Teaching Demand Management and Price Optimization in the MBA Program at the Carnegie Mellon University Tepper School of Business

Nicola Secomandi
Tepper School of Business, Carnegie Mellon University, Pittsburgh, Pennsylvania 15213, ns7@andrew.cmu.edu

In this paper, I describe the course Demand Management and Price Optimization that I have taught in the MBA program at the Carnegie Mellon University Tepper School of Business during the past five years. I focus on my experience in teaching this course, which has significantly evolved over time from essentially a revenue management course to a course that emphasizes quantitative models that address features falling at the interface between the operations and marketing functions of a firm. I hope that prospective instructors of similar courses will find this discussion useful and informative in making their own choices regarding how to structure their courses.

Key words: revenue management; demand management; price optimization; operations management; supply chain management

History: Received: June 2008; accepted: December 2008. This paper was with the author 3 months for 2 revisions.

1. Introduction

In this paper, I describe the course Demand Management and Price Optimization (DMPO) that I have taught during the past five years in the MBA program at the Carnegie Mellon University Tepper School of Business. This course is an MBA elective that counts both as an operations management course and a quantitative analysis course. DMPO largely started as a "pure" revenue management course, but it has now evolved to feature a broader perspective on the interface between the operations and marketing functions of a firm.

I developed and taught DMPO in the 2003–2004 academic year and also taught it in the next three consecutive academic years, from 2004–2005 to 2006–2007. DMPO was not offered in 2007–2008 for idiosyncratic reasons. I am teaching it again in 2008–2009. The MBA program at the Tepper School includes three types of programs: day-time (regular), flex-time (evening), and flex-mode (remote locations). I have taught DMPO five times in the day-time program and once in each of the flex-time and flex-mode programs. Thus I have gained significant experience in teaching DMPO. I am teaching one day-time section and one flex-time section of this course in 2008–2009.

My goal in this paper is to provide details of my experience that I hope will be useful to prospective instructors when making their own choices regarding how to structure similar courses. I emphasize how DMPO has evolved over time. Rather than providing a year-by-year list of the changes that I have made to this course, I offer a more general description of my approach to teaching DMPO, its content, what seems to work well and what does not, some challenges, and what I have learned in the process. Parts of DMPO are still very much in flux, and I have also taken the liberty to include in this description some topics that I intend to cover as I teach this course again in 2008–2009.

The structure of DMPO is related to the pricing and revenue optimization (PRO) course described by Phillips (2003) and to similar courses discussed by Bell (2004) and Dutta (2006). These courses focus on the optimization of pricing and revenue-related decisions. DMPO also deals with these topics but has a broader perspective, as discussed in §2 (see also §6). Thus a paper describing DMPO seems warranted.

The remainder of this paper is organized as follows. Section 2 discusses the focus and theme of DMPO. Section 3 describes my choice of topics and applications and their sequence. Section 4 presents the main
2. Focus and Theme of the Course

DMPO is an operations management elective. (As mentioned in §1 and discussed in §5, it also qualifies as a quantitative analysis elective.) Thus it has an operational focus: the matching of supply and demand by emphasizing the management of demand, a tactic inspired by the approach of Cachon and Terwiesch (2006) to teaching operations management. However, DMPO differs from their approach because it presents models that are not fully developed in Cachon and Terwiesch (2006).

Specifically, Cachon and Terwiesch (2006) discuss revenue management booking limits and overbooking techniques to manage demand when supply exhibits significant inflexibility. DMPO takes a broader view: In addition to the tools of revenue management, it recognizes that the tools of operations management and marketing, including pricing, can be usefully integrated to match supply and demand.

Here, DMPO borrows from the views of Shapiro (2007, p. 481), who states that “[i]ntegration of supply chain and demand management decisions should be a prime concern of any profit-maximizing firm.”

This author sees much promise in the use of data-driven integrated supply chain management and marketing models to improve a firm’s profitability. In as far as improved profitability reflects a better match between supply and demand, the view of Shapiro (2007) clearly illustrates the theme of DMPO: the use of data-driven optimization-based demand management models that recognize the firm’s supply choices and considerations (e.g., capacity and inventory availability) as tools to support managers to better match supply and demand, thereby improving profitability.

