Performance Evaluation of a Golf Course Using the PPP Model

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ABSTRACT

The “Profitability = Productivity + Price Recovery” (PPP) model was published in Harvard Business Review more than two decades ago. Yet hardly any application of the model can be found in the open literature. This paper describes a spreadsheet application of the model in a real-world setting. Interest in golf has been growing over the years, but many golf courses have been losing money. So a performance measurement system using the PPP model is developed for a golf course to identify and analyze problem areas. Experience from this implementation and recommendations for improvement of the golf course will be discussed.

INTRODUCTION

Golf has been growing in popularity over the years. The majority of the courses in the USA are public. Since 1950s, public courses have shown the most growth, and currently have the largest market share with 46% of the golf market (Melvin and McCormick, 2001). Research suggests that the industry is over-built and half of the golf courses don’t make money (Snell, 1999). Cities around the country are reporting financial problems with their golf courses (City of Reno, 2003; Woodward, 2003; McGee, 2004; Hardy, 2004; Viren, 2004). If the municipal golf courses keep on losing money year after year, tax payers are not going to be happy.

Total-factor productivity measurement models can help identify the problem areas in business organizations. The purpose of this paper is to describe the case of a municipal golf course, collect the financial data, develop a spreadsheet-based performance evaluation system, analyze the results, identify any problems, and develop possible solutions. Financial viability of golf courses is essential for making many more Woods and Wies of the future.

The paper is organized as follows: 1. background on performance measurement models and golf, 2. description of the Ebony Hills Golf Course, 3. data collection and model setup using the PPP model, 4. interpretation of the results, and 5. summary and conclusions.

BACKGROUND

Profit margins and productivity are the two most important performance indicators for CEOs in their strategic decision-making, according to Industry Week’s 27th annual survey (Stevens, 1998). Performance measurement has gained some importance in recent years because of the
balanced scorecard created by Kaplan and Norton (1992). The scorecard does not attempt to link productivity to profitability, and it uses both financial and nonfinancial measures. But according to a 1998 survey of U.S. and Canadian companies, financial measures are given more importance and used most often (Stivers et al., 1998). The balanced scorecard and nonfinancial measures have gained tremendous importance in performance measurement over the last decade (Bourne et al., 2003; Frigo and Krumwiede, 1999; Ittner and Larcker, 1998). Managers are continually under pressure to measure the performance of their organizations (Holloway, 2001). Many companies are attempting to implement the balanced scorecard. However, there is evidence that many of these implementations are not successful (Bourne et al., 2003; Bruce, 2004; Clinton, Webber and Hassell, 2002; Ittner, Larcker and Randall, 2003; Schneiderman, 1999; Smith, 2002). One of the main problems seems to be the complexity of the system requiring considerable time and expense to implement and operate. Some suggest a more encompassing system that includes measures on corporate social responsibility (Stainer and Stainer, 2003). That may create even bigger problems.

Golf has been growing in popularity as shown in Table 1. Since 1990, while the number of golfers increased by 14%, golf courses increased by 32%. While rounds of golf played per facility had an up and down but relatively flat growth, the number of golfers per facility has dropped (Figure 1). This suggests over capacity. Moreover, the daily fee charged has by far the biggest growth since 1990: over 50% increase for golf facilities and 65% increase for golf courses. Given this financial state of golf courses, we wanted to look at the performance of a local municipal golf course.

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<td>431</td>
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(Source: National Golf Foundation. ** Includes 9-hole courses also)

Table 1: Golf Statistics
Because the significant problems facing many golf courses now seem to be financial, this paper will focus on financial performance. Moreover, a study of service industry shows that “the majority of performance indicators that companies have in place are financial ones. Non-financial aspects are partially measured but often they are not an integral part of the monthly or annual reporting…. The analysis shows further that the concept of leading and lagging indicators is not applied” (Kueng, 2002). The objective of performance evaluation is to identify the problem areas and their root causes so that management can take corrective action to improve the situation. Profit-linked total-factor productivity measurement models are more suitable for organization-level performance measurement. These models could be used for any organization that generates revenues. Although Ebony Hills golf course is not a for-profit organization, it generates revenues.

The advantage of total-factor measurement models lies in the fact that they link productivity to profitability (Miller, 1984; Miller and Rao, 1989; Rao, 2000; Sink et al, 1984). The terms total-factor and multi-factor are sometimes used interchangeably. When all factors of production are not used in the model, total-factor becomes a multi-factor measurement model (Sink et al, 1984).

