

# A Multi-Attribute Utility Model for Performance Evaluation of Sustainable Banking

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**Abstract**—In this study, we develop a performance evaluation model based on a multi-attribute utility approach aiming at reaching the sustainable banking (SB) status. This model is built accounting for various banks' stakeholders in a win-win paradigm. In addition, it offers the opportunity for adopting a global measure of performance as an indication of a bank's sustainability degree. This measure is referred to as banking sustainability performance index (BSPI). This index may constitute a basis for ranking banks. Moreover, it may constitute a bridge between the assessment types of financial and extra-financial rating agencies. A real application is performed on three French banks.

**Keywords**—Multi-attribute utility theory, Performance, Sustainable banking.

## I. INTRODUCTION

POSTERIOR to the recent crises, it became almost a consensus that conventional banking should experience major restructuring. Many researchers and practitioners argue that sustainable banking should rather be substituted by sustainable banking (SB). While various tentative definitions are attempted, [1] offer a somewhat exhaustive definition of SB.

However, all traditional performance evaluation systems in the banking sector are rather compatible with the conventional banking concept in which the maximization of the shareholder value is the main if not the only concern of the evaluation process. The main objective of this paper is to develop a performance evaluation model keeping track of being a SB. Based on various marginal single attribute utility functions (SAUF), we build a multi-attribute utility function (MAUF) expressing the degree of sustainability of a bank. This MAUF is built while accounting for the various banks' stakeholders through a win-win paradigm rather than just exclusively focusing on shareholders' value. Furthermore, our performance evaluation model would yield an aggregate performance score referred to as the banking sustainability performance index, BSPI. This index reflects the degree of sustainability of a bank for which, the higher the BSPI the higher the bank sustainability.

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## II. THE MODEL

We start by identifying the main stakeholders of a bank. Then, we suggest a list of criteria and sub-criteria for the assessment of the sustainability performance with respect to each stakeholder. Later, we develop a utility function for each sub-criterion used by each stakeholder. Next, we combine these utility functions to obtain a multi-attribute utility function for each criterion. Further, each of these utility functions will play the role of the marginal utility function for the assessment of the multi-attribute utility function of the relevant stakeholder. This function provides a score reflecting the bank performance at the stakeholder level. Finally, we aggregate all the stakeholders' utility functions into a global utility function. This aggregate function provides an aggregate score indicating the sustainability performance of the bank under consideration. This score is the suggested BSPI index. The remaining of the section deals with the details of selecting stakeholders, criteria and sub-criteria as well as embedding them into utility functions.

### A. Involved Stakeholders

As we have already pointed out, one among the previously discussed main keys to improve a bank's sustainability is to consider and protect the interests of all the main stakeholders. Even if these interests are conflicting, a reasonable tradeoff is required. To appraise the degree of sustainability of a given bank, we first need to closely identify the appropriate stakeholders. According to the related literature, the concept of stakeholders goes back to the definition given by [2]. Stakeholders of a given company are defined as "any group or individual, who can affect or is affected by the achievement of organization's objectives". The review of the literature shows a lack of agreement on a financial institution's stakeholders. Reference [3] identified four groups: surplus units, deficit units, owners and regulators as a bank's stakeholders. Likewise, [4] recognized also four social groups as a saving bank's stakeholders: depositors, employees, founder entities, and public administrations. However, [5] specified five stakeholders; namely, shareholders, customers, managers, employees, and regulators.

Based on the SB concept, we conjecture that the evaluation of the degree of sustainability of a given bank requires; in addition to its traditional stakeholders as suggested by the beforehand mentioned authors, one more important stakeholder; namely, the civil society. In consistency with the World Bank definition, the civil society refers to a wide range of organizations: community groups, non-governmental organizations, labor unions, indigenous groups, charitable

organizations, faith-based organizations, professional associations, and foundations that reveal interests and will of citizens. To conclude, in examining bank sustainability, we suggest the following six stakeholders: the regulators, the shareholders, the customers, the managers, the employees and the civil society. We may note that our choice offers a relatively global view of a bank performance giving rise both to a macro level consisting of regulators and civil society and a micro level consisting of shareholders, customers, managers, and employees.

The criteria and sub-criteria initially suggested for each stakeholder are summarized in Fig. 1. Later, AHP is used to exclusively focus on the most important criteria and sub-criteria. In the real application on three French banks, some additional criteria/sub-criteria are eliminated just because of lack of relevant data.

