Journal of Hospitality Financial Management

The Professional Refereed Journal of the International Association of Hospitality Financial Management Educators

Volume 29
Issue 1 *Special Issue: Economics of the Foodservice System*

Article 3

2021

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Recommended Citation
Sharma, Amit (2021) "Cost-benefit Analysis Rules for the Foodservice System," *Journal of Hospitality Financial Management*: Vol. 29 : Iss. 1 , Article 3.
DOI: https://doi.org/10.7275/s78n-vv08
Available at: https://scholarworks.umass.edu/jhfm/vol29/iss1/3

THE JOURNAL OF HOSPITALITY FINANCIAL MANAGEMENT
2021, VOL. 29, NO. 1, 16–23
https://doi.org/10.7275/s78n-vv08

# Cost-benefit Analysis Rules for the Foodservice System

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**ABSTRACT**
Cost-benefit analysis (CBA) is an established approach to help make informed decisions. The practical technique has been used extensively in several areas of study, and there is a robust literature on numerous aspects of CBA. While the functional characteristics have been well expounded, the incorporation of CBA into varied disciplinary contexts remains scanty. Foodservice systems can be viewed as an extension of the broader food system. Within food system economics literature, a critical gap remains in the study of behavioral decision-making through the lens of microeconomic approaches. CBA provides a theoretical approach to conduct such inquiries. Two rules in CBA, opportunity cost and sunk cost, relevant to behavioral decisions, remain understudied, not just in context of the food system (and therefore the extended foodservice system) but also in the general literature in CBA. In this paper, we provide an overview of those two CBA rules. We do so in context of the key concepts and ideas that define the economics of the foodservice system. Opportunity cost and sunk cost research presented here offers perspectives from business focus, supply chain, and consumer aspects. In articulating an agenda for future research, we highlight the value of employing interdisciplinary and multidisciplinary approaches for such inquiries. Novel methodologies can also ensure we capture the true nature of decision behavior within these CBA rules. The most apparent of these is the measurability of costs and benefits. In this paper, we describe going beyond measurable costs and benefits, and tapping into the opportunities to broaden the framework of systematically understanding decision-processes. While we focus the discussion on the foodservice and food system, the discussion is as relevant to broader hospitality research endeavors.

**Keywords**: cost-benefit analysis, sunk cost, opportunity cost, foodservice system, decision-making

## Introduction

Cost benefit analysis (CBA) is a well-studied and applied concept in decision-making. It emerged from the need to justify the investments in public work projects in the nineteenth century. Jules Dupuit is largely credited for the concept, later developed by others, including Alfred Marshall. Since its beginnings though, CBA as an idea has been incorporated in the decision-making of policy matters, and also in business project decisions. In the last three decades, there has been a growing interest of using CBA in everyday decisions at the individual level. While this literature continues to gain the interest of scholars, it remains understudied. This presents an opportunity to investigate how CBA can better guide decision-making in everyday decisions. CBA also lends itself well for normative rules that can offer guidance to ensure everyday decisions are optimized. Larrick, Nisbett, and Morgan (1993) argued that normative rules can guide decision-making. Certainly, we can debate the value of normative decision rules. While we do so, though, there is an abundance of information through online and social media sources that such debates are in a sense moot. Meanwhile there is a level of vulnerability for users of this information, given not all of it is from credible sources. In the context of the numerous societal challenges that we face, we believe all attempts are worth an effort to enhance decision-making.

The purpose of this paper is to highlight two rules associated with CBA: sunk costs and opportunity costs. The focus on sunk cost and opportunity cost rules is for two reasons: increasing awareness of utilizing available resources effectively for decisions and everyday choices (Arkes & Blumer, 1985; Kulikovskaja & Aschemann-Witzel, 2017); and also because

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of the increased pressure on decision-makers from the perspective of an ever-growing set of options to choose from (Gul, 2018). The information overload and information accessibility (Phillips-Wren & Adya, 2020) are also the reasons for the growing complexity of decision-making. Ignoring sunk costs and missing out on opportunities can therefore impose greater burdens of erroneous decisions. Despite these decision-making realities, surprisingly these two CBA rules remain relatively understudied, particularly for everyday personal and management decisions.

