Sustainable performance evaluation of banks using a multi-attribute utility model: an application to French banks

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Abstract—The recent banking crises have led experts in finance and banking as well as scientists to think about innovative banking practices in order to get out of the financial and economic problems that banks experienced. Nowadays, it becomes obvious for banking experts that the solutions go further than simply improving supervision and regulation. As an alternative, experts advocate the necessity of switching the current economy where everybody is only motivated by maximum profits to an economy where everybody contributes for the achievement of banking sustainability. A new concept of “sustainable bank” begins to rise. The exact concept of “sustainable bank” is evolving over time and is still a subject of debate. In this study, we present our view of a “sustainable bank” and we develop a framework based on multi-attribute utility approach aiming to assess the performance of a bank from different stakeholders’ points of views in order to appraise the degree of sustainability of the bank. This developed framework is applied to five French banks.

Keywords—sustainability; sustainable bank; multi-attribute utility function; performance;

I. INTRODUCTION

Nowadays, sustainability in various areas constitutes one among hottest discussion topics. More than that, the problem of global sustainability is widely acknowledged all over the world. Financial institutions have recently recognized sustainability as an important part of their plans showing that sustainable banking may be a powerful solution to financial crises. To go forward sustainability, banks must look for better performance but using a new adequate measure of performance. Over the past several years, substantial effort has been spent into investigating the unavoidable and the tormenting question “How well are financial institutions doing?” Answering this question of “fact” is essential to ensure that financial institutions are not only functioning but functioning right. The review of the literature reveals that there is no clear concept used to assess the performance of financial institutions. The performance is mainly evaluated objectively or subjectively through a given measure that differs from one study to another. One thing in common with these previous studies is that they were limited to a single point of view while ignoring the perceptions of the other financial institution stakeholders. More specifically, a widespread characteristic for most of these papers is the use of managers’ or investors’ points of view ([1], [2]). Only a small number of these studies have recognized other points of view. For instance, [3] acknowledged that customer satisfaction was the main key indicator of a bank performance. Also, [4] have adopted regulators points of view. To the best of our knowledge, only two previous studies [5] and [6] asserted that performance evaluation should be done from a multiple stakeholders’ standpoint. Specifically, under a data envelopment analysis (DEA) methodology, [5] built an aggregate performance index using different stakeholders’ goals. Whereas, [6] evaluated efficiency from a multiple-stakeholder perspective through DEA using the same variables, each of which is interpreted differently either as input or as output.

Recent crises showed that even banks that had been classified as performing encountered serious problems. This suggests reconsidering the concept of performance evaluation of banks. In the current study, we indeed introduce a new concept of a performing bank “sustainable bank”. We believe that all banks’ stakeholders should participate in the process of the bank’s performance evaluation. Further, a sustainable bank has to take into consideration the expectations of all of its stakeholders. More explicitly, we think that to evaluate the degree of performance of a bank, we need to assess a kind of satisfactions’ tradeoffs of all of the bank’s stakeholders. In other words, a sustainable bank is a bank that attains a certain good enough degree of global satisfaction for all its stakeholders. To assess a global degree of satisfaction for a bank, we develop a framework based on multi-attribute utility approach seeking to appraise the performance of a bank from each stakeholder points of view accounting for different judgments criteria.

The rest of this paper is organized as follows. In section 2, we identify for each stakeholder the main criteria to use for performance evaluation. In section 3, we build the sustainable performance model with illustration through a case study of
French commercial banks. In section 4, we provide discussions and analysis of our findings. Finally, section 5 concludes the paper and outlines some future research directions.