This theme is reflected in the name of the course. Although price is not the only demand management choice that can be optimized, it does represent an important one in practice, e.g., markdown pricing in retailing (Mantrala and Rao 2001). Recent supply chain and operations management textbooks, such as Chopra and Meindl (2007), Simchi-Levi et al. (2008), and Van Mieghem (2008), include a chapter on revenue management and pricing that discusses price optimization.

3. Choice and Sequence of Topics and Applications

DMPO covers the following topics: revenue management (booking control), overbooking, price-response functions and constrained supply pricing, markdown pricing, customized pricing, additional joint supply and demand management decisions, and competitive analysis. Phillips (2005) covers the first five topics, and others, in detail. Shapiro (2007, §§12.1–12.5) provides sufficient material and references for the last two. Following are brief descriptions of the topics covered in DMPO.

- **Revenue management (booking control):** The business situation faced by a firm that sells products to different customer segments of uncertain size at different prices through advance reservations and uses finite perishable capacity to deliver its products. It is advantageous for such a firm to control the booking of its capacity over time by accepting/rejecting customer orders (capacity reservations). Selling airline seats is the classical example of this situation. Other applications deal with industries such as car rental, hotel, transportation, and manufacturing.

- **Overbooking:** Taking more reservations than capacity allows. This can improve revenue in the setting I have described because a considerable number of accepted reservations do not materialize at the time of product delivery. The potential applications of overbooking are similar to those of revenue management.

- **Price-response functions and constrained supply pricing:** The price-response function relates price to the demand for a product by a particular customer segment during a particular time period. This function is essentially a price-dependent product and customer-segment revenue rate. Different from the revenue management setting, the price-response function is useful in almost all business domains, including theme parks, sports and entertainment venues, and online advertising. The firm’s objective in the short and medium term is to maximize profit (price minus avoidable costs) from product sales. If the firm’s supply (capacity/inventory) is fixed during the time period under consideration, then the firm faces a constrained supply pricing problem.

- **Markdown pricing:** The special case of constrained supply pricing faced by most retailers, where seasonal merchandise, such as apparel, is sold during a relatively short time period during which customers’ valuations naturally decrease as time progresses.

- **Customized pricing:** The situation faced by firms that operate in business, as opposed to consumer, markets. In business markets, the norm is that suppliers negotiate individual prices with different customers who perform price comparisons among competitors.
suppliers. Customized pricing aims at setting a price for a specific deal to optimize a supplier’s margin from the transaction while taking competitor behavior into account in a statistical (decision-theoretic) fashion.

- Additional joint supply and demand management decisions: A category that could include a very large set of topics. I restrict attention to strategic distribution decisions with revenue and cost considerations, joint production and advertising or dynamic pricing decisions, and product line configuration.

- Competitive analysis: Pricing at the industry level with competition, relying on structural (game-theoretic) modeling of competitive behavior. Applications include pricing with competitive effects and pricing in commodity and commodity-like markets.

I have not covered all of these topics in earlier versions of this course. In particular, most of the topics included in the last two categories are new, and I intend to cover them in the next version of DMPO. I admit that the ability to cover competitive analysis within the available time is in doubt; thus I consider this topic optional.

I proceed by asking students which system computes the opportunity cost of capacity in a typical company. Students have no answer. I suggest that their lack of answer is in fact correct: The typical firm has no such system. I then stress that airlines, hotels, and car rental companies are the most sophisticated firms in consistently computing the opportunity cost of their capacity across markets and time periods and that there is a lot to learn from them about effective demand management. This contrast allows students to appreciate the potential practical usefulness of revenue management methods in other business settings.

There is also a direct methodological connection between revenue management and the other DMPO topics that rely on constrained supply pricing: As is well known, the opportunity cost of constrained supply is a component of an optimal price. I use this argument to explain to students that revenue management models using the opportunity cost of capacity to make accept/reject decisions, such as the bid price
method, can be thought of as restricted constrained supply pricing models.

4. Syllabus and References

This section discusses important elements of the DMPO syllabus. I do not include the details of my syllabus because they are specific to my institution and the program type (day-time or flex-mode/time) and are unlikely to transfer directly to other institutions.