We contextualize our discussion to everyday decisions in the foodservice system, for both consumer and business management contexts. The foodservice system involves a variety of decisions that can impact personal well-being and beyond (McMahon et al., 2010). Elsewhere in this special issue, there is discussion on the significance of food expenditure by households. While the proportion of household expenditure has been reduced over the last several decades (largely due to increasing incomes and lower food prices), food expenditure remains a dynamic issue, and one with consequences on health and well-being of households (Chen & Antonelli, 2020). The foodservice industry also has a broad economic impact (Sharma, Da Motta, et al., 2016); and businesses need to make decisions that are optimal for the investor, and also those that will ensure environmental sustainability (Kim et al., 2015). As supply chain, operations, and market channel complexities continue to increase, so will the need to make effective and optimal decisions. We highlight the current research in CBA, and then focus particularly on sunk cost and opportunity cost perspectives. On these we superimpose the foodservice system components (Heller & Keoleian, 2003) where the CBA rules can be leveraged to enhance decision-making. We conclude the discussion with an agenda for future research in the multidisciplinary and interdisciplinary aspects of the economics of foodservice decisions through the lens of CBA.

## Economics of the Foodservice System

Economic analysis of the foodservice system presents possibilities to gain a deeper understanding of this system's various components, and the whole. There is extensive literature on the economic analysis of the food system in general (Reardon & Timmer, 2012) that dates back to the 1950s and 1960s. Since then, there have been several strands of literature that have emerged in food system economics. However, and broadly speaking, the literature has sought to understand the structural and contextual nature of the food system (Goonan et al., 2015). One of the critical gaps that exists in the food economics literature is a lack of microeconomic behavioral analysis and decision-making (Sharma, 2020). Furthermore, theoretical foundations integrating subsystems into a whole foodservice system are relatively recent (Goonan et al., 2015); frameworks are needed that can capture decision-making mechanisms adopted by stakeholders across the food system, including farmers, producers, and further upstream into the food processing, wholesale, and retail environments. That brings to point the limited research in the food retail area of the food system, the space that also includes the foodservice industry. In fact, this literature recognizes the existence of micro-systems in the larger food system (Popkin & Reardon, 2018). Altogether, what is lacking is an inquiry into the decision-making aspects of the foodservice sectors of the food system.

Stepping back, the idea of a foodservice system is also in its infancy and needs further description and elaboration. Foodservice system in this current context is defined broadly to include the key components of a system: input, process, and output (Goonan et al., 2015). Inputs for the foodservice system are the resources (such as capital, employees, equipment, land) and direct raw materials (agriculture output, food, beverage). Each of these resources and inputs have their own subsystems. Processes for converting these inputs are several, as evidenced from the broad variety of foodservice operations. As the market segmentation of foodservice activity continues to expand (DiPietro, 2017), there is also a need to recognize the unique approaches and technical requirements for processing foodservice outputs in each of those segments.

These variety of processing create a diverse set of subsystems. Each of those foodservice segments focus on a particular type of output, as in the foodservice experience. And each of those outputs has a subsystem of its own defined by the varied consumer segmentation. While a more detailed discussion on these issues is reserved for elsewhere, we highlight

the systems approach to provide a perspective of the depth and breadth of decisions that can impact the availability of inputs, design and efficiency of processes, and the variety, quality, and acceptability of the output as perceived by the ultimate consumer. Monetary investments are needed in the various components of the systems and subsystems for investment in establishing the business (Lin et al., 2020), and for subsequent upgrades. Furthermore, various areas of long-term investments include equipment, technology (DiPietro, 2017), and also the investments in constantly evolving business concepts. The most recent example is that of ghost kitchens (Garlick, 2017). Spurred by the COVID-19 pandemic, but with historical references, ghost kitchens as a concept are being well received by the consumer and are experiencing strong growth at the time of writing this paper. In the past, building a restaurant involved defining the concept that will last a lifetime of that business. However, that trend is no longer considered feasible. Flexible and ever-changing concepts are becoming more acceptable, and even demanded by the consumer that is often seeking novel experiences (Reinstein & Hand, 2020). Reimagining investment in foodservice will require managers and owners to embrace lowered risk aversion and rethink those sunk costs of ever-constrained resources of money, time, and effort. The future performance and eventual success of foodservice businesses will depend on management and owners' ability to avoid overemphasis on the past, and remain focused on the future. Similarly, consumers will have opportunities to experience newer product and service concepts, which will be better aligned with health and broader sustainability outcomes. Emphasis on evaluating future costs and benefits for behavior change will yield greater utility to consumers and the society as a whole than choosing the status quo. We believe an understanding of sunk cost effect and opportunity cost mechanisms can inform normative rules for decision-making.