II. Stakeholders suggested criteria

Satisfying all stakeholders is absolutely hard. The complexity of carrying out this task adequately is mainly due to the difficulties in meeting the conflicting requests of its various stakeholders. For instance, depositors seek high returns. This however results in a high cost to the bank. Borrowers on the other hand wish to receive loans at the lowest cost. This again affects negatively bank’s return. Moreover, bank owners look for earning more by paying less which restrains the bank’s ability to provide its personnel with reasonable benefits. Furthermore, regulators are involved in reducing the risks that a bank may take in obtaining and using funds. This limits the bank’s ability to satisfy the remaining stakeholders. This has already been acknowledged by [6] and [7]. While [7] adopted four groups of stakeholders; namely, surplus units, deficit units, owners and regulators, [6] specified the following five stakeholders: shareholders, customers, managers, employees, and regulators. This suggests closely considering the appropriate classification of stakeholders.

Today’s fast changing world requires figuring out the way to adequately meet the related challenges. One of these challenges is how to achieve short term objectives without compromising the ability of future generations in carrying out their own needs? Still, it is important to note that sustainable development cannot be achieved by a single group of actors; but, it should be a pervasive attitude, to which every participant in the global economy must contribute to. A sustainable bank should be suitable for that changing world. It, indeed, should attempt to ensure a strong and recurring value creation while respecting not only its traditional stakeholders but also taking into account the civil society as a whole. To take into account this new dimension, we suggest adding the civil society to the previous list of stakeholders. That is, to examine the sustainability of a bank, we will consider six stakeholders’ points of view; namely, regulators, shareholders, customers, managers, employees and civil society.

In the following sub-sections, we suggest a list of criteria related to each stakeholder. These criteria are commonly used but not exhaustive in measuring bank performance.

A. Regulators’ points of view

The regulation has the burden of protecting the financial system users and assuring the stability of the financial system as a whole. To achieve these goals, regulators impose some prudential norms and consider risks control degrees as the fundamental measure of banks performance. Insolvency risk, credit risk and liquidity risk are some chief categories of risks. To appraise the solvency of a bank, regulators use the global ratio of solvency as a criterion. This solvency ratio indicates the coverage degree of banks’ assets by equity. The higher this ratio, the safer the bank is. Besides this, the fact that a bank incurs a greater portion of equity in its activity leads it to have a tendency to adopt less risky activities. Credit risk is the risk of losses on banks debts. It arises when counterparty is unable to meet its obligations. We evaluate credit risk through the ratio of nonperforming loans relative to total loans. Note that a huge non-performing asset in a bank balance sheet causes wearing away its capital base that is why measuring credit risk is imperative. Liquidity risk is the ability of a bank to cope at any time with withdrawals of deposits. For this, a given bank must have a certain amount of liquid assets that have to be bigger than resources of the same duration. Liquidity risk can lead to a reduction in a bank income. In fact, faced with liquidity risk a bank may be enforced to have access to funds at a disproportionate cost to wrap its urgent cash requests. Liquidity level can be assessed through the ratio of loans to total assets.

B. Shareholders’ points of view

In addition to pleasing depositors and borrowers, shareholders have to be considered. In fact, within the framework of banking industry a commercial bank must be treated as a firm that provides a set of products and services to generate profits. Profitability is vital for a bank to sustain its ongoing activity. Shareholders focus mainly on profit making and seek to attain reasonable levels of profit. For this, we suggest to use two measures for profitability: the rate of return on equity (ROE) and the ratio of dividend payout per share (DPS). Explicitly, ROE estimates the efficiency of the bank’s equity use. The higher these ratios, the more shareholders are satisfied.

C. Customers’ points of view

Banks are mainly considered as providers of services to customers. This means that for a bank, customers are the source of its profits and it is crucial to make them satisfied. However, it is important to figure out how to evaluate customers’ satisfaction? In the current study, we appraise customers’ satisfaction through two main criteria: accessibility to the bank and service quality. To evaluate accessibility, we use two sub-criteria the number of branches and the number of automated teller machines (ATMs). It is obvious that the higher these numbers, the higher the bank’s accessibility. The dynamism of a bank business can give an idea about customers’ satisfaction. In fact, the more a bank gives loans the more customers are satisfied. Also, the more customers deposit their money in a bank, the more they are satisfied. Then, loans evolution and deposits evolution will be used as customers’ satisfaction sub-criteria.

