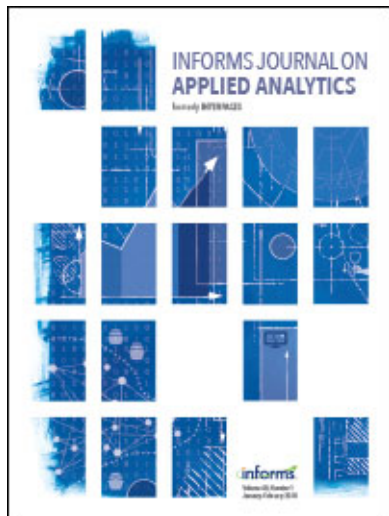




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Book Reviews

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Book Reviews

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Abstract. In *Book Reviews*, we review an extensive and diverse range of books. They cover theory and applications in operations research, statistics, management science, econometrics, mathematics, computers, and information systems. In addition, we include books in other fields that emphasize technical applications. The editor will be pleased to receive an email from those willing to review a book, with an indication of specific areas of interest. If you are aware of a specific book that you would like to review, or that you think should be reviewed, please contact the editor. The following books are reviewed in this issue of *Interfaces*, 48(1), January–February 2018: *Portfolio Construction Measurement and Efficiency*, John Guerard, Jr., ed.; and *Contract Analysis and Design for Supply Chains with Stochastic Demand*, Zhao Yingxue, Xiaoge Meng, Shouyang Wang, and T.C. Edwin Cheng.

GUERARD, JOHN, JR., ed. 2017. *Portfolio Construction Measurement and Efficiency*. Springer. 453 pp. \$159.00.

Portfolio Construction Measurement and Efficiency is a collection of 19 papers honoring Jack Traynor—an American economist who made important contributions to financial theory and practice. The papers are written by renowned academics and seasoned practitioners on issues of portfolio risk and return, and inspired by approaches pioneered by Jack Traynor.

The papers address topics in several areas. Chapters 1 and 2 provide a general introduction to the Nobel Prize-winning modern portfolio theory (MPT) and the capital asset pricing model (CAPM), which Jack Traynor invented simultaneously and independently of William Sharpe, John Lintner, and Jan Mossin at the beginning of the 1960s. Chapter 1 also discusses the performance assessment of mutual funds, another area in which Jack Treynor blazed a trail, and the industry-standard Barra and Axioma risk models, whose development was inspired by empirical research related to the CAPM and theoretical extensions of the CAPM, such as arbitrage pricing theory. Chapter 4 provides further discussion of risk models and an empirical comparison.

The remaining chapters can be grouped by discussion topic. Several chapters focus on extensions or applications of MPT. Chapter 7 applies a framework in which variance as proxy for risk is replaced by

expected tail loss which, in contrast to variance, is a downside risk measure rather than a symmetric measure of uncertainty. The author describes the optimization framework and provides an empirical comparison and performance attribution based on the Barra risk model. Chapter 11 describes a three-step portfolio construction process based on MPT utilizing alpha signals coming from certain factors, such as value and momentum. Finally, Chapter 14 discusses an application of MPT to the construction of long-only efficient portfolios of foreign large-blend mutual funds. The authors study the effects of transaction cost, turnover, and upper weight bound and provide ex-post efficient frontiers.

Performance measurement is the focus of several chapters. Chapter 3 discusses return-based performance measurement and, more specifically, methods to capture the market-timing skills of active managers. The authors provide an extensive overview of the historical evolution of different models and discuss empirical results. Chapter 6 focuses on the impact of transaction costs on the profitability of investment strategies. The authors provide a summary of the empirical evidence regarding the profitability of different asset pricing anomalies under both proportional and nonproportional transaction costs. Chapter 8 discusses the statistical issues in performance assessment and

proposes a method for improvement. Finally, Chapter 12 analyzes a measure of market connectedness, thus capturing the statistical significance of a prespecified cluster structure as a risk factor with explanatory power for the cross section of stock returns.

