} 0 \qquad j = 1,.....,N$$

$$u,v \geq 0$$

This form is known as the "multiplicative form" of the linear programming problem. By using the dual program of linear programming, we derive an equivalent form of the problem of envelopment:

$$\begin{aligned} &\text{Min}_{\theta,\lambda}\ \theta \\ &\text{S/C} \quad -y_i + Y\lambda \geq 0 \\ &\theta x_i - X\lambda \geq 0 \\ &\lambda \geq 0 \end{aligned} \tag{4}$$

where θ is a scalar and λ is a vector (N 1) of constants. The value of θ thus obtained will be the efficiency score of the *i*th business. We will have $\theta \leq 1$; with 1 indicating a point on the boundary and therefore an efficient business. It is worth noting that the linear programming problem must be solved N times: once for each bank in the sample. A value of θ is thus obtained for each bank. This is the linear programming of the DEA Model under the constant scale profit hypothesis. Programming is obtained in the case of variable scale profit by adding a further constraint, to take account of the convexity of the envelopment that is, N 1'λ= 1.

When panel data are available; as is the case in this research, the Malmquist Index is needed to calculate productivity change and its decomposition into technical change and change in technological efficiency. This last component may in turn be decomposed into pure efficiency and allocative efficiency. The definition of the Malmquist Productivity Index oriented input assumes that at each period t = 1 ...T, the production technology *st* can be defined by the transformation of the input vector X'є Rn + into outputs vectors Y 'є Rn +. This means that *st* {*xt*, *yt*: can produce *yt*}. Between the two periods *t* and *t +1*, the Malmquist Index according to Caves, Christensen, and Diewert (1982) is defined by:

$$M(x_t, y_t, x_{t+1}, y_{t+1}) = \left[d_t(x_{t+1}, y_{t+1})\, d_{t+1}(x_{t+1}, y_{t+1})\right]^{1/2} / \left[d_t(x_t, y_t)\, d_{t+1}(x_t, y_t)\right]^{1/2} \tag{5}$$

where *dt* represents the geometric distance. It represents the productivity at the production point (*xt +1*, *yt +1*) relative to the production point (*xt*, *yt*). A value greater than 1 indicates a positive growth in the total factor productivity between t and t +1. It can be broken down as follows, according Fare et al. (1994):

$$M(x_t, y_t, x_{t+1}, y_{t+1}) = \left[d_{t+1}(x_{t+1}, y_{t+1}) / d_t(x_t, y_t)\right]^{1/2} * \left[(d_t(x_{t+1}, y_{t+1}) / d_{t+1}(x_t, y_t)) * (d_t(x_t, y_t) / d_{t+1}(x_t, y_t))\right]^{1/2} \tag{6}$$

The first factor in square brackets measures the change at level of technical efficiency (TEF) between *t* and *t +1*. There are two components which reflect the pure efficiency and the efficiency of scale, respectively. The index of pure efficiency is obtained by recalculating the efficiency indexes on the same data under the variable profit scale (VPS) hypothesis. The scale efficiency index (SEI) is the ratio of the efficiency under the constant profit scale hypothesis, over the variable profit scale hypothesis.

The second term in brackets measures the change in technology that is, technology change between *t* and *t+1*. Algebraically, it is the geometric average of the measurements of the displacement of the boundary observed at the time *t +1*, then at the time *t*.

4.2 Results and interpretations

For a better understanding of the transmission channels of the effects of financial liberalization, it is

important to present successively its effects on the efficiency, and on the productivity of banks in our sample. The data collected in this study cover the period from 1987 to 2005. The DEA estimates are shown in Table 3. In this table, θ= the Farrell Efficiency. θ = 1 means that banks are efficient and are on the production boundary.