## Cost-Benefit Analysis

CBA has provided a rule-based systematic approach for decision-making, though in mostly policy, project, and infrastructure analyses (Jones et al., 2014; Johansson & Kriström, 2015). Its utility in everyday behavioral decisions has remained less explored, and therefore only scant research exists. However, even though research has not always been explicitly labeled as CBA, the general concepts have been of interest to researchers. So it will help to provide definitions and outlines of the concepts we intend to focus upon.

CBA essentially focuses on decision rules that systematically evaluate the incremental costs and benefits of each available option so that the decision-maker optimizes their utility by choosing the one that has the most net benefits (Larrick et al., 1993). Complexity of the process can arise due to several elements of the approach that are not always well defined.

For instance, costs and benefits often depend on the context of choice (Hensher, 2019). Factors impacting the decision may or may not be entirely in the control of the decision-maker. Often there will be more than one factor impacting the nature of the decision, thereby creating a complex array of costs and benefits. Therefore, the nature of costs and benefits is also not homogenous (Sharma, 2020), least of all the factors that influence them. Factors that can influence food decisions include economic (prices, demand, supply), taste, environment, variety of choices, ambience, socio-cultural, psychological, biological, and demographic factors (Sharma, 2020). Depending on the choice alternatives derived from each of those influences, the cost-benefits can vary. The characteristics of these costs and benefits will also differ. Costs and benefits may not always be monetary either. Often costs are uniquely understood as monetary, but that is not necessarily the case, and usually cost characteristics violate that definition. For a more in-depth discussion on CBA, particularly in context of foodservice decisions, see Sharma (2020) and Sharma, Roberts, and Seo (2011). The non-monetarization of costs and benefits is not a trivial issue. While we propose that to be the focus of a future discussion elsewhere, we define costs and benefits broadly in this discussion as time, effort, and money (Sharma, 2020) (See Figure 1).

The rules that we focus our discussion on for this paper are sunk costs and opportunity costs (Larrick et al., 1993). There are several reasons to focus on those two rules of CBA. First and foremost, both rules emphasize the focus on future costs and benefits by ignoring past ones. In other research, lack of future orientation has been noted as a crucial blind spot for

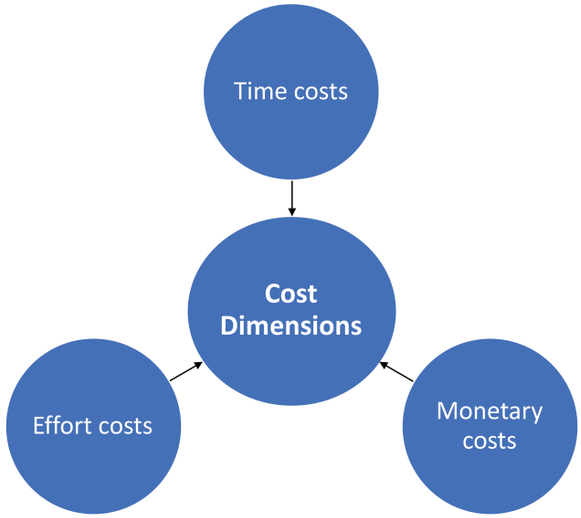


**Figure 1.** *Cost Dimensions*
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choices and decision-making under uncertainty. We believe therefore issues surrounding future orientation of decision rules has a greater significance of impact on eventual behavior change. Furthermore, sunk cost and opportunity cost implicitly highlight the issues surrounding nonmonetary costs and benefits. Therefore, indirectly we hope not to ignore the challenges that surround the measurement issues related to costs and benefits. Also as noted earlier, the ever-increasing constraints on resources and the complexity of decision-making justify the focus on these two CBA rules (Arkes & Blumer, 1985; Kulikovskaja & Aschemann-Witzel, 2017; Phillips-Wren & Adya, 2020). In the next two sections we describe the nature of sunk cost and opportunity cost and their impact on decision-making. We also superimpose the food systems framework to identify opportunities to leverage these ideas so that decisions can be optimized.

