

B8602
Customer Management: Concepts and Models

Columbia Business School

Spring 2019, Term A

Instructor:

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Time and Room:

Time: Monday, 10:45 am to 2:00 pm (first class on Friday, February 1)
Room: Warren 209

Teaching Assistant: Jaiqi Lu (JLu20@gsb.columbia.edu)

Professor Office Hours: Thursday, 2 pm to 3 pm in Uris 521

TA Office Hours: Wednesday, 5 pm to 6 pm in Uris 4L

MOTIVATIONS AND OBJECTIVES

Understanding and forecasting customer activity is a critically important exercise for all firms. In this course, we will learn:

1. Simple yet powerful models that use readily available customer activity data to capture underlying patterns in customer behavior;
2. How to use these models to provide accurate forecasts for what these customers will do in the future;
3. How to use these forecasts to inform customer management strategies and to estimate company value.

We will start by learning a few basic ideas and models in the initial sessions. These will serve as the building blocks for advanced models to calculate managerial, actionable quantities such as Customer Lifetime Value and for Customer-Based Corporate Valuation. Throughout the course, we will ascribe to and discuss the philosophy of *customer centricity*, i.e., how to identify and focus on the right customers for strategic advantage. We will learn how the developed tools will enable a manager to develop a robust customer-centric strategy.

The course will equip the sophisticated manager with a set of statistical tools that can help to analyze a wide variety of typical business situations. To ensure that the models that we learn in class are relevant and transparent to managers, they have been carefully developed and selected to: (a) offer actionable marketing insights, (b) work with data that are available in a simple, manager-friendly format, and (c) be *fully* implementable in a standard spreadsheet package (like Microsoft Excel).

Each class will start with a representative real-life problem which we will solve by the end of the class. Some of the problems that we will discuss in class are:

- How to project customer retention rates, such as in cell-phone contract renewals
- How to choose your target customers in a direct marketing program
- How to plan a reward program
- How to calculate the future profit from customers from early activity data
- How to tie the value of a firm's customer base to its overall financial valuation

The techniques discussed are easily portable to applications outside marketing and we will consider several such examples. Time permitting, we will also throw in some fun examples, e.g., ranking sports stars by developing a procedure to estimate their true abilities given their performance statistics, predicting Tweeting behavior using real Twitter data, etc.

Prerequisites: Students need sufficient mathematical background to handle the tools that will be introduced and discussed. To this end, an introductory probability/statistics course and exposure to basic integral calculus would be very helpful, but is not necessary.

COURSE ORGANIZATION AND MATERIALS

Most of the classes will be lecture-based, with a strong emphasis on real-time problem solving, including analytical exercises on the board and numerical investigations using Microsoft Excel. Central to the development of the skills associated with probability modeling is hands-on experience. To this end, a set of homework exercises will be assigned for some sessions. There is no formal textbook for the course, but lecture notes covering the material presented in class will be distributed on a session-to-session basis. Excel spreadsheets used in class will be made available to the students, and some journal articles will be suggested as illustrations/applications of some of the techniques discussed. While it is expected that students will read and review all of these materials thoroughly, there will be no pre-class readings assigned for most sessions.

EVALUATION

Homework Exercises (60%): These exercises, which will be given (almost) weekly, will give you practice in applying concepts studied in class. All of the numerical work can be completed using Excel (although students are welcome to use other software packages if they wish to). All HW exercises fall under Category B2 (Individual with Discussions of Concepts Only).

Take Home Final Exam (20%): This will be a challenging and thought-provoking final exam will involve careful and creative application of the concepts studied in the course. The final exam falls under Category C (Individual).

Class Participation (20%): While there are no formal case discussions, every class will start with a real-life problem which we will solve and implement in Excel by the end of the class. Students are encouraged to be actively engaged in the lectures and to contribute actively in developing the solution.

COURSE SCHEDULE

Date	Class Topic	Due Before Class on Canvas
2/1	Introduction and Models for “Whether” (and “When”)	HW 0
2/4	Models for “How Many”	HW 1
2/11	Empirical Bayes Methods and Conditional Expectations	HW 2
2/18	Customer Lifetime Value	HW 3
2/25	Customer Lifetime Value <i>Blue Apron case discussion</i>	Blue Apron Case pre-class survey (submit before 9 am)
3/4	Customer-Based Corporate Valuation Guest speaker Prof. Dan McCarthy Summary and Conclusion	HW 4
TBD	Take Home Final Exam	TBD

DETAILED COURSE CONTENTS

Note: There is one lecture each week, 3 hours long.

Week 1: Introduction and Models for “Whether” (and “When”) (1 lecture)

Motivating problems:

- Forecasting customer retention for a subscription-based service.

Tools and Concepts:

- General discussion about the philosophy and objectives of probability modeling.
- Comparisons to traditional regression-based models: “curve-fitting” vs. “model-building.”
- Highlights of the course.
- Models for choice data.
- Careful derivation of a parametric model for choice (the shifted-geometric, sG) and a parametric mixture model (the shifted-beta-geometric, sBG) using the beta distribution.
- Coverage of maximum likelihood estimation and the Microsoft Excel Solver tool.

Week 2: Models for “How Many” (1 lecture)

Motivating problems:

- Forecasting magazine readership.
- Forecasting customer donation incidence at a non-profit.