Table 3 Bank efficiency in Cameroon before and after financial liberalization

Years	Total loans (θ)	Slacks outputs		Slacks inputs			
		Loans	Net results	Deposits	Staff costs	Net fixed assets	Number of branches
PERIOD PRIOR TO THE FINANCIAL LIBERALIZATION							
1987	1	0	0	0	0	0	0
1988	1	0	0	0	0	0	0
1989	1	0	0	0	0	0	0
1990	0,814	0	0	0	3384,812	0	0,719
1991	0,735	0	0	417,144	0	12826,555	14,188
1992	0,673	0	0	0	2869,911	6611,982	5,070
1993	0,669	0	0	0	3518,583	9575,645	5,377
Moyenne	0,842	-	-	59,6	1396,2	4144,9	7,479
PERIOD AFTER THE FINANCIAL LIBERALIZATION							
1994	1	0	0	0	0	0	0
1995	0,957	0	0	0	1881,946	0	0
1996	1	0	0	0	0	0	0
1997	1	0	0	0	0	0	0
1998	1	0	0	0	0	0	0
1999	0,944	0	0	0	1457,697	30154,692	0
2000	0,849	0	0	0	0	75496,658	,288
2001	1	0	0	0	0	0	0
2002	1	0	0	0	0	0	0
2003	1	0	0	0	0	0	0
2004	1	0	0	0	0	0	0
2005	1	0	0	0	0	0	0
Moyenne	0,979	-	-	0	278,3	9361,54	0,107

Source: Results obtained by DEA

Banks having a value of θ less than 1 are ineffective, and are outside the production boundary. The degree of inefficiency is 1 - θ. The Slack Output corresponds to the excess output obtained without changing input. Slack Output = 0 means that the bank has reached its optimum production and therefore does not have a surplus of unnecessary resources.

The Slack Input is the amount of input which is not used during the production. Slack Input = 0 means that there is full utilization of production factors. Otherwise (that is slack input ≠zero), there is under-use of certain inputs. For the year 1990, for instance, the efficiency of banks is 0.814, and the slacks inputs on staff costs and the number of agencies are different from zero, which means that banks during this period are ineffective and may therefore reduce the use of these inputs by 1- 0.814 that is 18.6%, without reducing the amount of output.

To study the actual effects of financial liberalization on the efficiency of these banks, we refer to the definition proposed by Farrell (1957); which states that a bank is effective if and only if its efficiency (θ) is equal to 1, and its slacks are all nil.

The period between 1987 and 1993 precedes the implementation of the measures taken at the end of the financial liberalization of 1990. We expected an inefficiency of banks. But this is not the case, and Table 3 shows that banks are fully effective between 1987 and 1989 (θ = 1, Slacks = 0). This efficiency is due to the refinancing system then in force. It allowed the Central Bank to refinance current loans without any requirement for banks which were rehabilitating their activities. The period between 1990 and 1993 corresponds to our expectations, because there is indeed a progressive inefficiency of banks. This is due to an under-utilization of inputs, and a slowdown in banking as a result of the anticipation of the devaluation that prompted many depositors to place their assets abroad, especially in France.

With the implementation of measures of financial liberalization, we expected a gradual efficiency of banks. But we still find that they were ineffective in 1995, 1999, and 2000.

To take a synthetic conclusion, we estimated a DEA before the application of measures of financial liberalization (between 1987 and 1993), and another from the application of those measures. We found that the efficiency of all banks in the first period is only slightly lower than that of the second period (0.842 against 0.979). From, the preceding facts, we can deduce that financial liberalization has stimulated, to some extent, the efficiency of commercial banks in Cameroon. The DEA method above does not permit the researcher to decompose efficiency following several sources. Table 4 calculates and decomposes the Malmquist Index according to productivity, over the study period. The availability of data imposes a certain inconsistency in the study periods; according to whether one is measuring the efficiency or the productivity.

Productivity = Technology × Efficiency. For instance, in 1989 we note 0.640 = 0.943× 0.679. If the year of reference is 1988, the measurement of the first variation is in 1989.

A value greater than 1 indicates a positive productivity growth over the period; and a value less than 1 indicates a decrease in productivity. On this basis, the period before liberalization is characterized by a decline in the total factor productivity by 20.9%: due both to the decrease in the technical efficiency (by 4%) and in the technical changes (by 16.8%). After the implementation of liberalization measures, there is a slight tendency to reverse the situation since the fall in overall productivity is less than proportional, compared to the period before (10 against 20%). Unlike in the period prior to the liberalization, its value results from two contradictory phenomena.

