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Benchmarking firm performance from a multiple-stakeholder perspective with an application to Chinese banking

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ABSTRACT

We know very little about how a firm would compare against its peers when evaluated from a multiple-stakeholder perspective where the same variables are interpreted differently. Since most medium-to-large organizations acknowledge the multi-dimensional nature of their operations, finding out the performance evaluations of various stakeholders can inform managerial decision-making. Thus, the main motivation for this study is to capture the interactions among different perceptions on a common set of performance measures. Using data envelopment analysis (DEA), we work with an approach that allows a flexible designation of inputs and outputs based on varying perspectives of five key stakeholders in banking. The versatile approach demonstrates that different views from the stakeholder universe can be summarily captured in DEA scores. A numerical example on Chinese commercial banks identifies the compliant (efficient) banks versus rigid (inefficient) banks, as well as the amenable stakeholders (those evaluating banks as efficient) versus the recalcitrant stakeholders (those evaluating banks as inefficient). The aligned views held by management and shareholders as evidenced by significant correlation among performance rankings imply reduced agency costs. Similarly, shared perceptions between customers and employees may encourage management to examine how this important business interface can be improved.

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1. Introduction

It is a firmly established view in the business world, particularly among executive management, that a firm's primary loyalty is to its shareholders. This has given rise to a large volume of research directed at measuring the shareholders' wealth as reflected in the share price. On the other hand, relative performance or benchmarking studies that rely on well-documented Operations Research techniques such as data envelopment analysis (DEA) tend to estimate stock performance based on an *a priori* selection of production inputs and outputs (for example, see Chu and Lim [1], Beccalli et al. [2], and Kirkwood and Nahm [3]). More importantly, such studies of stock performance often investigate performance from management's or investor's perspective. Yet, we know very little about how a firm would fare against its peers when evaluated from a *multiple-stakeholder perspective* where the same variables may be perceived quite differently.

The concept of evaluating performance from a multiple-constituency perspective is not new. For example, human resource management literature talks about measuring an individual's performance through a process of multi-source feedback (e.g., see London and Smither [4]). A variant of multi-source feedback is 360° evaluation where a manager's performance is assessed by his or her subordinates, peers, supervisors, customers, and suppliers. Furthermore, some publications report that orienting toward the diverse interests of stakeholders is central to strategic planning, and failure to address the interests of multiple stakeholders may harm company performance (Greenley and Foxall [5]). In the current study, we adopt a multi-constituency evaluation where the individual is replaced by the organization (i.e., a bank). Since most medium-to-large organizations recognize the multi-dimensional and dynamic nature of doing business, finding out the perceptions of various stakeholders can inform managerial decision-making in an exercise of peer benchmarking.

Thus, the main motivation for this study is to capture the interactions among different perceptions on a common set of bank performance attributes and their corresponding measures. We achieve this using DEA, which summarizes the input–output performance analysis in a single score and identifies potential improvements where conversion of inputs to outputs are inefficient relative to the best performers in the sample. We distinguish technically efficient banks from inefficient banks as

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evaluated by a selection of key attributes and stakeholders. In addition to shareholders, other key stakeholders would normally include customers, management, bank employees, and regulators. In the first application of multiple-stakeholder perspective to evaluating relative bank performance, we illustrate how to answer the following key research questions:

(a) Which banks are considered *efficient* by the stakeholders? We call this group the *compliant banks*. For example, regulators may reward such banks by relaxing additional reporting requirements or inspections because of their success in pleasing a wide section of the population that includes consumers. The argument in this example is that the other stakeholders are doing part of the regulator's job and sending favorable signals.
(b) Which banks are considered *inefficient* by the stakeholders? We call this group the *rigid banks* and provide them with benchmarking advice. For example, regulators may exercise tighter monitoring over this group.
(c) Which stakeholders are evaluating the banks as *efficient*? We call this group the *amenable stakeholders*. For example, banks could collaborate with such stakeholders for public relations and promotional purposes, particularly aimed at winning over the recalcitrant stakeholders (identified next).
(d) Which stakeholders are evaluating the banks as *inefficient*? We call this group the *recalcitrant stakeholders*. For example, bank management could spend more effort in satisfying such stakeholders as suggested in the previous question. This kind of information can be channeled into promotional activities or marketing.