D. Managers’ points of view

To evaluate the performance of a bank from managers’ points of view, we believe that the benefits and incentives are good factors for the satisfaction of managers. To evaluate these factors, we use two measures the evolution of the annual average wages and the evolution of the annual average bonus. It should be obvious that the higher evolutions of wages and bonus, the higher the managers’ satisfaction.

E. Employees’ points of view

Employees also evaluate the performance of their bank from their own advantages. For this, we allude to benefits and
account for risk and uncertainty, a multi-attribute utility function (m.a.u.f.) is suggested. First, a marginal utility function for each sub-criterion used by each agent is developed. Next, a multi-attribute utility function is obtained for each criterion. Later, each of these utility functions will play the role of the marginal utility function for the relevant stakeholder. Finally, combining all assessed scores of the different stakeholders, a global degree of satisfaction for a bank can be appreciated. This later appreciation can be used to evaluate the sustainability of banks. The assessment approach of the various utility functions assumes a multiplicative form (which suggests verifying mutual utility independence conditions). As a result, a marginal score between zero and one will be obtained for each stakeholder reflecting the performance with respect to the stakeholder’s criteria. These scores can be used to rank banks on stakeholders’ levels. Fig.1 shows the attributes and the sub-attributes in a hierarchical framework related to multiple-stakeholders used to evaluate different facets of banks’ sustainability.

F. Civil society’s points of view

The banking sector is not often seen as a key actor in sustainable development since banks are not directly involved in socially devastating actions. However, its pivotal role in financing the economy gives the sector a valuable advantage for interventions in this regard. This fact legitimizes the commitment of the banking sector on this issue. As was suggested by [8], financial institutions have to play the catalytic role in influencing the behavior of other industries towards sustainable development. But how should the commitment of banks for sustainable development be evaluated?

First of all, let us specify that sustainable development concerns three dimensions; namely economic, environmental, and social ones. In economic terms, performing as a responsible bank is to provide means to play the economy financing role while controlling risks associated with bank activities such as money laundering or over-indebtedness of individuals. In addition to an economic responsibility, a bank should also have an environmental one. More specifically, a bank should reduce environmental risks associated with its activity by more encouraging investments in companies that respect environment such as reducing energy consumption or wastes. The social dimension concerns the contribution of a bank in the social systems inside which it carries its activities. In particular, it includes practices related to labour namely compliance with human rights, contribution to civic engagement, carrying out low cost accommodation projects, creating employment opportunities, and developing projects for poverty alleviation. Given the lack of data in this field, we propose to use a content analysis of the French version of published annual reports. Specifically, we suggest using the proportion of pages related to sustainable development (PPSD) in annual reports as a first measure and the amount of socially responsible investment (investment on green business) as second measure. It should be Clear that the higher the PPSD or the SRI, the higher the satisfaction of the civil society.

III. SUSTAINABLE PERFORMANCE MODEL DEVELOPMENT

The current research work aims at providing a performance evaluation tool for a sustainable bank accounting for multiple stakeholders’ points of view on the one hand; and for different criteria within the views of each stakeholder on the other hand. Given the varying criteria employed and the conflicting objectives involved, it is important to devise a suitable quantitative tool to assess performance. As some of the criteria...
A. Utility functions assessment

A \( n \) multi-attribute utility function is defined as \( u(x) = u_0(x_1)u_1(x_2) \cdots u_n(x_n) \), where \( x \) is a vector of the \( n \) attributes \( (x_1, x_2, \ldots, x_n) \) and \( u_i(x_i) \) is the marginal single-attribute utility function (s.a.u.f) of the attribute \( x_i(i = 1, \ldots, n) \).