## Sunk Cost Effect and Foodservice Decisions

Sunk cost effect (SCE) is the tendency for the decision maker to continue placing importance on a historic cost that has already been incurred and cannot be recovered (Ronayne et al., 2020). In essence, what should matter are the future costs and benefits and not historic costs. There are several classic examples of SCE to demonstrate how historic costs can bias decisions despite evidence to suggest that future costs and benefits are the relevant ones to focus on. For instance, the SCE is often related to the "Concorde effect" representing the expensive error of judgment of the French and British Governments to continue operations of the expensive supersonic jet rather than "cutting their losses" and ending the program (Arkes & Ayton, 1999). SCE has been well documented in decisions involving monetary resources (Roth et al., 2015). In general, the literature is supportive of the SCE effects though the context of the decision does matter. More importantly, the type of decision also makes the difference between the effects of sunk costs. For instance, Roth et al. (2015) differentiate between two types of decisions: utilization and progress decisions, the former involving a choice between two similar alternatives, and the later related to the start of a new project. However, research in the context of time and effort sunk cost is relatively scarce. The evidence that does exist points toward the existence of sunk costs in the context of time. For instance in a recent study Hrgović and Hromatko (2018) noted that study participants found it faster to continue investing in time rather than to terminate the project. Similarly, the research in the study of sunk cost of effort is also scarce and less understood.

The underlying mechanisms of the SCE are identified as loss aversion (Tait & Miller, 2019), optimistic probability bias (Juliusson, 2006), a sense of personal responsibility (Arkes & Ayton, 1999), and waste avoidance (Fantino et al., 2007). In each of those cases, research can guide us to better understand how sunk costs can impact decision-making. Loss aversion can increase the likelihood of overweighting sunk cost (Tait & Miller, 2019), and in fact underweighting of opportunity benefits. Therefore, decisions involving investing time, money, and effort in new projects, considering newer options in the choice set to make decisions, or incorporating new perspectives into ongoing projects or everyday choices can involve the potential of revoking loss aversion, and therefore sunk cost biases. Optimistic probability bias exists when a decision-maker places higher likelihood on the event than is expected (Meyer, 2014). Uncertain events involving a non-uniform distribution properties can all be prone to an optimism bias.

Decisions that involve input commitment over time or repeatedly for such activities can therefore

be disposed to the likelihood of sunk cost biases. Whether it is commitment to a certain process, input or output channel, obligations of time, effort, and money can all be impacted by sunk cost bias through optimism toward expected outcomes. Sense of personal responsibility of a past decision can create persistent commitment to a decision, thereby inducing the sunk cost effect (Navarro & Fantino, 2009). For foodservice businesses, repeated decisions, such as those involving supply chain commitments, product development, investment in assets and service quality, and consumer segmentation focus can bring about a sense of responsibility amongst owners and managers. Consumers are also accountable to their choices (Luchs et al., 2015). The accountability brings with it responsibility attributed to those past choices. Such instances can also involve the responsibility-driven persistent commitment of input and resources, thereby falling victim to sunk cost effects. There is also the waste avoidance theory that argues that the sense of avoiding waste can lead decision-makers to overemphasize the importance of past sunk costs and place less importance to future costs and benefits (Arkes & Ayton, 1999).

Given the very nature of food and agriculture products, waste avoidance has emerged as a critical factor for sustainable development (Kulikovskaja & Aschemann-Witzel, 2017). However, these foci come with caution of potential sunk cost influences, depending on the nature of future effects of such decisions. Within the foodservice system, production, processing, and consumption all involve an element of waste avoidance, including decisions involving supply chain management. Food waste itself happens to be a critical global challenge, especially in the foodservice sector (Beretta & Hellweg, 2019). How does the sunk cost effects interact with the priority of food waste avoidance? Several questions remain unanswered in the sunk cost effect literature. Incorporating them across the foodservice system presents opportunities to understand the characteristics of this bias, and also the prospects to enhance our understanding of foodservice system decisions that can improve system outcomes.

## Opportunity Cost and Foodservice Decisions

Given that resources are scarce, opportunity cost is the lost benefits that are forgone of the option that is not chosen (Palmer & Raftery, 1999). Even though this is a fundamental idea in economic analysis, estimation of opportunity costs is nontrivial. Opportunity cost estimates depend on the assumption that the forgone option yields those specific benefits. Uncertainty of those benefits can lead to incorrect estimates of opportunity costs. Furthermore, the options forgone are also a function of the choice set, and that this choice set is complete and stable over time. If temporal uncertainties exist, those too can create uncertainties in estimates of opportunity costs. Therefore, and from a related perspective, sunk cost effects can be triggered due to the lack of opportunity cost considerations.