The CAPM is celebrated as the first asset pricing model. Not only did it have a huge impact on empirical and theoretical work in finance, but it also had a major impact on investment management practices. As a result, for example, in the 1970s, the passive investment industry was born, which advocated that the best way to invest is to passively track a broad market capitalization-weighted portfolio, also known as a broad market index, which could be viewed as a proxy for the efficient market portfolio of the CAPM. Empirical research in the subsequent 30 years indicated that the market index may not be an efficient portfolio, and the late 1990s and the 2000s saw the rise of the so-called *smart beta strategies*, which can be positioned in the middle ground between passively and actively managed portfolios. Smart beta portfolios can be loosely defined as rule-based strategies with no discretionary input (and therefore akin to passive portfolios), but take advantage of the information in factors known to be priced. Some approaches are rooted in portfolio theory and therefore require optimization; some use ad hoc weighting schemes.

Several chapters relate to the concept of smart beta. Chapter 9 discusses the link between the classical value strategy and a long-term mean reversal strategy. The authors conclude that the value strategy is superior to the more naive long-term mean reversal because of the information content of the price-to-book ratio. Chapter 10 discusses the problem of how to build factor-replicating portfolios and provides an empirical study for the earnings yield and the momentum factors. Finally, Chapter 15 provides an empirical comparison of several smart beta strategies, known as fundamental index funds to some index providers.

Finally, an important problem that has been gaining attention in both theory and practice is that of model risk. Any factor model uses particular factors, which might be incorrect or incomplete. Because any such model is used in practice to forecast the future expected returns rather than the past realized returns, the ability to quantify the quality of the model related

to its forecasting power is of interest. Chapter 5 discusses a method to carry out such a test. In a similar setting, Chapter 18 argues that the CAPM theoretically describes the structure of the market factor and all extensions of the CAPM are essentially empirical in the sense that the additional factors are developed only after observing data; thus, their structure is driven by the data they are designed to explain. An empirical test should therefore be based on other types of data. The chapter provides a methodology and discusses empirical results.

In this review, we have attempted to provide a glimpse of the wide range of topics that the volume covers and are relevant to both practitioners and academics. This reflects the diversity of the pioneering contributions of Jack Traynor to the field of finance. As far as audience is concerned, the book would be a good reference for both researchers and practitioners who are interested in current trends in the application of portfolio theory and asset pricing models in equity portfolio construction. From a technical standpoint, the articles are quite accessible and include extensive bibliographies.

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YINGXUE, ZHAO, XIAOGE MENG, SHOUYANG WANG, T.C. EDWIN CHENG. 2016. *Contract Analysis and Design for Supply Chains with Stochastic Demand*. Springer. 184 pp. \$129.00.

Given the extensive utilization of contracts in supply chains, the issues concerning contract analysis and design are extremely important for supply chain management, and substantial research has been conducted to address the relevant issues over the past years. Despite the abundance of classical research, new research is needed to respond to recent issues that have emerged within the business environment, such as the rapidly changing and shorter life cycles of products and the increasing globalization of the supply chain. Only in this way can we gain a more comprehensive and profound understanding of this important topic.

The goal of *Contract Analysis and Design for Supply Chains with Stochastic Demand* is to present the results of new research on how to apply contracts to improve supply chain management. This monograph is successful in capturing interesting perspectives on a series of critical problems in the analysis, modeling, and design of supply chain contracts. It uses game theory or optimization models to design and analyze contracts and deal with supply chain cooperation, coordination, risk sharing under asymmetric information, environmental risk, and uncertainty. It provides theoretical innovations and makes substantial contributions to the theoretical development and practical applications of supply chain contracts. This book contains eight chapters that mostly concentrate on supply chain contract analysis and design.

Chapter 2 explores buyback contracts in a supplier-retailer supply chain in which the retailer faces a price-dependent downward-sloping demand curve subject to uncertainty. In comparison to the studies in the existing literature, a fundamental contribution of this chapter is the analytical examination of how uncertainty level, which is inherent in market demand, affects the applicability of buyback contracts in supply chain management. With such a new research perspective, the authors demonstrate that the demand uncertainty level (DUL) is an important dimension affecting the applicability of buyback contracts. This finding can be useful in explaining an industry phenomenon: in the same business setting, some forms of contracts are exploited more often than others, or the same form of contract is utilized more often in one business setting than in another. Although a systematic investigation of this issue has not been undertaken so far, some factors have been shown to have significant effects on the applicability of supply chain contracts; examples include the administrative cost involved (Cachon 2003) and the uncertainty type (Marvel and Peck 1995). In this study, the authors show that DUL is an important factor that affects the applicability of supply chain contracts.