#### B. Assessment Process

The performance with respect to each criterion is evaluated through a score given by a multi-attribute utility function (MAUF) of the various involved sub-criteria. The assessment of MAUF calls for the use of a two-step process. In the first step, we evaluate for each sub-criterion a marginal single attribute utility function (SAUF) expressing the different levels of performance. This is made with the help of interviews with some local experts. The evaluation of SAUF involves applying the well-known five-point approach due to [6]. Then in the second step, we appraise for each attribute the corresponding scaling constants assuming and validating mutual utility independence (MUI). Note that in the case study below, MUI is found to hold approximately with respect to all attributes at the various levels of the assessment process.

### III. CASE STUDY

In France, almost all banks start to be involved in the sustainability process. We consider a case study of three commercial banks among the largest ones in France; namely, BNP Paribas, Crédit Agricole, and Société Générale. Our choice is motivated in part by data accessibility. Data used in this study are mainly extracted from the published individual annual reports of these banks. Missing data are mostly obtained from direct communication. Data request some major processing in order to fit the need of our study.

The period of study extends over 2004-2011. We attempt to cover few years before and after the 2008 world financial crisis. We use the criteria and sub-criteria discussed above.

We assess all the SAUF and MAUF for the relevant criteria and sub-criteria in order to evaluate the MAUF of each stakeholder.

#### A. BSPI Assessment

While assessing a score for each stakeholder is important in the sense that it helps identify strengths and weaknesses in the banking performance with respect to the stakeholder of interest, it is equally important to come up with an aggregate score that reflects the overall sustainability performance of a bank, referred to as *the banking sustainability performance*

*index (BSPI)* as introduced above. Such an index accounts for the relative importance of each stakeholder in the evaluation process. Again, each stakeholder may be viewed as one attribute and the corresponding utility function may play the role of a marginal utility function for the overall MAUF expressing *BSPI* provided that some independence conditions hold.

Because it is debatable to specify the real importance of one stakeholder relative to the remaining ones, our assessment was carried out in a way such that all stakeholders are considered as equally important.

#### B. Results and Analysis

Table I displays the value of *BSPI* for each bank over the period of study. For confidentiality reasons, we have omitted the names of the banks and contented by referring to them as A, B, and C in an arbitrary manner.

It is clear from Table I that all these banks are far away from being sustainable. Their *BSPI* vary from the lowest level of 2.7% to the highest level 9.1% over the entire period of study. These low scores may give indications for the occurrence of the crisis. This is better visualized by Fig. 2. This figure helps in particular compare the sustainability performance of the three banks of the study over the period 2004-2011. Note that, bank B is constantly keeping relatively low scores. However, bank C which was providing the best performance has significantly degraded its sustainability score after the crisis. Meanwhile, bank A provided the highest scores after the crisis (2009-2011).

In order to understand in depth the factors leading to these low levels of *BSPI*, an investigation via stakeholders' scores is carried out. Fig. 3 displays the three banks performance over the period of the study with respect to each stakeholder. It appears clearly that before the crisis, all the banks had the priority to satisfy shareholders. This is particularly apparent with bank C. After the crisis, a significant drop in shareholders' utility is observed. Recall that banks' ultimate objective is to maximize shareholders' value. Such an objective fails in the presence of the crisis. Managers (at least for banks A and C) seem to be affected by the crisis. This might be due to the decrease of the banks *ROA* and perhaps as a result of initiatives to control executive wages. In contrast, the performance at regulators and customers levels has witnessed some detectable increase after the crisis reflecting perhaps higher awareness of the role of the regulators and the importance of customers' satisfaction. Concerning employees and civil society, no real change can be detected. This applies to all three banks reflecting similar attitude towards these stakeholders. Employees might still be marginalized. However, for the civil society even when some initiatives are taken, their outcomes are likely to be observed only at the medium- and the long-terms.