Rest of the paper unfolds as follows. Section 2 offers an overview of DEA and its use with multiple stakeholders, followed by an explanation of the current paper's approach to selecting inputs and outputs. Section 3 begins with a description of the study setting and data, before outlining the formulations for the range-adjusted measure of efficiency. Results and analysis are detailed in Sections 4 and 5, offers concluding remarks.

2. Conceptual framework

2.1. Data envelopment analysis and its use with multiple stakeholders

In the introduction, we briefly mentioned DEA as a popular technique for relative performance analysis. DEA is a non-parametric technique that computes a comparative ratio of pre-specified weighted outputs to weighted inputs for the production technology of each unit, which is reported as the relative efficiency score. At the heart of DEA lies the condition of Pareto optimality for efficient production. Pareto optimality states that a decision-making unit (DMU) is not efficient if an output can be raised without raising any of the inputs and without lowering any other output; similarly, a DMU is not efficient if an input can be decreased without decreasing any of the outputs and without increasing any other input (Charnes et al. [6]).

The relative efficiency score (a scalar value) is usually expressed as either a number between 0 and 1, or as a percentage. A DMU with a score less than 1 is deemed inefficient. Thus, DEA is classified as an efficient frontier technique where those units *on* the frontier determine the potential improvements (projections) for the various inefficient units *off* the frontier. DEA's ability to capture the interactions among multiple inputs and multiple outputs is its distinct advantage over traditional ratio analysis; because of this characteristic, some researchers refer to DEA as a multi-criteria decision-making technique. DEA is a particularly appropriate technique in the current study because it is able to generate a non-parametric efficient frontier based on actual observations instead of trying to estimate the production function. As such, DEA permits a more open-ended development of ideas and exploration of data. The reader is referred to Cooper et al. [7], Avkiran [8] and Zhu [9] for a more in-depth treatment of DEA.

Nevertheless, traditional DEA is not always appropriate. This is because it expects an *a priori* specification of input and output variables that do not change throughout the analysis. In an environment of multiple stakeholders, this fixed specification becomes unworkable because it is unlikely that all the stakeholders would agree on a given attribute's labeling as an input or an output. In the current study, we are interested in demonstrating how to capture the interacting different views of multiple stakeholders on multiple measures in order to benchmark firm performance.

An earlier attempt at using DEA to cater for multiple-stakeholders' perspectives can be found in Sarrico et al. [10] who examined how a student can best select a university. The authors' approach relies on the student answering a series of questionnaires that guide the designation of inputs and outputs, as well as weights that reflect the relative importance attached to these variables by the student. Sarrico et al.'s approach generates a league table customized for the individual student.

On the other hand, Bougnol et al. [11] illustrate how a generalized model of DEA can be used to profile the evaluation of multiple projects put forward for an interstate highway by accommodating the perspectives of multiple constituencies. Predefined attributes are treated as potential inputs and outputs for DEA but are not forced into either category. Instead, a flexible code tests for all possible constituencies determined by systematically changing the designation of each attribute to an input where a rise is regarded as *undesirable*, or to an output where a rise is regarded as *desirable*. This treatment of each attribute as desirable versus undesirable is referred to as isotonic in Dyson et al. [12]. That is, all else equal, a higher output increases the technical efficiency of converting inputs to outputs (thus, is desirable), whilst a higher input reduces efficiency (thus, is undesirable).

2.2. Designating input and output variables across multiple stakeholders

In the current study, the *a priori* fixed designation of inputs and outputs seen in traditional DEA is replaced by a varying stakeholder-specific treatment of each attribute as *desirable* (i.e., an output) or *undesirable* (i.e., an input). This judgment is left to, what Bougnol et al. [11] call, constituencies (referred to as stakeholders in the current study), with the expectation that different stakeholders may maintain different perspectives on the desirability of attributes. Essentially, we avoid the *a priori* fixed designation by working with an approach which permits a more flexible choice between inputs and outputs based on perspectives of stakeholders. Our study differs from Bougnol et al. [11] in that, while they use generalized DEA which tests for all possible input–output combinations, the current study works with pre-designated input–output sets that represent the views of selected stakeholders. In this respect, the study's research design falls in between traditional DEA and generalized DEA.

According to Garcia-Cestona and Surroca [13], previous studies of relative efficiency in banking have often overlooked the multiple-goal nature of such businesses in measuring

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