Cost-benefit analysis complications can in fact be best represented in the computational effort needed for estimating opportunity costs (Kurzban et al., 2013). In this manner, opportunity cost estimation is closely aligned to the core principle of sunk cost effects, whereby the decision-makers' focus ought to be on future anticipated benefits and to compare those to the options under consideration. Opportunity costs have been studied in the context of food away from home (Prochaska & Schrimper, 1973), particularly in the context of time. In essence, as the opportunity cost of time increases, the greater is the incidence of food away from home. Opportunity cost of time can also impact the choice ability of decision-makers. For instance, Sharma, Moon, Bailey-Davis, and Conklin (2017) argued that such costs limit choice behavior to certain preferences, and potentially even a preference of fewer choice options. In other instances, higher opportunity costs, such as for time, can also have implications on the choice architecture (Sharma, Moon, & Bailey-Davis, 2018), if the friction of greater opportunity costs are impeding decision-making. Therefore, opportunity costs of time (and effort) can be viewed as transaction costs, particularly when decision-maker's ability to conduct transactions is negatively impacted by time constraints (Fugate et al., 2012).

While monetary opportunity costs are challenging to often estimate, barriers to estimate opportunity cost of time and effort are as many, if not greater. Although there is evidence to suggest that nonmonetary benefits are of importance as decision criterion for small agri-businesses (Alam & Wagner, 2016), there is relatively less clarity on

the role nonmonetary cost, and even less so on how this relates to small businesses in other sectors of the food system. Small business owners comprise a large majority of foodservice industry. While undoubtedly monetary costs (capital for investment) remain a challenge, nonmonetary opportunity costs, such as those of time and effort, could also impact decision-making; however those remain understudied. Even in monetary terms, the opportunity cost of capital for entrepreneurs can be relatively higher than those of a well-diversified investor (Kerins et al., 2004). Given the importance of foodservice businesses in entrepreneurship and small business activity, such lines of inquiry can enhance our understanding of business success or failure. Previous literature has suggested novel approaches to measuring nonmonetary opportunity costs translated to monetary values (Maeda et al., 2018). We believe such approaches (and others) can be adopted to investigate the role of opportunity cost in foodservice system decisions.

## Agenda for Future Research

In this paper we reviewed the case of cost-benefit analysis inquiries of decision-making in the foodservice system. In doing so, we presented a description of the foodservice system as one comprising several subsystems linked to the various foodservice stakeholders. We also provided an overview of economic analysis in this foodservice system, that can be linked to food systems economics inquiries. Furthermore, we identified two clear gaps in that literature: limited inquiry into the behavioral economic aspects of the food system, and limited research in the food retail space, which also includes the foodservice system. The cost-benefit analysis (CBA) provides a theoretical framework within which there are possibilities to investigate behavioral decision making of foodservice stakeholders. We propose two specific rules of CBA: opportunity cost and sunk cost. Both cost rules were discussed from various perspectives, highlighting the research gaps in the literature. These gaps in the literature present opportunities to pose questions that can be relevant to multidisciplinary and interdisciplinary approaches. For instance, questions related to foodservice businesses can benefit from an operational focus along with organizational behavior perspectives. How organizations make decisions in context of CBA can provide new insights. Decisions related to food sourcing and supply chains can incorporate external stakeholder networks and contractual issues in decision-making, where costs and benefits may not be distinctly attributable to only a single player. Product and service-related issues can interface with marketing, brand positioning, and consumer behavior aspects of cost-benefit analysis. And finally, there will be questions related to policy implementation, that can extend across multiple disciplinary points of view. Methodologically, we also believe there are opportunities to incorporate mixed methods approaches for the collection of primary data that allow us to observe behavioral responses. Novel methodological and data analytic approaches will ensure we are able to capture behavioral decisions within the CBA rules: the two presented here, opportunity cost and sunk cost, certainly provide a starting point for these inquiries.

### *COVID-19 and Decision-making*

Sunk cost and opportunity cost effects can be context dependent (Thames, 1996; Keasey & Moon, 2000). That is, perceived costs can be influenced by the framing of these costs and the circumstances that are represented by those costs. Furthermore, research also suggests that the influence of both these costs under extreme uncertainty can be impacted by loss aversion behavior by people (Phillips et al., 1991). The external environment in particular can be a consequential source of uncertainty. Research conducted during the COVID-19 pandemic found that consumers and decision-makers had become overly concerned about the uncertainty and risk posed by the pandemic (Yue et al., 2020). This change in risk and loss acceptance impacted decision-making. Both sunk and opportunity cost effects could then have a higher likelihood of being triggered during such a crisis. How such crises impact the ability of decision-makers to ignore sunk costs and accurately consider opportunity costs, can also enhance our understanding of decision-making in these contexts. Future crises will occur, and when they do, such an understanding will be valuable to create interventions that alert decision-makers of how sunk and opportunity costs can weigh negatively on decision outcomes.

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