Table 4 Evolution of the total factor productivity (Malmquist's Index) and its components before and after financial liberalization

Year	Global technical efficiency	Technological change	Pure technical efficiency	Scale efficiency	TFP
PERIOD PRIOR TO FINANCIAL LIBERALIZATION					
1989	0.943	0.679	1.000	0.943	0.640
1990	1.000	0.679	1.000	1.000	0.679
1991	1.000	0.782	1.000	1.000	0.782
1992	0.988	0.828	1.000	0.988	0.818
1993	0.870	1.193	1.000	0.87	0.038
Moyenne	**0.96**	**0.832**	**1.00**	**0.960**	**0.791**
PERIOD AFTER FINANCIAL LIBERALIZATION					
1994	1.129	0.595	1.000	1.129	0.672
1995	0.998	0.869	1.000	0.998	0.868
1996	1.110	0.882	1.000	1.110	0.979
1997	1.017	0.826	1.000	1.017	0.839
1998	1.011	0.947	1.000	1.011	0.957
1999	0.948	0.949	1.000	0.948	0.900
2000	0.993	0.933	1.000	0.993	0.927
2001	0.938	1.015	1.000	0.938	0.952
2002	0.864	1.490	1.000	0.864	0.287
2003	1.149	0.483	1.000	1.149	0.555
2004	1.028	0.877	1.000	1.028	0.901
2005	0.995	0.979	1.000	0.995	0.974
Moyenne	**1.015**	**0.903**	**1.000**	**1.015**	**0.900**

Source: Authors' estimates

The overall technical efficiency has improved by 1.5% (1 to 1.015) and technological change deteriorated by 9.7%. The improvement on technical efficiency is mainly due to scale efficiency: pure technical efficiency remained constant for all observations.

These two analytical approaches show that the results of financial liberalization are mixed; and the general finding is that the years of efficiency alternate with the years of inefficiency before and after liberalization. To understand these results, we will analyze the direction of variation of the transmission channels identified at the end of the literature review above. These channels are the debit and credit interest rates, the loan to the economy, and banking concentration.

Lending rates were virtually insensitive, while deposit rates moved in opposite directions; as opposed to expectations. Before liberalization, there were four institutional lending rates: 10.7% for the preferred short term, 17.4% for the regular short term, 9.3% for the preferred medium and long term, and 14.3% for the regular medium and long-term (World Bank, 1986). BEAC has set a very high Average Lending Rate (ALR) in favor of liberalization: about 20.1% between 1994 and 2004. But lending rates actually charged by banks are significantly below the ALR and are about 10.38% in 2010. This leads COBAC (2010) to the conclusion that financial liberalization has not led to an increase in interest rates on the various aids granted by banks as it was expected.

On the other hand, three deposit rates were in force during the period prior to liberalization: 10% for large deposits of 6 to 12 months, 8.25% for cash vouchers of 6 to 12 months, and 6.25% for saving deposits. The reforms led the BEAC to fix a single ALR to protect small savers. But it is systematically practiced by all banks and all deposits. Its value has never stopped decreasing since liberalization: from 5.5% between 1994 and 1999, to 5% between 2000 and 2005, to 3.5% today.

However, liberalization has allowed banks to integrate the quality of loan applicants in their strategy of differentiation of lending rates; rather than sticking only to the duration.

For example, the total effective rate (TER) of all credits to the economy; according to the time and according to the categories of beneficiaries, was 7.31% for large enterprises, 12.36% for small and medium enterprises (SMEs), and 14.91% for individuals (COBAC, 2010). This strategy is likely to increase the efficiency of banks, because it takes into account the risk of bad debts.