The utility function is assessed in four steps. First, attributes \( (x_i) \) have to be identified. Second, the s.a.u.f \( (u_i) \) have to be assessed. Third, weights to aggregate these s.a.u.f are evaluated. Finally, the n.m.a.u.f. \( (U) \) is calculated. In order to assess the utility functions, one needs to make assumptions regarding utility mutual independence\(^1\) (m.u.i). In the case of our study, we performed a number of tests with some experts in order to check for each m.u.i of the suggested attributes. The outcomes reveal that m.u.i. is a valid assumption. Therefore, according to [9] the m.a.u.f is multi-linear and can be written in the form

\[
k(x) = 1 = \prod_{i=1}^{n} [k_i k_i(x_i) + 1] \tag{1}
\]

where \( k \) and \( k_i \) are scaling constants for \( i = 1, \ldots, n \).

To assess the s.a.u.f \( u_i \), we apply the well-known approach due to Keeney and Raiffa (the five-point assessment method). Since we use a similar m.a.u.f assessment procedure, we choose to give details only for regulators’ m.a.u.f. The other functions are assessed using the same approach. As aforementioned, we considered a case study of five French banks; namely, BNP Paribas, Banques Populaires et des Caisses d’Epargne (BPCE), Crédit Agricole (CA), Crédit Mutuel (CM) et Société Générale (SG). Data used in this study are from the 2010 annual reports of these banks.

For the rest of the paper, the following notations are introduced:

- \( x_{lj} \) is the \( j \)th sub-attribute of the \( l \)th attribute for stakeholder \( L \).
- \( u_{lj} \) is the s.a.u.f of the \( j \)th sub-attribute of the \( l \)th attribute for stakeholder \( L \).
- \( x_{li} \) is the \( i \)th attribute for the \( l \)th attribute for stakeholder \( L \).
- \( U_{li} \) is the m.a.u.f of the \( i \)th attribute for stakeholder \( L \).
- \( U \) is the overall performance function.
- \( x_{lj,q} \) is the sub-attribute measure value such that \( u_{lj}(x_{lj,q}) = q \). \( k_{l1} \) and \( k_{lj} \) are scaling constants used in the assessment of the m.a.u.f for each stakeholder and each relevant attribute \( i \) and sub-attribute \( j \).

B. Assessment of the regulators’ marginal utility function \( u_b \)

A single attribute (Risk) and three sub-attributes (Insolvency Risk, Credit Risk and Liquidity Risk) are selected for the regulator. In table 1, below, we give for each bank the data used to appraise respectively the sub-attributes. It is worth noting that, to be safe a sustainable bank should seek high solvency ratio and low credit risk and liquidity risk ratios.

As shown in table 1, the highest solvency ratio found is 14.5\%, while the lowest ratio is 11.2\%. Applying the standards of Basel 2, banks are required to comply at all times a capital ratio of at least 8\%. Some banks must also, because of their status as Financial Holding Companies in the United States, maintain a solvency ratio of 10\%. Consequently, let us assume that the solvency ratios are fluctuating between 10\% and 20\%. That is, the best ratio (20\%) is given a utility of 1, and the worst ratio (10\%) is given a utility of 0. Accordingly, we set \( u_{R1}(10\%) = 0 \) and \( u_{R1}(20\%) = 1 \). Then, a sequence of 50-50 lotteries have been proposed to a local expert in regulation to assess through the certainty equivalence procedure the values of \( x_{R11,1/2}, x_{R11,1/4}, x_{R11,3/4} \). More specifically, in order to evaluate say \( x_{R11,1/2} \), the expert is asked whether he would choose a given sure lottery involving a certain solvency ratio to a 50–50 one involving the best and the worst solvency ratios. Many values of the certain ratio were suggested until the expert became indifferent between the certain lottery and the risky one. For this latter value, the expected utilities of the two lotteries are equal. We find that the expert is indifferent between 13.5\% for sure and 50-50 lottery yielding either 10\% or 20\%. Therefore, 13.5\% is the certainty-equivalent of this latter lottery (\( u_{R1}(13.5\%) = 0.5u_{R1}(10\%) + 0.5u_{R1}(20\%) = 0.5 \). In a similar way, we found, for a 50-50 lottery, that the expert is indifferent between 12\% and the 50-50 lottery yielding 10\% or 13.5\%. In addition, 16\% was the certainty-equivalent of the 50-50 lottery leading to 13.5\% or 20\%. This indicates that \( u_{R1}(12\%) = 0.25 \) and \( u_{R1}(16\%) = 0.75 \). A utility curve can then be built-in using the five empirically evaluated points (see Table 2). In this case, the curve has a concave shape exhibiting a risk-averse attitude of the regulator.