One of the total-factor models is called the “Profitability = Productivity + Price Recovery” (PPP) model by Miller (1984). It is more than two decades since it was published in Harvard Business Review. Yet no application of the model can be found in the open literature. In this paper we describe the use the PPP model for performance measurement.
THE PPP MODEL

The attraction of the PPP model to the business community is that it uses readily available accounting data and provides performance results in dollars as opposed to abstract indexes (Rao, 2000). In the PPP model, current period performance is measured against the actual performances of the previous periods. As Peter Drucker said, to gauge firm performance over time, “[w]hat matters...is not the absolute magnitude in any area, but the trend...that the measurements will give...no matter how crude and approximate the individual readings are by themselves” (Drucker, 1992). The PPP model can be easily implemented in popular spreadsheet software such as Microsoft Excel, and can facilitate easy creation of graphs that are useful for trend analysis. This paper describes a multi-period implementation of the PPP model for a municipal golf course. This application can help many revenue-generating organizations – both public and private – to develop their own applications for performance evaluation.

A CASE STUDY

Ebony Hills golf course is a 9-hole municipal golf course in the center of Edinburg, Texas. Edinburg is located in the Rio Grande Valley in South Texas. It is about 20 miles north of Mexican border and about 50 miles west of South Padre Island. As a municipal course it is run on a cost recovery basis. It is managed by a superintendent, a golf supervisor, a green foreman, two cashiers, a cook, and three lawn equipment operators. The course structure is similar to an 18-hole course with 3 tees and combination of par 3, 4, & 5’s. The course competes with 30 other courses in the valley, 17 of them within 15 miles and two 18-hole courses (one public and one private) within Edinburg. There are two 9-hole courses within 15 miles, but Ebony Hills is the largest and charges the lowest green fees.

Customers are primarily Winter Texans and persons over 40. Most revenue is derived in winter months. Winter Texans spend about $225 million in the valley and it is estimated that a total of 7,850 jobs are generated from the economic impact that Winter Texans bring to the Valley (Texas Lawyer, 2002). Since 1998 there has been an annual increase of 7% of the winter visitors that come to the valley (Center of Tourism Research, 2003). Most under-18 golfers use the golf course in the summer via camp.

DATA COLLECTION AND MODEL SETUP

The required data for the PPP model is any two of the quantities, prices and values. Value is the product of quantity and price. These data are required on both outputs (products/services sold) and inputs (resources used). As shown in Table 2, the revenues here come from green fees, annual memberships, cart fees, and other sales. The expenses are categorized into labor, supplies, material, maintenance, energy, capital, and miscellaneous.

For-profit businesses rarely share operational data such as quantities and prices of inputs and outputs. Since a municipal golf course is under the city government, the data is not confidential. Citizens have the right to the data. Yet there could be problems in getting the necessary data in the detail that is needed. Even if the data is accessible, we may have to spend many hours to sort through the data and extract the numbers. Finally without the cooperation of individuals who
know and use the data, interpretation and/or analysis may be impossible. We were fortunate to have the support of the city mayor as well as the superintendent and supervisor of the golf course.

### Table 2: Quantities and prices of inputs and outputs

With the quantities and prices entered, costs and revenues are calculated. Then there are a series of calculations: 1. implied deflators and deflators, 2. values (i.e., costs and revenues) in constant

<table>
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Table 2: Quantities and prices of inputs and outputs
dollars, and 3. profit margins and deflated profit margins, 4. profitability, productivity, and price recovery indices, and 5. profitability, productivity, and price recovery contributions in dollars.

**Calculation of deflator values**

With the quantities and prices entered, costs and revenues were calculated. The PPP approach uses cumulative deflation. The period-to-period price changes are "chained together to produce a cumulative price deflator. Dividing a current period figure by this cumulative deflator allows the figure to be restated in base period prices, using a base several periods removed" (Miller, 1984). The values of deflators are obtained by multiplying current period quantity by the last period price. The implied deflator is obtained by dividing "value" of each period by the "value in last period price." The deflator values are calculated by multiplying all the previous periods' implied deflators with the current period's implied deflator.

**Performance results**

“The PPP model is based on the premise that a firm can generate profits from productivity and/or from price recovery improvement. Productivity is a measure of real growth changes in physical input and output quantities whereas price recovery is the extent to which input cost or price increases are passed on to the customers (i.e., the extent to which inflation is recovered through sales price increases)” (Miller and Rao, 1989). Performance results with respect to profitability, productivity and price-recovery for periods 2-4 are determined as follows:

**Profitability contributions**

Profitability is calculated by multiplying the difference between the current period margin and the base period margin by the total sales of the current period. That’s

\[
\text{Profitability} = S_t (\text{Margin}_t - \text{Margin}_B) = S_t \left[ \left( \frac{(S_t - C_t)}{S_t} \right) - \left( \frac{(S_B - C_B)}{S_B} \right) \right] = \left( S_t C_B - S_B C_t \right) / S_B
\]

where \(\text{Margin}_B\) = Base period gross profit margin
\(\text{Margin}_t\) = Period t gross profit margin.