It should be possible to cover all of the topics in a typical full-semester MBA elective, provided that one leaves out competitive analysis and chooses a limited set of applications and models to illustrate additional joint demand and supply management decisions.

Table 1 shows the cases, which are either published or available from their authors. With the exception of Bloomingdale’s (Ke et al. 2007), Fjord (Phillips 2007), and Retailer (Broadie and van Ryzin 1995), which I will likely use in 2008–2009, I have used all of them. These cases span different topics and applications, ranging from revenue management in airline/transportation/hospitality contexts, to markdown pricing in retailing, to customized and dynamic pricing in manufacturing. I intersperse case discussions with lectures throughout the course.

The course features the use of simulators. I have used the Easy Profit simulator of Popescu (2006b) once with good success. This is an airline simulator that allows students to play the role of a revenue manager of a single flight, whose seats are sold over time to two customer classes. Students like this tool because it makes the potentially abstract concept of revenue management booking limits concrete. I have never used the retailer simulator of Joneja and Broadie (1994) in class, but I will do so the next time I teach DMPO to illustrate the process of marking down the price of seasonal merchandise in retailing as the selling season progresses. What I have used so far in this respect is a simplified spreadsheet-based version of this simulator that I developed, which allows me to illustrate how to develop simple yet effective decision support models in practice. Of course, these two activities are not mutually exclusive (more on this below).

Support activities include external speakers and videos of effective managerial practices that leverage relevant quantitative models. Students prefer external speakers. However, videos of the INFORMS Edelman Award competition and the INFORMS Marketing Science Practice Prize competition may provide more variety. Table 2 includes the videos that I have employed during different years of teaching DMPO, with the exception of Travelocity and Chrysler and J.D. Power, which I intend to use in 2008–2009. The Edelman Award videos are available from INFORMS and are supported by papers published in Interfaces following the year of the Edelman competition (see Table 3). The INFORMS Society for Marketing Science videos are also available from INFORMS and are supported by an electronic copy of the presentation that was given during the competition.

Assessment activities include participation, homework, case studies, and either a project or a final exam.

Two activities are not mutually exclusive (more on this below).

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Table 1 Cases

<table>
<thead>
<tr>
<th>Case</th>
<th>Description</th>
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<tbody>
<tr>
<td>Easy Profit (Popescu 2006a):</td>
<td>Airline revenue management</td>
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<tr>
<td>SkyJet (Shumsky 2007; see also Shumsky 2009):</td>
<td>Airline revenue management</td>
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<tr>
<td>Revenue Inn (Chen and Freimer 2004):</td>
<td>Hotel revenue management</td>
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<td>Transportation National Group (van Ryzin 1998):</td>
<td>Transportation revenue management</td>
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<tr>
<td>Yahoo (Dabbous and Popescu 2006):</td>
<td>Internet advertising slot pricing</td>
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<tr>
<td>Vertigo (Popescu 2006c):</td>
<td>Concert pricing</td>
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<td>Bloomingdale’s (Ke et al. 2007):</td>
<td>Retail markdown pricing</td>
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<tr>
<td>Retailer (Broadie and van Ryzin 1995):</td>
<td>Retail markdown pricing</td>
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<tr>
<td>Fjord (Phillips 2007):</td>
<td>Manufacturing customized pricing</td>
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<td>The Right-Price Consultants (Swann 2004):</td>
<td>Manufacturing dynamic pricing</td>
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</table>

Table 2 Videos

<table>
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<tr>
<th>INFORMS Edelman Award</th>
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<tr>
<td>American Airlines (Smith et al. 1991):</td>
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<tr>
<td>National Car Rental (Geraghty and Johnston 1996):</td>
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<tr>
<td>NBC (Bollapragada et al. 2001):</td>
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<td>Texas Children’s Hospital (Born et al. 2003):</td>
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<td>Travelocity (Smith et al. 2006):</td>
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<td>Chrysler and J.D. Power (Shearin et al. 2007):</td>
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<td>bauMax (Natter et al. 2005):</td>
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Table 3 Books, Articles, and Journal

Books

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<td>Phillips (2005)</td>
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<td>Shapiro (2007, Chapter 12)</td>
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Articles