Risk is a pertinent issue in the analysis and design of supply chain contracts with stochastic demand. In addition to credit risk, the risk associated with a supply chain contract, which is designed based on the concept of expectation (i.e., expected profit), includes uncertainty risk in the ultimately realized outcome of

the contract, even if each contracting party has obeyed the contractual terms. Such risk in a supply chain contract, which is termed value risk, is an important factor in a contract's design or analysis. In addition, individuals in supply chains have differing risk preferences; therefore, they can have different attitudes toward the contract value risk, which in turn affect their contracting decisions. In Chapter 3, motivated by these observations, the authors conduct a mean risk analysis for a wholesale-price contract with a supplier-retailer supply chain facing a stochastic price-dependent downward-sloping demand curve, considering contract value risk and the degree of the retailer's risk aversion toward the contract's value risk. This study makes the first attempt to assess the efficiency of wholesale-price contracts that incorporate contract value risk.

Traditional manufacturing simply means production of tangible products; however, customers are becoming more demanding and are imposing captious requirements on both product quality and on the services associated with the product. Because of this change in how customers view service, those firms that are capable of providing service-enhanced products tend to achieve more satisfactory levels of customer service; hence, they capture a greater market share than those that can offer only a pure product. Thus, the concept of a product service system (PSS) has recently become prevalent. In addition, in practice, supply chain members commonly have asymmetric information structures; that is, one supply chain member lacks an important piece of information, while another possesses it. When information asymmetry exists among supply chain members, optimal supply chain performance requires both effective information sharing among these members and coordination of the individuals' actions, thus leading to more complexities in the design and analysis of the supply chain contract. In Chapter 4, the authors assume that the PSS is heterogeneously and complementarily operated; that is, the manufacturer provides a basic product, while the retailer, as the owner of the private demand information, is responsible for adding the necessary value-added service for the basic product. Three types of contracts are developed to help supply chain members make decisions and enhance the efficiency of supply

chain operations. The first is the franchise fee (FF) contract, under which the manufacturer provides a two-part tariff contract, including a wholesale price and a franchise fee, to influence the retailer's decision and detect its private demand information. The second is the franchise fee with service requirement (FFS) contract, under which the manufacturer specifies the service level required in addition to the two-part tariff. The third is the franchise fee with centralized service requirement (FFCS) contract, which is similar to the FFS contract; however, the service level specified by the manufacturer is the system-wide optimal solution. This chapter mainly addresses how to design the contract to assure a credible information sharing across the supply chain and how differences in these three forms of contracts affect the decisions and profits of the supply chain members. Analytical studies show that all three forms of contracts can assure credible demand information sharing across the supply chain; however, the FFCS contract achieves the highest channel profit. This chapter contributes to the literature because it describes the development of systematic theoretical results for the optimization of the PSS using FF contracts in the service-oriented manufacturing supply chain with demand information asymmetry.

Classical research on the option contract model has typically focused on a single-direction option (i.e., the call or put option); under such an option, order adjustment is allowed only upward or only downward. It has been shown that, however, if only upward adjustment is permitted, the option buyer tends to make a conservative order commitment, which leads to an increase in the channel shortage cost. If only downward adjustment is available, the option buyer tends to make an aggressive order commitment, which may lead to excess inventory in the supply chain, thus increasing the channel overstocking cost. Furthermore, the biased orders under the single-direction option may exacerbate the bullwhip effect in the supply chain (Wang and Tsao 2006, Lee and Staelin 1997). Hence, allowing option buyers to adjust orders in only a single direction is not in the best interest of the supply chain. In addition, the market may be so volatile that at the point at which the option buyer wants to purchase an option, that buyer may be unsure of the direction in which

to adjust the order quantity. In such a case, a bidirectional option, which allows the bidirectional adjustments of orders, may be more helpful than a single-direction option in facilitating supply chain operations. Motivated by these observations and insights, Chapter 5 extends the concept of the single-direction option to develop the bidirectional option contract model in which the option may be exercised as a call option and a put option. A two-echelon supply chain comprising one manufacturer and one retailer is considered for the problem under study. With a general demand distribution, the research characterizes the retailer's optimal order strategies, including the initial order strategy and the option purchasing strategy in closed form, with the bidirectional option contract. In addition, the authors take a chain-wide perspective to explore how to design the bidirectional option contract for supply chain coordination.

