General Information:

1. The goal of this seminar is to introduce the participants to the conducting of scientific research. It thereby prepares the students for the writing of their diploma / MSc thesis. The seminar is geared towards students intending to write their thesis at the Chair of Logistics.

2. Each Participant will explore one of the research papers listed below. The task is to review and critically assess the assigned research paper and to relate it to the corresponding stream of scientific literature. Each participant presents his/her findings in a written report (about 20 pages) as well as in an in-class presentation (20 min + 20 min discussion).

3. Each participant also acts as a discussant for one of the other presentations. The discussant is responsible for critically assessing the presented work and for opening the ensuing discussion.

4. A kick-off meeting for all participants will be held on Wednesday, May 29, 10:15 hrs in room SO318. During this meeting, general guidelines for conducting a scientific literature review will be discussed.

5. The written reports have to be submitted electronically and as a hard copy in two-fold by November 08.

6. The presentations will be held as a blocked session (exact time + room to be announced). Attendance of the presentations is obligatory.

7. The final grade for the seminar is composed of the following components: Written report (60%), presentation (30%), contribution to discussion (10%).

8. The report and the presentations can be delivered either in English or in German.

9. There is a joint application process for all seminars offered by the chairs of the Area Operations Management. In the HWS 2013, this includes the following seminars:

   - OPM 701: Research Seminar Supply Chain Management (Chair of Logistics and Supply Chain Management), topics labeled with ‘L’
   - OPM 761: Research Seminar Production Management (Chair of Production Management), topics labeled with ‘P’
   - OPM 781: Research Seminar Service Operations (Chair of Service Operations), topics labeled with ‘S’
Detailed information on the seminar topics is available on the home pages of the respective chairs. In their application, students can indicate up to five preferred topics from all seminars.

10. Students can apply for the seminars as of May 6 by completing the following online form [click here]. Applicants for OPM 701 must in addition send a CV + official grades overview by e-mail to logistik@bwl.uni-mannheim.de, mentioning “Seminar Application Documents” in the subject row.

11. Applications will be accepted until May 23. Admission to the seminar is binding and will be confirmed by e-mail by May 27.

12. For questions concerning the seminar, contact Prof. Fleischmann at logistik@bwl.uni-mannheim.de.

Seminar topics

Each participant will be assigned one of the topics listed below. The task then is to identify the main issues addressed by the paper, explain its methodology, including potential quantitative models, position it in the corresponding stream of scientific literature, and critically assesses the paper’s contribution to the literature as well as to practice.


*Abstract*

In traditional supply chain inventory management, orders are the only information firms exchange, but information technology now allows firms to share demand and inventory data quickly and inexpensively. We study the value of sharing these data in a model with one supplier, N identical retailers, and stationary stochastic consumer demand. There are inventory holding costs and back-order penalty costs. We compare a traditional information policy that does not use shared information with a full information policy that does exploit shared information. In a numerical study we find that supply chain costs are 2.2% lower on average with the full information policy than with the traditional information policy, and the maximum difference is 12.1%. We also develop a simulation-based lower bound over all feasible policies. The cost difference between the traditional information policy and the lower bound is an upper bound on the value of information sharing: In the same study, that difference is 3.4% on average, and no more than 13.8%. We contrast the value of information sharing with two other benefits of information technology, faster and cheaper order processing, which lead to shorter lead times and smaller batch sizes, respectively. In our sample, cutting lead times nearly in half reduces costs by 21% on average, and cutting batches in half reduces costs by 22% on average. For the settings we study, we conclude that implementing information technology to accelerate
and smooth the physical flow of goods through a supply chain is significantly more valuable than using information technology to expand the flow of information.