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<th>Title</th>
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<tr>
<td>Fleischmann et al. (2004):</td>
<td>Pricing and operations management</td>
</tr>
<tr>
<td>Smith et al. (1992):</td>
<td>Airline revenue management</td>
</tr>
<tr>
<td>Geraghty and Johnson (1997):</td>
<td>Car rental revenue management and pricing</td>
</tr>
<tr>
<td>Friend and Walker (2001):</td>
<td>Retail markdown pricing</td>
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<tr>
<td>Mantrala and Rao (2001):</td>
<td>Retail markdown pricing</td>
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<tr>
<td>Smith et al. (2007):</td>
<td>Internet retailing</td>
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<td>Bollapragada et al. (2002):</td>
<td>TV advertising slot sale revenue management and pricing</td>
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<td>Born et al. (2004):</td>
<td>Hospital contract optimization</td>
</tr>
<tr>
<td>Silva-Risso et al. (2008):</td>
<td>Automotive industry pricing</td>
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<tr>
<td>Robinson and Satterfield (1998):</td>
<td>Profit-based distribution strategy</td>
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<tr>
<td>Yunes et al. (2007):</td>
<td>Product line configuration</td>
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</table>

Journal of Revenue and Pricing Management

Additional information, including supplemental material and rights and permission policies, is available at http://ite.pubs.informs.org.
Graded participation stimulates active student involvement. I typically assign three homework sets and three cases throughout a minisemester. I recommend having either a project or a final exam. A final exam stimulates students to take a comprehensive view of the course material. This exam can be in-class or take-home, with the latter alternative creating less anxiety among students. A project is more stimulating than a final exam for most students. However, it has two disadvantages in the Tepper School minisemester setting: (1) it can be both challenging and frustrating for students to identify interesting topics and perform a proper analysis in one minisemester; and (2) there is typically no time left for students to present their work in class, which is something they highly enjoy.

Another option is to assign students a guided project. That is, assign to students a project dealing with a specific topic whose execution can lead to a (largely) predefined set of outcomes and guide them through the selection of one of these outcomes.

For example, the next time I teach DMPO I will likely assign students a retail markdown pricing guided project, based on the data used by the retailer simulator (Joneja and Broadie 1994) and ask them to develop a simple spreadsheet-based simulator that embeds both a demand-forecasting model and an optimization-based markdown model, which allows them to assess the performance of these models. That is, I will ask students to create a simplified spreadsheet-based version of the retailer simulator. In this extended exercise, students practice how to creatively approach the development of a data-driven forecasting and optimization decision support tool by being guided through the process of conceptualizing, creating, and explaining such a tool in a written report. This approach could reduce the students’ anxiety level associated with executing a full-blown project in one minisemester without compromising their creative experience.

Yet another possibility is to have students present an article that describes an implementation documented in the practice literature. The advantage of this choice is that students practice giving presentations. The disadvantages are that (1) students present someone else’s work without engaging in a creative process in the same way they would in a (guided) project; and (2) the instructor must trade off presentation time with lecturing time (thus the number of topics that can be covered in the course decreases). One way to tackle the second disadvantage would be to ask students to prepare a written report, but this would take away the excitement of giving a presentation, which is more important for this type of assignment than for (guided) projects.

Table 3 displays the readings of DMPO. I adopted the book by Phillips (2005) one year before it was published. I have found that some students do well without the book by relying on my slides. However, some students prefer to have a book for reference. In the next version of DMPO, I will also include §§12.1–12.5 of the book by Shapiro (2007) in the course readings to provide students with reference material on additional joint supply and demand management decisions.

The course readings also include several relevant articles selected from Interfaces, Harvard Business Review, MIT Sloan Management Review, and the OR Practice area of Operations Research. Further, they include a link to the Journal of Revenue and Pricing Management via our university’s library website. This journal includes several interesting articles dealing with pertinent applications. I have found it to be a good resource for students. (It is also a good source for project ideas.)

I conclude this section by discussing two “must have” topics and related teaching material:

- **Revenue management:** Capacity control with a network of resources based on the demand-to-come linear program and the related bid price method with transportation applications, the Transportation National Group case (van Ryzin 1998), and the article by Smith et al. (1992).