Using the same previous process, we assess the s.a.u.f for the remaining two sub-attributes. Having estimated the relevant s.a.u.f we can assess the m.a.u.f for risk. \( U_{R1} \) can be written in the following form:

\[
k_{R}(U_{R1}, x_{R1}) + 1 = \prod_{j=1}^{3} [k_{R1}k_{R1j}u_{R1j}(x_{R1j}) + 1] \tag{2}
\]

where \( x_{R1} \) is a vector of the three sub-attributes \( (x_{R11}, x_{R12}, x_{R13}) \).

In order to estimate \( U_{R1} \), we need appraising the scaling constants, \( k_{R1j} \) to aggregate the three s.a.u.f. To find \( k_{R1j} \) we use a similar procedure as used previously.

More specifically, we present to the regulation expert a choice between two lotteries \( L_1 \) and \( L_2 \):

- \( (L_1) \) get for sure the best level for the sub-attribute \( x_{R1j} \) and the worst levels for the other two attributes; or
- \( (L_2) \) get the uncertain lottery providing the three sub-attributes attributes at their best levels with probability \( p \) and the three sub-attributes at their worst level with probability \( 1-p \).

\(^1\)According to Keeney and Raiffa (1976), attribute \( x \) is defined to be utility independent of attribute \( y \) when the conditional preferences for lotteries on attribute \( x \) given the attribute \( y \) do not depend on the particular level of attribute \( y \) (p. 226). If attribute \( y \) is also utility independent of attribute \( x \), \( x \) and \( y \) are said to be mutually utility independent.
The probability $p$ is gradually varied (in a trial-and-error fashion) until we find the $p$ value that makes the expert indifferent between the two lotteries. The last obtained resulting value of $p$ equals the scaling constant $k_R$ for the attribute at the best level in the sure lottery. Figure 2 illustrates the assessment of the insolvency risk scaling constant $k_{R1}$. After some manipulations of probabilities we obtain the three following scaling constants values: $k_{R1}=0.25$, $k_{R2}=0.75$ and $k_{R3}=0.60$. We can easily check that $\sum_{j} k_{R1j} = 1$, therefore $k_{R1}$ can be evaluated by solving the following equation

$$k_{R1} + 1 = \prod_{j=1}^{3} [k_{R1j} k_{R1j} + 1]$$

(3)

In order to preserve the utility independence properties of the utility function, $k_{R1}$ must be between -1 and 0. Using the $k_{R1}$ values, we found $k_{R1} = -0.87001$. Substituting the scaling constants by their respective values in equation (2), we obtain the Risk m.a.u.f. It should be clear that the Regulators’ utility function is the utility of risk ($U_{R}(x_{R}) = U_{R}(x_{R1}))$. In Table 2, we summarize the different results and the used values in the assessment of these functions.

C. Assessment of the remaining marginal utility functions

Given the repetitive nature of the assessment procedure and for space reasons, we will content by specifying the main characteristics of the considered attributes in a first step. Then, we will display all the combined findings of the various marginal utility functions in Table 3. The corresponding detailed calculations are omitted.

To evaluate shareholders’ marginal utility, we also use a single-attribute (Profitability) and two sub-attributes (Returns and Dividends). We consider two attributes from customers’ points of view: Accessibility and Service Quality. For each attribute we propose two sub-attributes; namely, we use Branches and ATMs as sub-attributes for accessibility, and Loans and Deposits as sub-attributes for service quality.

\[2\] Note that this equation stems directly from equation (1) by fixing all attributes at their best levels.