Tools and Concepts:

- Models for count data.
- The binomial distribution, the beta distribution, the beta-binomial model (BB).
- Generalizing the model to allow for “spikes.”
- Evaluating goodness-of-fit.

Week 3: Empirical Bayes Methods and Conditional Expectations (1 lecture)

Motivating problem:

- Understanding customer behavior over time at a wine seller

Tools and Concepts:

- Conditional distributions and expectations for choice and count processes.
- Combining population information (“priors”) with observed data for individuals.
- Regression-to-the-mean.

Weeks 4 and 5: Customer Lifetime Value (CLV) (2 lectures)

Motivating Problems:

- CLV at a subscription-based service and “The Perils of Ignoring Heterogeneity.”
- CLV at a non-profit.
- Case: CLV and Customer Management Strategy at Blue Apron

Tools and Concepts:

- Combining the basic building blocks to create integrated models to estimate customer lifetime value and related concepts.
- “Buy till you die” models:
 1. CLV in a contractual setting – sBG
 2. CLV in a non-contractual setting – BG/BB
- If time:
 - Other related BTYD models (Pareto/NBD, BG/NBD and PDO models).
 - Adapting basic models to privacy-preserving data formats (RCSS).

Week 6: Customer-Based Corporate Valuation (CBCV) (0.5 lecture)

Motivating Problem:

- How to tie the value of a firm's customer base to its overall financial valuation
- Guest lecture by Prof. Dan McCarthy (Professor of Marketing at Emory University; Co-founder of Theta Equity Partners and Zodiac; the world's #1 CBCV expert)

Tools and Concepts:

- Models to combine CLV calculations across customers and across years

Week 6: Summary and Conclusion (0.5 lecture)

ATTENDANCE, CLASSROOM NORMS AND EXPECTATIONS

You are required to attend each class. If you want an excused absence, please contact OSA and ask them to send me an email (or forward their approval email to me).

Students are expected to adhere to CBS Core Culture in this class by being Present, Prepared, and Participating.

Laptops and cell phones are not allowed in class.

INCLUSION, ACCOMMODATIONS, AND SUPPORT FOR STUDENTS

At Columbia Business School, we believe that diversity strengthens any community or business model and brings it greater success. Columbia Business School is committed to providing all students with the equal opportunity to thrive in the classroom by providing a learning, living, and working environment free from discrimination, harassment, and bias on the basis of gender, sexual orientation, race, ethnicity, socioeconomic status, or ability.

Columbia Business School will make reasonable accommodations for persons with documented disabilities. Students are encouraged to contact the Columbia University's Office of Disability Services for information about registration. Students seeking accommodation in the classroom may obtain information on the services offered by Columbia University's Office of Disability Services online at www.health.columbia.edu/docs/services/ods/index.html or by contacting (212) 854-2388.

Columbia Business School is committed to maintaining a safe environment for students, staff and faculty. Because of this commitment and because of federal and state regulations, we must advise you that if you tell any of your instructors about sexual harassment or gender-based misconduct involving a member of the campus community, your instructor is required to report this information to a Title IX Coordinator. They will treat this information as private, but will need to follow up with you and possibly look into the matter. Counseling and Psychological Services, the Office of the University Chaplain, and the Ombuds Office for Gender-Based Misconduct are confidential resources available for students, staff and faculty. "Gender-based misconduct" includes sexual assault, stalking, sexual harassment, dating violence, domestic violence, sexual exploitation, and gender-based harassment. For more information, see <http://sexualrespect.columbia.edu/gender-based-misconduct-policy-students>.

ASSIGNMENTS

All of your assignment submissions are subject to the [CBS Honor Code](#). Violations of the CBS Honor Code may lead to failing the assignment, failing the course, suspension, and/or dismissal. In order to avoid ambiguity that may lead to unintentional violations of the Honor Code, assignment description types have been standardized and specified below.

<u>Type</u>	<u>Designation</u>	<u>Grade</u>	<u>Preparation of submission</u>	<u>Discussion of Submission*</u>	<u>Discussion of Concepts**</u>
A	Group Work	Same grade for all group members	By the group	Permitted to discuss (within group)	Permitted
B ¹	Individual w/ Discussions of Concepts and Submission	Individual grade	Individual preparation	Permitted to discuss; sharing solutions or submission files is not allowed	Permitted
B ²	Individual w/ Discussions of Concepts Only	Individual grade	Individual preparation	Not permitted to share/discuss solutions or submission	Permitted
C	Individual	Individual grade	Individual preparation	Not permitted to share/discuss solutions or submission	Not permitted***

The designated group can be either an assigned study group or a self-selected one.

* Submission means any work and/or output pertaining to the specific assignment. If an assignment submission contains a calculation or decision related to a specific set of data and setting, discussing the details how to make this calculation or decision with regard the data/setting is to discuss the submission. Providing another student with a draft of the calculation or decision is sharing the submission.

** Concepts mean any ideas, examples, readings, or other related materials from the class/course. Conceptual discussion should not be based on a specific set of data or setting related to a calculation or decision required in the assignment, but could be based on other related examples, preferably those from class/course materials.

*** As no conceptual discussion is permitted, Type C is akin to a take-home exam.