*Abstract*

Inventory pooling is at the root of many celebrated ideas in operations management. Postponement, component commonality, and resource flexibility are some examples. Motivated by our experience in the aftermarket services industry, we propose a model of inventory pooling to meet differentiated service levels for multiple customers. Our central research question is the following: What are the minimum inventory level and optimal allocation policy when a pool of inventory is used in a single period to satisfy individual service levels for multiple customers? We measure service by the probability of fulfilling a customer's entire demand immediately from stock. We characterize the optimal solution in several allocation policy classes; provide some structural results, formulas, and bounds; and also make detailed interpolicy comparisons. We show that the pooling benefit is always strictly positive, even when there are an arbitrary number of customers with perfectly positively correlated demands.


*Abstract*

The paper considers a race among multiple firms that compete over the development of a product. The first firm to complete the development gains a reward, whereas the other firms gain nothing. Each firm decides how much to invest in developing the product, and the time it completes the development is a random variable that depends on the investment level. The paper provides a method for explicitly computing a unique Nash equilibrium, parametrically in the interest rate; for a given interest rate, the Nash equilibrium is determined in time that is linear in the number of firms. The structure of the solution yields insights about the behavior of the participants. Furthermore, an explicit expression for a unique globally optimal solution is obtained and compared to the unique Nash equilibrium.


*Abstract*

The available to promise (ATP) function has increasingly attracted the attention of the supply chain management research community as a tool for enhancing the responsiveness of order promising and the reliability of order fulfillment. It directly links available resources, including both material and capacity, with customer orders and, thus, affects the overall performance of a supply chain. In this paper, a mixed integer programming (MIP) model for a quantity and due
date quoting ATP mechanism is presented. This model can provide individual order delivery dates for a batch of customer orders that arrive within a predefined batching interval. In addition, the model allows customized configurations and takes into account a variety of realistic supply chain constraints, such as material compatibility, substitution preferences, capacity utilization, and material reserve. We conclude this paper with sensitivity analysis of performance impacts with respect to batching interval size and material reserve policy.


*Abstract*

The computation of bid-prices for resources is the most popular instrument for capacity control in network revenue management. The basic task of this control includes supporting accept/reject decisions on dynamically arriving requests for products that differ in their revenues and resource demands, respectively. Within actual control, bid-prices can be used to approximate the opportunity cost of reserving resources to satisfy a request. Using this valuation, the request is accepted if the associated revenue equals or exceeds the opportunity cost. Most commonly, bid prices are computed by linear programming based on the forecasted demand with a few updates during the booking period. Due to accepted requests and variations between forecasted and real demand, the approximation of the opportunity cost becomes less accurate with time passing by, leading to inferior accept/reject decisions. Therefore, we propose the concept of self-adjusting bidprices. The basic idea includes defining bid-prices as functions of the amount of capacity already used and of the expected demand-to-come. Coefficients for calibrating the bid-price functions are obtained by a simulation-based optimization using the metaheuristic scatter search.


*Abstract*

Previous experimental work showed that newsvendors tend to order closer to mean demand than prescribed by the normative critical fractile solution. A recently proposed explanation for this mean ordering behavior assumes that the decision maker commits random choice errors, and predicts the mean ordering pattern because there is more room to err toward mean demand than away from it. Do newsvendors exhibit mean ordering simply because they make random errors? We subject this hypothesis to an empirical test that rests on the fact that the random error explanation is insensitive to context. Our results strongly support the existence of context-sensitive decision strategies that rely directly on (biased) order-to-demand mappings, such as mean demand anchoring, demand chasing, and inventory error minimization.

*Abstract*

This paper studies decision rules for accepting reservations for stays in a hotel based on deterministic and stochastic mathematical programming techniques. Booking control strategies are constructed, which include ideas for nesting, booking limits and bid prices. Multiple day stays are taken into account. Instead of optimising a decision period consisting of a fixed set of target booking days, this study simultaneously optimises the complete range of target booking dates that are open for booking at the moment of optimisation. This yields a rolling horizon of overlapping decision periods, which will conveniently capture the effects of overlapping stays.