### Table I. Risk’s Sub-Attributes Measures

<table>
<thead>
<tr>
<th>Bank</th>
<th>BNP Paribas</th>
<th>BPCE</th>
<th>CA</th>
<th>CM</th>
<th>SG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solvency Ratio (%) ($x_{R12}$)</td>
<td>14.5</td>
<td>11.2</td>
<td>12.8</td>
<td>11.5</td>
<td>12.1</td>
</tr>
<tr>
<td>Credit Risk Ratio (%) ($x_{R12}$)</td>
<td>4.4</td>
<td>3.5</td>
<td>3.9</td>
<td>4.2</td>
<td>4.5</td>
</tr>
<tr>
<td>Liquidity Risk Ratio (%) ($x_{R13}$)</td>
<td>37</td>
<td>67</td>
<td>49.8</td>
<td>62.6</td>
<td>39.1</td>
</tr>
</tbody>
</table>

### Table II. Single-Attribute Utility Functions and Scaling Constants for Risk Attribute

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Sub-attribute</th>
<th>Sub-attributes measures</th>
<th>Sub-attributes utility function curve</th>
<th>Scaling constants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insolvency Risk (%) ($x_{R11}$)</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>Risk (%)</td>
<td>8</td>
<td>0</td>
<td>6.2</td>
<td>3</td>
</tr>
<tr>
<td>Credit Risk Ratio (%) ($x_{R12}$)</td>
<td>80</td>
<td>30</td>
<td>67</td>
<td>66</td>
</tr>
</tbody>
</table>

Concerning managers, we consider again a single attribute (Benefit & Incentives) and two sub-attributes (Wage and Bonus). For employees, we consider Benefit and Social Incentives as two attributes. On one hand, to appraise Benefit we use two sub-attributes: Remuneration & Incentives and Training. On the other hand, to assess Social Incentives, we limit our study to a single sub-attribute Retirement. Finally, for civil society, we suggest the use of two attributes and a single sub-attribute for each one. The first attribute Sustainable Development is assessed by the sub-attribute Belief this later gives idea about how much the bank believes in getting involved in sustainable development through its activities. Whereas, the second attribute Investment evaluate the socially responsible investment. The related assessments are omitted for space reasons. In Table 3, we summarize the assessed m.a.u.f. for different stakeholders. It is worth noting that the m.a.u.f. for customers, managers, employees and civil society are obtained by combining two relevant marginal sub-attributes utility functions, each of which has been assessed in turn through two marginal sub-utility functions.

D. Assessment of the bank sustainability degree

Individual stakeholders’ scores can be aggregated reflecting the degree of sustainability of the bank. More specifically, this aggregated score gives for each bank, its degree of achievement of the status of being a sustainable bank. Note however, that a lot of care should be exercised in order to assign importance weights of various stakeholders.

IV. Results and Discussion

This study provides useful insights on the views of different stakeholders. In fact, the assessed utility functions are used to compute utility indices for each bank according to each stakeholder (see Fig. 3).
TABLE III. **THE ASSESSED STAKEHOLDERS’ MULTI-ATTRIBUTES UTILITY FUNCTIONS**

<table>
<thead>
<tr>
<th>Stakeholders (R)</th>
<th>Attributes</th>
<th>Stakeholder’s utility function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulators</td>
<td>Insolvency Risk (x1)</td>
<td>( U_I(x_{I1}, x_{I2}) = 0.85 u_I(x_{I1})u_I(x_{I2}) + 0.15 u_I(x_{I1})u_I(x_{I2}) )</td>
</tr>
<tr>
<td></td>
<td>Credit Risk (x2)</td>
<td>( -0.10 u_I(x_{I2})u_I(x_{I2}) )</td>
</tr>
<tr>
<td></td>
<td>Liquidity Risk (x3)</td>
<td>( -0.13 u_I(x_{I3})u_I(x_{I3}) )</td>
</tr>
<tr>
<td></td>
<td>Profitability (x4)</td>
<td>( 0.39 u_I(x_{I4})u_I(x_{I4}) + 0.25 u_I(x_{I4})u_I(x_{I4}) )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( + 0.70 u_I(x_{I4})u_I(x_{I4}) + 0.10 u_I(x_{I4})u_I(x_{I4}) )</td>
</tr>
</tbody>
</table>