As concerns deposits and loans (data in Table 2), bank deposits which were 590,913 between 1987 and 1992 (before liberalization), were summed up to 806,357 between 1993 and 2005 (after liberalization): that is an upward variation of 37%. This trend was maintained. Instead of following this path, the importance of credit to the economy, as measured by the credit / GDP ratio increased slightly with liberalization (from 31.24% in 1982 to 36% in 1990) has not stopped declining to reach 11.72% in 2005. This trend of excess liquidity as a result of liberalization is obvious. The liquidity ratio which was only 174.5% in 2000, reached 233.2 % in 2005; and since then, it has continued to move away from its normal value which is 100%.

Following another approach let us consider William and Mahar (1998) who state that it is not only the amount of loans granted after financial liberalization that matters, but their greater efficiency. This can be seen through the changes in the distribution of funds according to their term and across sectors. As to their term, financial liberalization has not played for a long-term as it was planned. Before the implementation of this policy, short-term loans accounted for 70.1% of bank loans; against 29.9% for medium and long term loans (World Bank, 1986). In 2001, they accounted for 76.6% and 23.4% (BEAC 2001) and this trend is maintained. In overall, the Cameroonian banks are more likely to short-term services such as overdrawn accounts, transfers, fees on foreign exchange transactions, and investments at the BEAC.

Table 5 presents information on two years, depending on the sectoral distribution of loans: one year before liberalization and the other after liberalization (data are not available on all the years of the two sub-periods).

Table 5 Distribution of credit across sectors

		1984 (%)	**2010 (%)**
1	Agriculture, forestry and fishing	4,18	7,54
2	Mining, Oil	12,15	1,40
3	manufacturing	20,66	23,91
4	Water and electricity	2,75	2,14
5	Construction and public works	7,09	9,73
6	Commerce and Trade	32,31	21,49
7	Services	11,34	24,82
8	Miscellaneous (including loans)	9,42	8,97
	Total	100	100

Source: constructed by authors from the World Bank (1986) and African Development Bank (ADB, 2012)

One notes a transfer of loans from the sectors of *Mining and Oil*, *Commerce and Trade* to *Services*, *Agriculture*, and *Manufacturing*. This confirms a greater flexibility of banks in developing their strategy of loan in favor of liberalization.

Banking concentration was not significantly attenuated as intended with liberalization, due to the reduction in the number of banks as a result of merging and direct acquisitions.

For instance, in 1986, 40% of commercial banks controlled 80% of deposits and 85% of loans (World Bank, 1986). COBAC statistics (2003) show that three banks (BICEC, Credit Lyonnais and Societé Générale) that is, 25% of banks, appropriated 63% of funds raised in 2003. The same year, two banks (Societé Générale and BICEC) that is, 16% of banks, controlled the loan market to 44%. In terms of market share, concentration is measured by the place occupied by banks in the total assets. In 2003, three banks (Crédit Lyonnais, Société Générale and BICEC) represented a little more than 50% of the total assets amounting to 1.278 billion. We also assess banking concentration using the geographical distribution of bank branches within the country. Out of the 85 bank branches that the Cameroonian banking system had in 2003, a little more than 80% are grouped in the cities of Douala and Yaoundé.

5 Conclusion and policy implications

The objective of this research was to determine whether the financial liberalization measures implemented in Cameroon in 1993 had led to an increase in bank productivity in Cameroon. The results obtained by the DEA and the Malmquist Index are very mixed, and they do not argue in favor of a strengthening effect of financial liberalization on the efficiency of banks. This situation results from the combination of favorable and unfavorable facts.

Two favorable facts are noteworthy: (i) liberalization allowed banks to integrate the quality of loan applicants in their strategy of differentiation of lending rates; rather than sticking only to the period;

(ii) there has been a transfer of loans from such sectors as Mining, Petroleum, Commerce, and Trade; to Services, Agriculture, and Manufacturing. This confirms a greater flexibility of banks in developing their loan strategy in favor of liberalization. As to unfavorable facts, lending rates and long-term loans were insensitive to liberalization; deposit rates, the amounts of loans to the economy, and banking concentration have evolved in the opposite direction as opposed to expectations.