**Deflated values and margins**

Gross margin values are calculated by dividing the difference between the total sales and the resource cost by the total sales to get the gross margin of a resource. The deflated gross margin values are obtained by dividing the difference between the deflated sales and costs by the sales (all deflated to base period).

**Productivity contributions**

Productivity is calculated by multiplying the difference between the deflated margin of the current period and the base period margin by the deflated total sales of the current period. That’s
Productivity \(= S_{ID} \times (\text{Margin}_{ID} - \text{Margin}_B)\)

\[= S_{ID} \times [(S_{ID} - C_{ID})/S_{ID}] - ((S_B - C)/S_B)\]

\[= (S_B C_B - S_{ID} C_B)/S_B\] (6)

where Margin\(_B\) = Base period gross profit margin
Margin\(_{ID}\) = Deflated gross profit margin in period \(t\).

\[
\text{Price recovery} = \frac{\text{Sales}_{tPR} \times (\text{Margin}_{tPR} - \text{Margin}_B)}{\text{Profitability} - \text{Productivity}}
\]

Table 3: Overall performance results

Price recovery contributions

where "Sales\(_{tPR}\)" is price-generated revenue in period \(t\), and "Margin\(_{tPR}\)" is the price margin that equals the difference between price-generated revenue and inflation-generated cost divided by price-generated revenue.

An alternative formula of price recovery is simply the difference between profitability and productivity contributions.

Price recovery = Profitability - Productivity

INTERPRETATION OF RESULTS

Table 3 and Figure 2 show overall performance results for the golf course in terms of productivity, price recovery, and profitability contributions. Overall price recovery trend looks very good, but there are serious problems with overall productivity and profitability. They are not only negative but showing worsening trend. The biggest problem area seems to be labor. As shown in Figure 3, labor performance trend lines look very much like the overall performance lines. Price recovery seems to be good, but labor productivity and profitability are negative and going downhill. Negative labor productivity suggests that more labor hours are being used for the same or lower output. The sales revenues and deflated sales (revenues in constant dollars) suggest that they are either flat or slightly decreasing over time. If we go back to Table 2 and look at the quantities and prices of labor, it clearly shows that although labor pay rates remained relatively same, the hours have been going up significantly. This is something that management
should look into and address. Price recovery contributions are a result of inflationary effects on outputs and inputs. Positive price recovery suggests that there is not much more inflation on resources used that is not factored into the prices of goods or services sold. Profitability contribution is the sum of productivity and price recovery. The overall results suggest that the management needs to look at strategies for increasing revenues and lowering costs, especially labor costs.

![Overall Profitability, Productivity, and Price Recovery](image1)

**Figure 2: Overall profitability, productivity, and price recovery**

![Labor Profitability, Productivity, and Price Recovery](image2)

**Figure 3: Labor profitability, productivity, and price recovery**
Although golf is popular, many golf courses are losing money. Many of them are owned by taxpayers and run by local governments. In this paper, we described the case study of a local golf course, collected data and developed a spreadsheet-based performance measurement system using the PPP model. It revealed serious problems in the areas of productivity and profitability contributions of labor. Even without the PPP model, the financial data revealed deepened losses year after year. We plotted the profit/loss figures by month for each year. This chart exposed that summer months are big losers and Winter Texans are making a significant contribution to lessen the losses.

In order to develop solutions, we conducted SWOT analysis and came up with several strategies that the management could consider. When we presented the report, representatives of the city management were impressed by the analysis, identification of problems and recommendation of possible solutions. The multi-period application of the PPP model in this case has clearly exposed labor as the main culprit for worsening losses. But laying off people is not a politically viable option at this point. They very much liked the idea of building a driving range in order to attract more customers and increased revenues.

A word about the implementation of the model. The seasonality of the data suggests that it would have been wrong to develop the PPP application using monthly or quarterly data. We used yearly data, which ignores seasonalities within a year. Finally, we hope this application will encourage others to look at the enterprises run by their own local government, collect data, analyze the results and develop solutions for the betterment of their community.

REFERENCES


Center of Tourism Research (2003), available at: coba.panam.edu/centers/tourism.html.