| Shareholders (S) | Profitability (x5)                  | \( U_{P}(x_{S1}) = U_{P}(x_{S2}) \) |
| Customers (C)    | Accessibility (x6)                  | \( U_{A}(x_{C1}) = U_{A}(x_{C2}) \) |
|                  | Service quality (x7)                | \( +0.75 U_{A}(x_{C1}) + 0.45 U_{A}(x_{C2}) \) |
| Managers (M)     | Benefit Incentives (x8)             | \( U_{B}(x_{M1}) = U_{B}(x_{M2}) \) |
|                  | Societal Incentives (x9)            | \( +0.75 U_{B}(x_{M1}) + 0.45 U_{B}(x_{M2}) \) |
| Employees (E)    | Benefit Incentives (x10)            | \( U_{B}(x_{E1}, x_{E2}) = -0.59 U_{B}(x_{E1})U_{B}(x_{E2}) \) |
|                  | Economic Sustainability (x11)       | \( +0.05 U_{B}(x_{E1})U_{B}(x_{E2}) \) |
| Civil Society (Cv)| Sustainable Development (x12)      | \( U_{C}(x_{Cv1}, x_{Cv2}) = -0.05 U_{C}(x_{Cv1})U_{C}(x_{Cv2}) \) |
|                  | Economic Sustainability (x13)       | \( +0.05 U_{C}(x_{Cv1})U_{C}(x_{Cv2}) \) |

It is clear from Fig. 3 that all these banks are not 100% **sustainable banks**. In fact, each of these banks needs some corrective actions from at least one stakeholder’s points of view. According to shareholders, they are better satisfied in BNP Paribas and SG followed by BPCE and CM. Indeed, all these four banks achieved almost a score of profitability greater than or equal to 0.7. However, some corrective actions are needed to enhance the CA profitability. Under the managers’ dimension, all banks display weak scores (less than 0.23). These low scores indicate that the managers’ benefits and incentives growth was not very large especially for CA. Under regulator’s points of view, all banks are roughly similar. All banks accomplished medium scores. This may be due to the restrictive prudential norms imposed in the banking system. Also from customers and employees sides, banks attained similar scores. However, in both cases some improvements are needed given that the registered scores are below 0.5. Finally, in accordance with civil society, CA, BNP Paribas and SG are more advanced than SG and CM. These later two banks have also recorded some progress in sustainable development; however, greater efforts are needed.

Furthermore, the developed model can also be considered as a valuable tool in assisting banks in their strategic choices in order to achieve their ultimate objective of being a **sustainable bank**. Indeed, an in-depth analysis can be conducted for each bank. More specifically, using the assessed s.a.u.f. and m.a.u.f., strengths and weaknesses can be detected for each bank and then necessary corrective actions and enforcement measures can consequently be identified and implemented. For instance, BNP Paribas shows low scores both in terms of deposits evolution and retirement prime evolution. Consequently, it would be worth for BNP Paribas to be more careful about both its quality of service and its relation with its employees.

**V. CONCLUSION**

Although many earlier studies have developed a number of banks’ performance evaluation models, these studies have not developed an aggregate index taking into account multiple criteria from many stakeholders’ points of views. To our knowledge, the present study represents the first attempt to overcome these beforehand weaknesses. That is, we developed a multi-attribute utility model providing an evaluation for banks accounting for different criteria within the views of each stakeholder. This model was, then, applied to five French banks in order to evaluate their degree in achieving a **sustainable bank** status.

Within this framework, we plan on carrying out additional research to improve our approach. First, in assessing some utility functions, we assumed that the opinions of the authors reflect the preferences of the stakeholders. In future research, stakeholders’ opinions should be drawn out through interviews. Second, in a future study, we plan to consider more attributes and sub-attributes. Finally, we need to perform sensitivity analyses for utility functions forms and attributes weights.

**REFERENCES**