The diagnosis of these facts leads us to two conclusions. First, the fact that companies benefit from the most favorable lending rates to the detriment of small loan applicants is justified by the asymmetry of information that characterizes the bank / customer relationship. Secondly, a classification of the World Bank (2006) in the ascending order of bad business environments ranks Cameroon 130th out of 155. The indicators which were taken into account were date-lines in obtaining credits, the number and cost of procedures to start a business, the time and cost for negotiating a contract, the weight of taxes on business, and the scope of protection of property rights.

Accordingly, we recommend that institutional measures be taken so as to improve the business environment and enable banks to overcome difficulties in having reliable accounting and financial information on loan applicants. Such measures will enhance the recovery of financial support to the economy and the transmission channels will become operational.

6 References

Allen, L. & Rai, A. (1996). Operational efficiency in banking: An international comparison. *Journal of Banking an Finance*. n°20, 655-672.

Arestis & Basu S. (2003). Financial globalisation and regulation. Working paper N^0 397, the Levy Economics institute.

Banker, Charnes & Cooper (1984). Some models for estimating technical and scale inefficiencies in data envelopment analysis. *Management Science*. 30(9), 1078- 1092.

Banque Africaine de Développement (2012). *Environnement de l'investissement privé au Cameroun*. Groupe de la BAD. Département régional de l'Afrique Centrale, Ghana.

Banque mondiale (2006). *Doingbusiness*. Banque mondiale, Washington.

Banque mondiale (1986). *Cameroun, Étude du secteur financier*. Bureau régional Afrique de l'ouest

Banque mondiale (1989). *Rapport sur le développement dans le monde: systèmes financiers et développement*. Banque mondiale,Washington.

BEAC (2001). *Rapport d'activités, exercice 2001*. Yaoundé Cameroun

Brou, E. (2010). Développement financier, croissance économique et productivité globale des facteurs en Afrique Sub-Saharienne. *African Development Review*. 22(1), 23-50.

Caves D.W., Christensen, L.R., & Diewert, E. (1997). The economic theory on index numbers and the measurement of input, output, and productivity. *Econometrica*. 50(6), 1393-1414.

Chaffai M. E., & Dietsch, M. (1998). Productive efficiency performances of Tunisien and Morocan banks: an econometric analysis using panel data. *Paper presented at the ERF fourth annual conference*, Beirut 7-9 September.

Charnes, A., Cooper, W. W., & Rhodes, E. (1978). Measuring the efficiency", *European Journal of Operations Research*. n°2, 429-444.

COBAC (2010). Architecture de la tarification des services bancaires dans la CEMAC. Document de travail

Diatkine, S. (2002). *Les fondements de la théorie bancaire*. Dunod, Paris.

Dietsch, M., & Lozano-Vivas A. (2000). How the environment determines banking efficiency : A comparison between french and Spanish industries. J*ournal of Banking and Finance*. n°24, 985-1004.

English, M., Grosskopf, S., Hayes, K., & Yaisawarng, S. (1993). Output allocative and technical efficiency of banks. *Journal of Banking and Finance*. n° 17, 349-370

Fare, R. S., Grosskopf, & Lovell, C. A. K. (1994). *Production Boundarys*. Cambridge University Press.

Farell, M. J. (1957). Measurement of production efficiency. J*ournal of Royal Statistical Society*. series A, 253-278.

Fry, M. J. (1981). Money, Interest and Banking in Economic development. Second edition, London : John Hopkins, University Press.