To employ option contracts in practice, an issue that must be addressed is pricing the option in a reasonable way, such that the pricing scheme is acceptable to all the contracting partners. To address this issue, Chapter 6 explores the supply chain options pricing issue. In classical research, this issue is generally considered in the Stackelberg game framework. Such a pricing scheme, however, is usually unacceptable to the follower because it serves only the leader's interest. This chapter includes the development of a value-based pricing scheme, which differs from the models in the existing literature, for the supply chain options. This scheme encompasses two model scenarios (i.e., a single retailer and multiple retailers). The insight behind such a pricing scheme is to price the option based on the value inherent in the "option right." Furthermore, as the research shows, such a pricing scheme can assure that each contracting partner is able to capture a share of the surplus derived from the option. As a result, all the contracting partners are more likely to accept the pricing schemes developed instead of those that follow the Stackelberg game approach.

Various forms of contracts have been developed to ensure supply chain coordination and allow arbitrary allocation of the resulting coordinating profit between the contracting partners. Note that it is important for a coordinating contract form to enable arbitrary allocation of the coordinating profit, because this implies that there are always some coordinating contracts (i.e., a

subset of all the coordinating contracts, but possibly only a single contract in the subset) under which Pareto improvement can be attained as compared with the decentralized case. Therefore, this property ensures that the coordinating contract form can be implemented with the satisfaction of individual rationality. However, an issue still remains to be resolved: because the extent to which individual contracting parties increase their profits differs among the various contracts in this subset, how to select one that is acceptable to all the contracting partners from this subset remains unclear. Obviously, the ultimate outcome will closely depend on the risk preferences and negotiation powers of the contracting partners. In Chapter 7, the authors attempt to address this issue by using the case of option contracts to consider the selection issue of the coordinating option contracts with a cooperative game theory approach, considering the risk preferences and negotiation powers of the supply chain members. The research developed with the option contract can be easily extended to other types of supply chain contracts, such as the buyback contract and the revenue-sharing contract, which have been well studied in theory and widely adopted in practice. In this sense, this chapter presents a theoretical modeling framework for the selection and implementation issue of supply chain contracts.

In addition to these issues, Chapter 1 provides a comprehensive review of the classical studies of supply chain contracts and summarizes the main contributions made by this monograph. Chapter 8 concludes the monograph and suggests important research directions in the field of supply chain contracts, which are worthy of pursuing in the future.

An acknowledged limitation for the theoretical modeling research of supply chain contracts is that the results and findings derived are mostly based on the model setup, typically the demand setting, and cannot be generalized to the general cases. To improve the applicability of the theoretical modeling research of supply chain contracts, a worthwhile future study would be the exploration of some structural properties

that are largely independent of specific model settings or are applicable to a relatively wide range of business settings for supply chain contracts.

In this research, the option value is calculated based on the concept of expectation, which implies that only risk neutrality is considered. However, supply chain members tend to have different risk preferences and their risk preference structures can substantially determine the option value, which in turn can affect the option pricing. In addition to risk preferences, other critical factors can contribute to the option value; these include the uncertainty level inherent in market demand, the quality of demand information updating, and the trend of spot price of the underlying product. Hence, further research on supply chain options pricing, which incorporates all these factors, is worth pursuing in the future.

To summarize, this monograph provides a wide set of perspectives that, in my opinion, can help both researchers in supply chain management and business practitioners who are seeking a better understanding of supply chain contracts and looking for guidance and decision support in the practice of these contracts. Therefore, this monograph can be useful for both researchers and practitioners in operations management, management science, and business administration. Above all, this monograph will play a significant role on pushing forward the research on supply chain contracts.

References

- Cachon G (2003) Supply chain coordination with contracts. de Kok AG, Graves S, eds. *Handbooks in Operations Research and Management Science. Supply Chain Management, Design, Coordination, and Operations* (Elsevier, Amsterdam), 227–339.
- Lee E, Staelin R (1997) Vertical strategic interaction: Implications for channel pricing strategy. *Marketing Sci.* 16(3):185–207.
- Marvel H, Peck J (1995) Demand uncertainty and returns policies. *Internat. Econom. Rev.* 6(3):691–714.
- Wang Q, Tsao D (2006) Supply contract with bidirectional options: The buyer's perspective. *Internat. J. Production Econom.* 101(1): 30–52.

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