## **Contents**

	Prefa	ace and Acknowledgments	ix
1	Intro	oduction	1
2	Basi	cs of Impact Evaluation	7
	2.1	The Fundamental Problem of Impact Evaluation	7
	2.2	Characterizing the Impact	8
	2.3	The Problem of Comparing Apples to Oranges	12
3	Exp	eriments (A/B Testing)	19
	3.1	Comparing Apples to Apples	19
	3.2	Behavioral Assumptions and Methods for Analyzing Experiments	22
	3.3	Multiple Interventions	26
	3.4	Use Cases in R	29
	3.5	Use Cases in Python	33
4	Selec	ction on Observables: Aim to Compare Apples with Apples	37
	4.1	Making Groups Comparable in Observed Characteristics	37
	4.2	Behavioral Assumptions	41
	4.3	Methods for Impact Evaluation	42
	4.4	Use Cases in R	49
	4.5	Use Cases in Python	54
5	Caus	sal Machine Learning	59
	5.1	Motivating Causal Machine Learning	59
	5.2	Elements of Causal Machine Learning	63
	5.3	A Brief Introduction to Several Machine Learning Algorithms	64
	5.4	Effect Heterogeneity and Optimal Policy Learning	69
	5.5	Use Cases in R	74
	5.6	Use Cases in Python	80
6	Instrumental Variables		
	6.1	Instruments and Complier Effects	87
	6.2	Rehavioral Assumptions and Methods	80

viii		Conte
	<ul><li>6.3 Use Cases in R</li><li>6.4 Use Cases in Python</li></ul>	
7	Regression Discontinuity Designs 7.1 Sharp and Fuzzy Regression Discontinuity Designs 7.2 Behavioral Assumptions and Methods 7.3 Use Cases in R 7.4 Use Cases in Python	1 1 1
8	Difference-in-Differences  8.1 Difference-in-Differences and the Impact in the Treatment Gro  8.2 Behavioral Assumptions and Extensions  8.3 Use Cases in R  8.4 Use Cases in Python	1 p <b>up</b> 1 1
9	<ul> <li>Synthetic Controls</li> <li>9.1 Impact Evaluation When a Single Unit Receives the Intervent</li> <li>9.2 Behavioral Assumptions and Variants</li> <li>9.3 Use Cases in R</li> <li>9.4 Use Cases in Python</li> </ul>	
10	Conclusion	
	References Index	