J. Dairy Sci. 98:8319–8332
http://dx.doi.org/10.3168/jds.2014-9252

A decision-making tool to determine economic feasibility and break-even prices for artisan cheese operations

Catherine A. Durham,*[1] Andrea Bouma,† and Lisbeth Meunier-Goddik†
*Department of Applied Economics, Food Innovation Center, Oregon State University, Portland 97209
†Department of Food Science and Technology, Oregon State University, Corvallis 97331

ABSTRACT

Artisan cheese makers lack access to valid economic data to help them evaluate business opportunities and make important business decisions such as determining cheese pricing structure. The objective of this study was to utilize an economic model to evaluate the net present value (NPV), internal rate of return, and payback period for artisan cheese production at different annual production volumes. The model was also used to determine the minimum retail price necessary to ensure positive NPV for 5 different cheese types produced at 4 different production volumes. Milk type, cheese yield, and aging time all affected variable costs. However, aged cheeses required additional investment for aging space (which needs to be larger for longer aging times), as did lower yield cheeses (by requiring larger-volume equipment for pasteurization and milk handling). As the volume of milk required increased, switching from vat pasteurization to high-temperature, short-time pasteurization was necessary for low-yield cheeses before being required for high-yield cheeses, which causes an additional increase in investment costs. Because of these differences, high-moisture, fresh cow milk cheeses can be sold for about half the price of hard, aged goat milk cheeses at the largest production volume or for about two-thirds the price at the lowest production volume examined. For example, for the given model assumptions, at an annual production of 13,608 kg of cheese (30,000 lb), a fresh cow milk mozzarella should be sold at a minimum retail price of $27.29/kg ($12.38/lb), whereas a goat milk Gouda needs a minimum retail price of $49.54/kg ($22.47/lb). Artisan cheese makers should carefully evaluate annual production volumes. Although larger production volumes decrease average fixed cost and improve production efficiency, production can reach volumes where it becomes necessary to sell through distributors. Because distributors might pay as little as 35% of retail price, the retail price needs to be higher to compensate. An artisan cheese company that has not achieved the recognition needed to achieve a premium price may not find distribution through distributors profitable.
Key words: artisan cheese revenue, price, cost

INTRODUCTION

As cheese entrepreneurs consider entering the artisan business, they find it challenging to determine whether it will be a successful business venture. Several tools are useful to evaluate the economic feasibility of an investment; some of the most commonly used are net present value (**NPV**), internal rate of return (**IRR**), and payback period (**PB**).

Within an adequately designed economic feasibility model, the NPV formula can be used to determine the minimum revenue per unit required to be profitable. For artisan cheese makers, that provides a means for determining the cheese price necessary to succeed, as well as understanding cost structure. The break-even price is the lowest price the product can be sold for that achieves a nonnegative NPV—the point at which the sum of discounted revenues and costs over time is zero. To be a sustainable business, cost structure and market pricing associated with cheese type need to be considered and should not be pursued unless the NPV is greater than zero. Business risk is included in NPV calculations by increasing the discount rate utilized.

Additional measures of business health often used are IRR and PB, mainly because they are intuitive to understand the level of potential value. The IRR is complementary to the NPV calculation; it is essentially the discount rate that would take the NPV to zero. Thus, if the calculated IRR is not greater than the discount rate considered appropriate for the project, the project should not be considered attractive. In practice, IRR is generally used to examine comparable investments, rather than to stand alone. The IRR provides

Received December 17, 2014.
Accepted June 25, 2015.
[1]Corresponding author: cathy.durham@oregonstate.edu

a way to examine projects with comparable risk and capital. Finally, the PB is commonly used to determine the time needed to earn back the initial capital investment. Although PB does not consider the time value of money and ignores the value of the venture beyond the point of payback, it is useful information especially for start-ups as liquidity can be the main reason a venture does not succeed. When evaluating risk of a potential venture, it is important to look at all of these financial measures across multiple scenarios to best understand the sensitivity of the overall system (Brigham, 1985).

A key parameter when determining business viability is price. Both Becker et al. (2007) and Nicholson and Stephenson (2007) concluded that product pricing was a challenge. Becker et al. (2007) suggest that smaller cheesemakers would have to depend, among other things, on their ability to adopt a "premium pricing strategy." Specialty cheeses produced by local artisan companies are generally more expensive to produce per unit than cheeses produced in nonartisan settings, in part due to the large start-up and production costs associated with artisan cheese making and the smaller scale (Bouma et al., 2014). Determining the correct pricing structure and potential for achieving it is essential. However, many start-ups do not have the information needed to determine a reasonable retail price and instead select their price based on comparable cheese prices in the market place. Although the price of comparable cheeses is critical information, the artisan must, at a minimum, be able to obtain a price that covers costs associated with production and marketing of the cheese as well as a mark-up based on wholesale or distributor sales (Caldwell, 2010). However, many artisan cheese makers lack data on cost of goods sold (**COGS**), which includes inputs such as milk and nonmilk ingredients, labor, aging, packaging, sanitation, utilities associated with production, rent, insurance, and licensing. This is only the beginning: financing, product shrink, cost of marketing, sales, distribution, depreciation, and preventive maintenance are also critical. Artisan cheese makers must also study the market situation to determine if the retail price required to cover expenses can actually be obtained. Are there sufficient customers willing to pay the high price for the artisan cheese? How can the company reach these customers? Are there special circumstances that will help sell the cheese such as having won a cheese competition, being promoted in a popular cheese book, or producing a limited supply of a popular variety (Franklin and Cotterill, 1994).

The study reported here uses a decision-making tool developed to determine the economic feasibility of artisan cheese operations. The application of the tool is demonstrated in this study by exploring 3 sets of scenarios: the first set explores how production volume affects NPV, IRR, and PB for a constant cheese type and retail price across a single market situation; the second determines the retail cheese price that achieves an NPV of zero across multiple cheese and milk types for a single production level and market situation; and the third explores minimum viable production and plant utilization given retail price and the plant size and capital investment.

MATERIALS AND METHODS

Artisan Cheese Economics Model

Development of the Excel model (Microsoft Corp., Redmond, WA) was described in Bouma et al. (2014). Briefly, 7 current artisan cheese makers were surveyed to determine all start-up and operating expenses along with income streams and sales and distribution systems. The 7 companies ranged in production size from 2,500 to 30,000 kg/yr. Five companies used goat milk and 2 used cow milk; all were located in rural or semi-rural settings. Four goat milk companies produced chevre and multiple hard cheeses. One goat milk company only produced Gouda-style cheeses. The cow milk companies exclusively produced hard cheeses. The 4 smallest companies sold cheeses through direct outlets, such as farmers markets or at the farm, and wholesale to select retail outlets and restaurants. The 3 largest sold additionally sold cheeses through distributors. All 7 were farmstead companies. The findings from the survey in conjunction with cost and operational information from equipment manufacturers were incorporated into an economic feasibility model. The model allows for adjustment in product offerings and pricing, initial capital investment needed, and operational costs, and calculates loan payment, depreciation, and taxation over a 15-yr operational period to produce cash-flow information. The cash-flow information was then used to calculate NPV, IRR, and PB. The tool was developed in Excel (Microsoft Corp.) to allow for maximum access. Subsequently, the model was beta-tested with multiple entrepreneurs during their business start-up to ensure model validity. Beta-testing was first conducted with the initial 2012 model and later repeated for the updated 2014 model.

Several model features have been updated. The changes incorporate additional information collected on labor and energy use and updated equipment costs, and allow for more flexible allocation of labor by the owner-operator as well as the frequency of cheese making. The model is currently used within the Oregon State University dairy extension program.