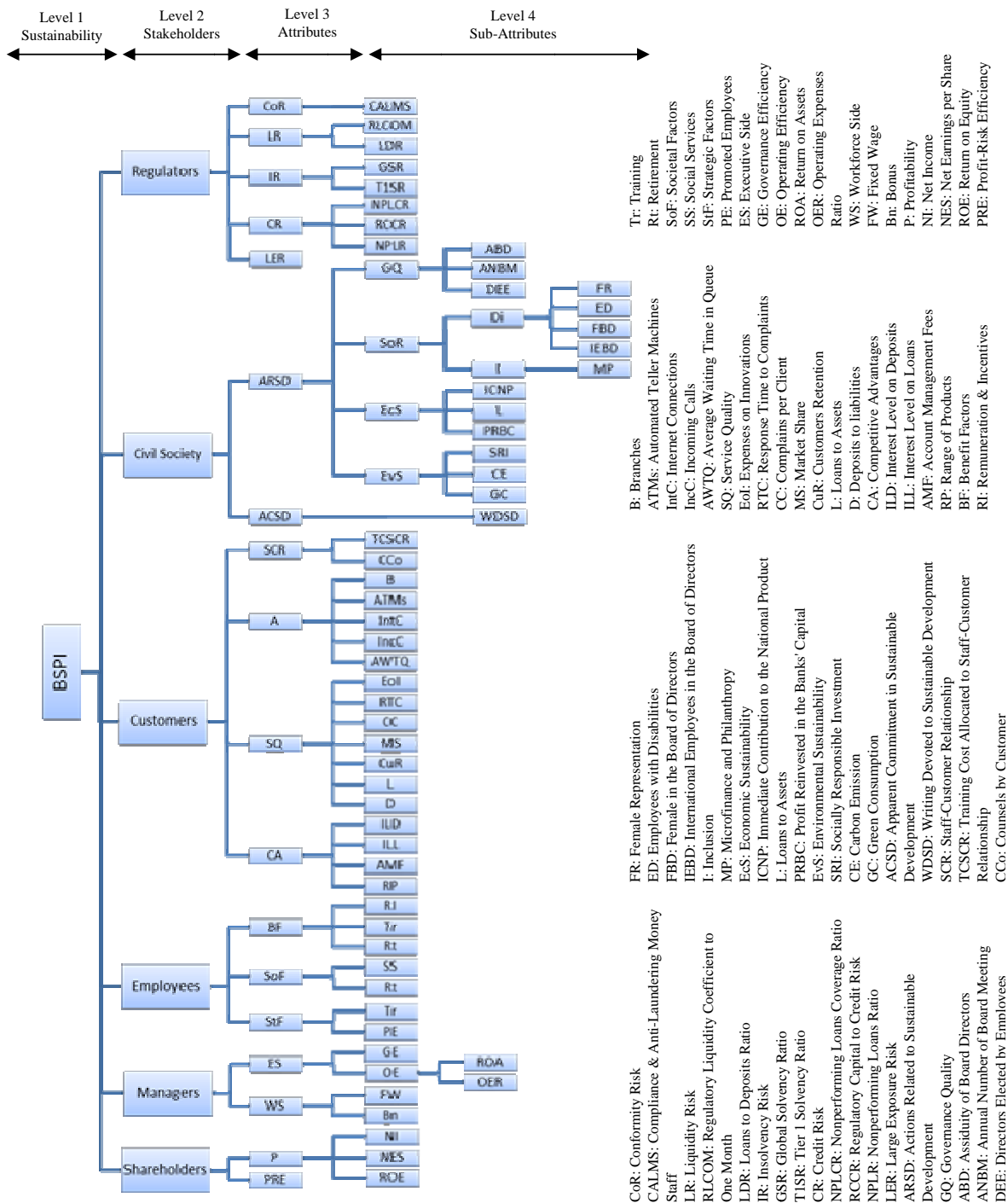


Fig. 1 Selected attributes and sub-attributes

TABLE I  
BSPI OF EACH BANK OVER THE PERIOD 2004-2011

BSPI	2004	2005	2006	2007	2008	2009	2010	2011
A	0,066	0,066	0,083	0,081	0,038	0,072	0,079	0,071
B	0,038	0,044	0,051	0,047	0,038	0,042	0,056	0,053
C	0,080	0,090	0,100	0,034	0,037	0,039	0,055	0,051
Average	0,061	0,067	0,078	0,054	0,038	0,051	0,063	0,059

*A. Discussion*

To the best knowledge of the authors, this is the first time when a banking performance evaluation process is made via the development of a sequence of utility functions rather than just measuring some key performance indicators (KPIs). The approach combines both qualitative and quantitative criteria in a pragmatic and scientific way to offer a rational score of overall performance referred to as BSPI. This score allows assessing the effects and synergies among the different plans and actions conducted. It accounts for the performance of the most important involved stakeholders of a bank as indicated above. It is built on win-win strategies with respect to all stakeholders rather than just satisfying a bank's shareholders.