- **Prize optimization:** Single-item markdown pricing in retailing, the retailer simulator (Joneja and Broadie 1994) and case (Broadie and van Ryzin 1995), and the articles by Mantrala and Rao (2001) and Friend and Walker (2001).

In addition, Fleischmann et al. (2004) is a concise and informative executive level article that discusses both of these topics.

The common denominator between these two topics is that they are both based on real applications. Moreover, the two highlighted cases can both be solved using linear programming. Thus these two topics could be used as the content of a module on revenue management and price optimization focused on the application of optimization methods to support demand management decisions. Such a module could be part of an operations management or operations research course.

5. Fit in the Curriculum

DMPO plays an important role in the Tepper School MBA program, where it is a “level 1” elective that students who concentrate in operations management are encouraged to take. The other two level 1 electives are courses in supply chain management and quality. This positioning of the DMPO course is a very recent development and attests to the practical relevance of
managing the “revenue and demand side” of firms in conjunction with the “cost and supply side” and the quality dimension.

The application of optimization, probability, and statistics plays an important role in DMPO. Therefore, the course also qualifies as a quantitative analysis course in the Tepper School MBA program. Our students are well versed in operations research, probability, and statistical modeling and analysis; e.g., they are all familiar with how to formulate and solve optimization models in a spreadsheet because they take required quantitative courses in the first two mini-semesters before enrolling in the core production and operations management course, which is a DMPO prerequisite. Instructors whose MBA programs do not have required quantitative courses may need to compensate for heterogeneity in the students’ quantitative modeling and analysis skills by providing short and focused introductions to these topics.

By its very nature, DMPO bridges our MBA operations and marketing offerings. As mentioned in §3, two courses are directly connected to DMPO in terms of topics: Pricing Strategy and Business to Business Marketing. However, these courses are more qualitative than DMPO, which thus serves a complementary function. In particular, the Pricing Strategy course covers pricing and customer segmentation strategies, which are not part of the material covered in DMPO, and does not feature the same depth of quantitative modeling and analysis of DMPO. Moreover, the Pricing Strategy course has a strategic focus whereas DMPO has a tactical and operational focus.

There is also a connection between DMPO and the Interpersonal Negotiations course offered in the organizational behavior area. The basic principle of the latter course is that a negotiator should not agree to a deal that brings him/her a benefit that is below the value of his/her best alternative to a negotiated agreement (BATNA; Raiffa et al. 2003). Although this makes perfect sense, it is less clear how a commercial negotiator can systematically estimate his/her BATNA value. The notion of opportunity cost discussed earlier is relevant here: The opportunity cost can be useful in estimating one’s BATNA value in a commercial setting. Moreover, when pricing decisions are relevant, an optimal price should typically exceed the opportunity cost. These arguments make for a good class discussion.

The topics covered in DMPO give rise to several interesting ethical questions. Phillips (2005, Chapter 12) discusses some of these issues. Although I do not have enough time to address these aspects in DMPO, they make excellent teaching material for ethics. One way to introduce some of this discussion in the course is to enlist an outside expert to address these aspects as part of a case study discussion. At the Tepper School, we are very fortunate in this respect because Professor John Hooker has made himself available for this purpose. John is both the T. Jerome Holleran Professor of Business Ethics and Social Responsibility and a professor of operations research, which is a perfect match for the stated purpose.

Finally, the course is indirectly related to corporate finance courses. The link here is that different demand management choices can impact the firm’s working capital. The models presented in DMPO do not deal with this link in an explicit manner. A case study dealing with this topic would be extremely useful.

6. Comparison with Similar Courses

Few other business schools offer full MBA courses similar to DMPO. I am aware of the following such courses:

- Dynamic Pricing and Revenue Management taught by Ioana Popescu at INSEAD (http://faculty.insead.edu/popescu/rm/). Apparently, this was the first such course to be developed and taught in a business school (it was offered as early as 1999).
- Pricing and Revenue Optimization taught by Costis Maglaras at the Columbia Graduate School of Business.
- Price and Revenue Optimization co-taught by J. Michael Harrison and Robert Phillips at the Stanford Graduate School of Business. This course is offered in both short (7 weeks) and long (14 weeks) versions.
- Pricing and Revenue Management taught by Itir Karaesmen at the Robert H. Smith School of Business, University of Maryland. This course is also offered in two versions: short (8 weeks) and long (16 weeks).