Fry, M.J. (1997). In favour of financial liberalisation. *The Economic Journal*, 107(442), 754-770.
Gonzalez-Hermosillo, B. (1999). Determinants of ex-ante banking system distress: a Macro-Micro empirical exploration of some recent episodes. *IMF working paper, mars*.
Grifell-Tatje E., & Lovell, C.A.K. (1996). Liberalization and productivity decline: the case of Spanish saving banks. *European Economic Review*. n°40, 1281-1303.
Guillaumont-jeanneney (1998), *Monnaie et Finance*, Puf, Paris
Guillaumont, J., & Kpodar, K. (2006). Développement financier, instabilité financière et croissance économique. *Économie et Prévisions*. n°174, 87-111.
Kablan, S. (2009). Mesure de la Performance des Banques dans les Pays en Développement : Le cas de l'Union Économique et Monétaire Ouest Africaie. *AERC Research Paper 192*.
Kaminski, G., & Reinhart, C. (1996). The twin crises: The causes of banking and balances of payments problems. *IMF discussion papers*. n^{0}544, Mars.
Kane, E., (1988). Interaction of Financial and Regulatory Innovation. *American Economic Review*. n°78, 328-334.
Kane J. E., & Tara, R. (2001). Bank Runs and Banking Policies: Lessons for African Policy Makers", *Journal of African Economies*. 10, 36-71
Kapur, B. (1976) "Alternative stabilisation policies for less-developed economies", *Journal of Political Economy*, 84(4), 777-795
King, R. G. & Levine, R. (1993), *Financial intermediation and economic development, in capital markets and financial intermediation.* Edited by C. Mayer and X. Vives, Cambridge University press, 156-196.
La Porta, Lopes-De-Silvanas F., Shleifer A., & Vishny R. (1996). Law and Finance. National Bureau of Economic Research. Paper n° 5661.
Leightner, J., & Lovell, K. (1998). The impact of financial liberalization on performance of Thai banks. *Journal of Economics and Business.* 50(2), 115-131.
Le Noir, A. (1992). Les leçons d'une hécatombe. *Jeune Afrique Économie*. n°175, 95-100
Levine, R. (1997). Financial development and Economic Growth: views and agenda. *Journal of Economic literature.* 35(2), 688-726
Levine R., Loayza, N. & Beck, T. (2000). Financial Intermediation and Growth: causality and causes. *Journal of Monetary Economics*. 46(1), 31-77.
Lovell, C. A. K. (1994). Linear Programming Approaches to the measurement and analysis of productive efficiency. *TOP*, n°2, 175-248.
Mathis, J. (1992). *Monnaie et Banques en Afrique francophone*. EDICEF, Paris
McKinnon, R.L. (1973). *Money and capital in economic development*, Brookings institution, Washington.
Nembot, N. L. & Ningaye, P. (2011). Réformes financières et rentabilité du système bancaire des États de la CEMAC. *Mondes en Développement*, 39(155), 111-124.
Pelletier, G. (1993). La restructuration des systèmes bancaires. *Afrique Contemporaine*, n°166, 51-56.
Sandretto, R. & Tiani, F. (1993). La faillite du système bancaire africain, autopsie et implication d'un désastre : l'exemple camerounais. *Information et Communication*. n° 83, 21-28.
Schumpeter, J. (1912). *Theory of Economic Development*. Cambridge Mass: Harvard University Press.
Shaw, E. (1973). *Financial deepening in economic development*. Oxford University press, New York.
Sobreira, R. (2004). Innovations financiers et investissement. Le cas de la titrisation. Innovations. 2004/1, n°1, 115-129.
Stiglitz, J.E & Weiss, A. (1981). Crédit rationing in markets with imperfect information. *American Economic Review*, 71(3), 393-410.
Talyor, L. (1983). *Structuralist macroeconomics: Applicable models for third world*. Basic Books. New-York.
Van, W. S. (1983). Interest rate management in LDC's. *Journal of Monetary Economics*. 12(3), 433-452.
Venet, B. (1994). Libéralisation financière et développement économique. *Revue d'Économie Financière*, n°29, 87-111.
Wheelock, D.C. & Wilson, P.W. (1999). Technical progress, inefficiency, and productivity change in U.S. Banking, 1984-1993. *Journal of Money. Credit and Banking*, 31(2), 212-234.
Williamson, J. & Mahar, M. (1998). A survey of financial liberalization. In Essays in international finance. Princeton University
Worthington, A.C. (1999). Malmquist indices of productivity change in Australian financial services. *Journal of International Financial Markets. Institutions and Money*, n°9, 303-320