Given that conflicting objectives exist among stakeholders, reaching very high levels of BSPI seems practically infeasible. However, banks planning efforts should be directed toward continuously improving BSPI. The best attained scores by the most performing banks at some given period can be used as a benchmark of sustainability. This benchmark is dynamic and higher levels should be targeted progressively. Moreover, BSPI can constitute a basis for ranking banks at national and

international levels. Its quantitative nature helps in avoiding any confusion or debatable subjective opinion in the evaluation process. Further, it is a pre-established system so that each bank may insert the appropriate data and obtain the right score independently of any ranking organization eliminating all sources of conflict of interest and offering therefore a transparent ranking tool.

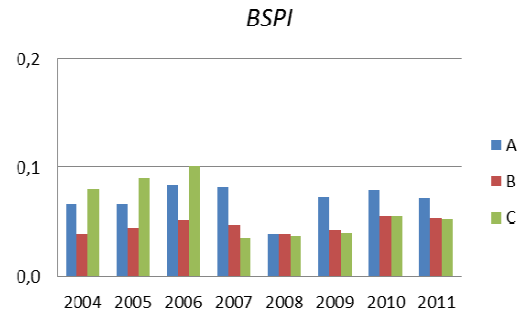


Fig. 2 BSPI comparison over time

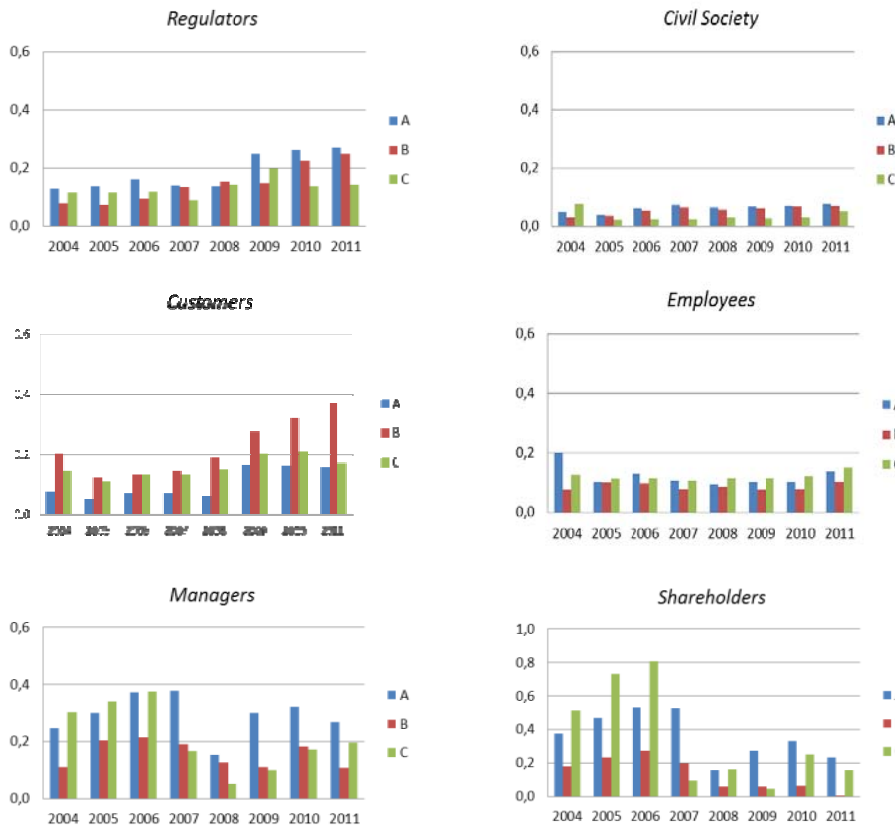


Fig. 3 Bank performance over time according to each stakeholder

Note that one of the major sources of critics of existing rating agencies resides in the conflict of interest behind their evaluations. Furthermore, the current evaluation effort of these

agencies is limited to financial aspects for financial rating agencies and societal aspects for extra-financial agencies. Clearly, our model constitutes a bridge between both types of

rating agencies.

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