Moreover, modules dealing with revenue management are included in operations research or operations management courses in various MBA and executive MBA programs. Bell (2004) and Dutta (2006) documenting two such examples.

An examination of the syllabi of the referenced full courses reveals that there are two main differences between these courses and DMPO: (1) the sequencing of topics (with the exception of the short course at Stanford) and (2) the positioning of the course.

First, all but one of these courses follow the basic structure of the course outlined by Phillips (2003). That is, they deal with pricing and price optimization aspects before dealing with revenue management (capacity allocation and booking control) and overbooking; however, not all of these courses deal with...
overbooking. For the reasons discussed in §3, DMPO does the opposite. The only other course that uses the same order of topic presentation as DMPO is the short version of the Stanford course. It is interesting to point out that the full version of this course does not follow the same structure. In contrast, both the short and the full versions of the Maryland course use the same sequencing of topics. Thus the length of the course does not seem to be a useful dimension to explain the inversion of the order of topic presentation in the Stanford short course.

Second, DMPO is positioned as an operations management elective at the interface of operations and marketing that also features quantitative content. In other words, although it does qualify as a quantitative elective, this course is fundamentally an operations management course that deals with demand management tools to support operations managers in matching supply and demand (see §2). In our MBA program, this aspect is reflected in DMPO being one of three level 1 operations management electives (see §5). In contrast, although some of the referenced courses are taught by operations management faculty, it seems fair to state that these courses emphasize the application of operations research and statistical techniques to support a set of demand management business processes rather than directly position the course as a fundamental element of operations management education. Even though our MBA program is fairly quantitative in nature, and DMPO is no exception, this remains an important distinction.

This difference is illustrated by the inclusion in DMPO of the following topics (see §3): joint supply and demand management decisions and competitive analysis (even though I have never covered the latter because of time limitations). In this respect, DMPO is related to those operations management courses that include a revenue management module. (Recall from §2 that most of the newer operations management MBA textbooks include a chapter on revenue management, pricing, or demand management.) The difference between DMPO and these courses is one of emphasis: Whereas these courses emphasize supply management decisions and touch on demand management decisions, DMPO emphasizes demand management decisions and touches on supply management decisions.

### 7. Challenges and Lessons Learned

Teaching DMPO comes with challenges. One challenge is the possible overlap with previous treatments of revenue management in the core operations management course. Students in our daytime program are exposed to some revenue management concepts, which is both a blessing and a curse. The positive aspect is that some students are already familiar with the basic idea behind revenue management. Thus some of those enrolled in DMPO want to deepen their understanding and knowledge of the relevant issues. The negative aspect is that some students may be satisfied with their exposure to revenue management in the core course and do not enroll in DMPO, thus negatively affecting enrollment (discussed below). Of course, this situation is not all bad because it is likely that these students would not have enjoyed this course.

Enrollment can be a challenge if one must meet minimum class size constraints. Table 4 shows that enrollment in my course has varied significantly over time. On average, the course has attracted 27.6 students per section that was offered. Restricting attention to the daytime program, this reduces to 24.5 students per section, which is about 15% of our typical daytime MBA cohort size for the years considered. Registration numbers for the two sections offered in the Fall 2008 semester are 32 and 34. This is encouraging given that DMPO was not offered in 2007–2008. Compared to an elective on supply chain management, enrollment in DMPO is roughly 25% smaller. It is also important to mention that although DMPO has so far attracted only a relatively small fraction of the MBA student population, I have received very positive feedback from the students who have taken this course.

The quantitative orientation of the course can be a challenge, not so much because the content is too technical for students, but rather because some students get carried away with models. The real challenge is to present models for what they are: tools that can potentially improve decision making. Although this is a challenge for any quantitative course in an MBA curriculum, it may be even more so for a course that spans both operations and marketing because models that address issues in two functional areas are

<table>
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<th>Academic Year</th>
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<th>Enrollment</th>
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<tr>
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<td>Day-time (Section B)</td>
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Grand average = 27.6
more difficult to use and implement in practice. Thus it is important to structure this course to address specific issues that arise at the interface of these functions in concrete settings.