*Abstract*

Supply contracts are used to coordinate the activities of the supply chain partners. In many industries, service level-based supply contracts are commonly used. Under such a contract, a company agrees to achieve a certain service level and to pay a financial penalty if it misses it. The service level used in our study refers to the fraction of a manufacturer's demand filled by the supplier. We analyze two types of service level-based supply contracts that are designed by a manufacturer and offered to a supplier. The first type of contract is a flat penalty contract, under which the supplier pays a fixed penalty to the manufacturer in each period in which the contract service level is not achieved. The second type of contract is a unit penalty contract, under which a penalty is due for each unit delivered fewer than specified by the parameters of the contract. We show how the supplier responds to the contracts and how the contract parameters can be chosen, such that the supply chain is coordinated. We also derive structural results about optimal values of the contract parameters, provide numerical results, and connect our service level measures to traditional service level measures. The results of our analyses can be used by decision makers to design optimal service level contracts and to provide them with a solid foundation for contract negotiations.


*Abstract*

Most models of product reuse do not consider the fact that firms might be required to innovate their products over time in order to continue to appeal to the tastes of customers. We consider how the rate of this required innovation, which might be fast or slow depending on the product, affects reuse decisions. We consider two types of reuse—remanufacturing to original specifications, and upgrading used items by replacing components that have experienced
innovation since the item was originally produced. We find that optimal reuse decreases with the rate of innovation, implying that models that ignore innovation overestimate the optimal amount of reuse that a company should pursue. Furthermore, we show that reuse can be encouraged in two ways—the intuitive approach of increasing end-of-life costs, and the less intuitive approach of raising the cost to make items reusable. We also examine the environmental impact of reuse, measured in terms of virgin material usage, finding that reuse can actually increase total virgin material usage in some cases. In an extension, we show how the results and insights change when the rate of innovation is uncertain.


*Abstract*

In this article, we investigate the interplay between returns policy, pricing strategy, and quality risk. We define quality risk as the possibility of product misfit, defect, or unconformity with the consumers’ perception. These notions of quality risks differ in return policy restriction, residual values, and whether it is possible to unambiguously reduce the probability of mismatch. Using a stylized two-segment market setting, we demonstrate that consumer returns are offered only when the high-segment consumers incur a higher hassle cost, and both the quality risk and the valuation of the low segment are moderate. Moreover, it is possible to wisely design the returns policy that eliminates all inappropriate returns. Furthermore, the seller with a high-quality risk may offer a refund that exceeds the selling price, which provides a theoretical ground and specific operating regime for the satisfaction guaranteed policy used in some e-tailers. In contrast, when the quality risk is relatively low, further improvement on mitigating the quality risk may not necessarily benefit the seller. Finally, we observe that the restocking fee may be non-monotonic in product quality; thus, a more generous returns policy does not necessarily indicate a lower quality risk.


*Abstract*

Does the payment scheme have an effect on inventory decisions in the newsvendor problem? Keeping the net profit structure constant, we examine three payment schemes that can be interpreted as the newsvendor’s order being financed by the newsvendor herself (scheme O), by the supplier through delayed order payment (scheme S), and by the customer through advanced revenue (scheme C). In a laboratory study, we find that inventory quantities exhibit a consistent decreasing pattern in the order of schemes O, S, and C, with the order quantities of scheme S being close to the expected-profit-maximizing solution. These observations are inconsistent with the expected-profit-maximizing model, contradict what a regular or hyperbolic time-discounting model would predict, and cannot be explained by the loss aversion model. Instead, they are consistent with a model that underweights the order-time payments, which can be explained by the “prospective accounting” theory in the mental accounting literature. A second study shows that the results hold even if all physical payments are
conducted at the same time, suggesting that the framing of the payment scheme is sufficient to induce the prospective accounting behavior. We further validate the robustness of our model under different profit conditions. Our findings contribute to the understanding of the psychological processes involved in newsvendor decisions and have implications for supply chain financing and contract design.