This need for specificity and concreteness is itself a challenge because the more well-developed tools are in traditional application areas such as airlines, hospitality, and retailing. Focusing exclusively on these areas makes students question the relevance of the course beyond these settings, but venturing into other areas where the practice of quantitative demand management and pricing is not well established goes against the stated need for concreteness. This requires open communication by the instructor to properly set students’ expectations. Inviting external speakers involved with nontraditional applications can also be useful in this respect, in order to illustrate the state of the art in a particular application area. Moreover, exploratory follow-up project courses with teams of MBA students could be used to identify relevant issues in novel application areas.

I learned several lessons in teaching DMPO. This course originated from within the revenue management community of professionals and academics. However, most students have never heard of revenue management unless they have worked for an airline, a large hotel chain, or a car rental company, or have been exposed to it in the core operations management course (unlike our daytime students, our flex-mode/time students are not exposed to revenue management in the core operations management course). Thus some may think that it is an area of accounting related to earnings management, whereas others may be simply unclear as to what a revenue management course has to offer (despite the course description that is made available to them). A more contextual name for the course that is different from revenue management is a better alternative. I thank Professor J. Michael Harrison for raising my awareness of this issue.

Alternatives do exist. I like having demand management in the title because it contrasts with supply chain management. I also like having optimization in the title because it sends a clear signal about the quantitative orientation of this course. At this stage “price” is part of the course name, but one could replace it with “revenue” to express that this course emphasizes revenue maximization as opposed to only cost minimization. Instructors at other institutions have opted to combine price, revenue, and optimization in a single title, such as PRO; that, however, leaves out “management” and emphasizes the “operations research” features of the course. In a nutshell, my strong suggestion to prospective instructors is to opt for a name more informative than “Revenue Management” for their course.

Another lesson I learned is that most MBA students, as future managers, like to solve problems. As academics with a quantitative orientation, we like to develop and analyze models that we believe are useful in solving business problems. Most MBA students with a quantitative bent have a different perspective: They like to use models as an aid to solve business problems. This is an important distinction. My job as an instructor of DMPO is not to convince students that the models I present will exactly solve their business problems. Rather, it is to explain to them how they could use these models to their advantage, knowing that they are perfectly aware that models are a simplification of reality. The lesson learned here is that I can openly discuss the limitations of the models I teach with my students. Students appreciate this position and enjoy discussing how to use or adapt a model to their particular needs.

The last lesson I want to emphasize is the structuring of the assessment activities. One may be tempted to structure them around group assignments of case studies and a project, which may work well if groups are very cohesive. However, this is not always the case, so making a significant part of a student’s course grade depend on his/her own individual understanding of the course material becomes important to ensure that all students learn. Although this issue arises with every MBA elective, it is particularly relevant for a course that features quantitative models that students can only understand if they spend time using the models to solve specific problems. Individual homework sets or final exams are useful to achieve this outcome. I did not use these assessment activities in the first two years that I taught this course, but I have always used them thereafter.

8. Conclusions

This paper describes my own experience in teaching DMPO to MBA students at the Tepper School. It covers aspects related to the focus and theme of this course and my choice and sequence of topics and applications; it provides the main elements of the course syllabus and relevant references; it articulates how DMPO fits within the MBA curriculum at the Tepper School; and finally it discusses some ongoing challenges in teaching DMPO and lessons that I have learned over time while teaching this course.

I would like to conclude this paper by encouraging other instructors to develop courses dealing with similar topics or at least to develop related modules to be included in a core operations management/research course. My advice to prospective instructors is that an open mind and willingness to learn are required to happily embark upon this endeavor. Teaching this
course is challenging and stimulating, and I have always found it to be extremely rewarding.

Acknowledgments
I thank the special issue guest editor, Ioana Popescu; an anonymous associate editor; and two anonymous referees for their constructive criticism that helped me to improve the content of this paper. I also thank J. Michael Harrison, Itir Karaesmen, Costis Maglaras, Robert Phillips, and Baohong Sun for sharing with me the syllabi of their courses.

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