

## **90-747A Cost-Benefit Analysis: A Capital Budgeting Approach**

Heinz College, Carnegie Mellon

Spring, 2025 MWF 3:30-4:50 PM Pittsburgh Time

HH1208 In Person

©Professor Robert P Strauss

[www.andrew.cmu.edu/user/rs9f](http://www.andrew.cmu.edu/user/rs9f)

[rpstrauss@gmail.com](mailto:rpstrauss@gmail.com)

Revised Course Outline: 11/22/2024

This public policy course provides a systematic framework, capital budgeting, for the evaluation of private-sector projects and also public sector projects; the latter builds on the former, and introduces issues of externalities, interdependencies between primary and secondary markets for goods and services, and the social rate of discount. Two courses, Public Finance, taught in the Fall by Professor Robert Strauss, and Cost-Benefit Analysis: A Capital Budgeting Approach taught in the Spring by Professor Robert Strauss, may be viewed as providing a conceptual and practical framework for those Heinz students seeking careers in the public sector, or those parts of the private sector that routinely deal with the public sector. This course strengthens each student's ability to compare resources devoted to providing current capital projects, and those proposed to new capital projects to understand how various stakeholders both pay for and receive benefits from them over time

The course is divided into 3 modules. In Module 1 (weeks 1 - 4), the course develops the essential techniques of private sector evaluation principles with a focus on long-lived capital projects and how such projects are typically financed through retained earnings, and bond and stock markets. In Module 2 (weeks 5 - 6), special problems which arise in the evaluation of public sector projects are discussed; a variety of evaluation techniques and applications especially suited to public sector projects are then examined. In Module 3 (week 7), actual cost-benefit studies in the policy areas of sports stadiums, elderly driving, and education, are examined.

### **Learning Outcomes**

In this course the student:

1. Will learn how to think about time and money.
2. Will learn how to measure private and public sector costs and benefits
3. Will learn why market structure matters in understanding prices facing private and public sector decision makers.
4. Will learn how to decide whether or not to “build a bridge” or “repair a bridge.”

## Prerequisites Description

Some high school algebra; preferably introductory courses in basic statistics, basic microeconomics, some understanding of income and balance sheet arithmetic.

Note: students desiring to confirm their financial accounting/reporting skills should consider doing *SolidFooting* during the Xmas break. It can be obtained for \$29 and is widely recognized as the premier interactive learning tool, and used in top 10 undergraduate business programs See <https://solidfootingaccounting.com>

## **Required student purchases in place by 10AM January 13, 2025:**

**Requirement 1:** a rental of the E-book version of Ross-Westerfield-Jaffe, *Corporate Finance*, McGraw-Hill, **13<sup>th</sup>** edition. (RWJ) and

**Requirement 2:** a [paid] subscription to the McGraw-Hill *Connect* learning/evaluation environment for this E-book. It is strongly recommended that you also purchase the loose leaf version of the book. The *Connect* learning environment contains extensive student learning tools and the evaluation environment (problem sets and examinations) that will be used in the course.

The approximate price of the: 1] book rental and 2] *Connect* environment through a third party are \$100, and 3] a 3 hole paper version of the entire book for \$30. NOTE: you are able to obtain 1 & 2 free for 2 weeks and will be charged by Student Accounts for the purchase.

**Requirement 3:** access to a financial calculator which can be put on your cell phone for free, or purchased. Said calculator must be able to do exponential arithmetic such as  $e^{(a/b)}$  or  $(1+r)^{(a/b)}$  as well as compute the natural logarithm of any [positive] number. For Android based cell phones, go to <https://play.google.com/store/apps/details?id=uk.co.nickfines.RealCalc> and download the free financial calculator as 20 million others have done.

**Requirement 4:** Access to a laptop computer that is capable of browsing the internet and has installed and running a current version of MS Office which includes Excel and MS word.

Should you be curious about how capital budgeting operates in the defense portion of the US federal budget, take a look at A YouTube Video on Innovation (or not) in the aircraft carrier business:

<https://www.youtube.com/watch?v=gbYqlbZumc0>

**Lecture Session (LS) and Topics, Chapter Readings from RWJ, Home Work (HW) and coverage**

Note: you are expected to have read and understood the chapter that is being lectured about before the lecture begins. Students will be randomly chosen in class to answer questions from Professor Strauss about the material under discussion.

LS\_1: Introduction to Corp & Public Finance, RWJ\_1 **HW 1 out (covers chapters 1-3)**

LS\_2: Financial Statements & Cash Flow, RWJ\_2

LS\_3: Financial Statements Analysis, RWJ\_3,

LS\_4: Discounted Cash Flow I, RWJ\_4

LS\_5: Discounted Cash Flow II, RWJ\_4, **HW 2 out (covers chapter 4)**

LS\_6: Net Present Value and Other Investment Rules, RWJ\_5

LS\_7:, Valuing Bonds, Stocks, Chapter 8,9 **HW 3 out (covers chapters 5,8,9)**

**MIDTERM EXAM (Covers Lectures 1-7)**

LS\_8: Making Capital Investment Decisions, RWJ\_6

LS\_9: Long Term Financing, RWJ\_15, **HW4 out (covers chapter 6, 15, 27)**

LS\_10: Cash Management, RWJ\_27

LS\_11: Special Issues of Public Capital Budgeting Analysis I, B\_1, B\_2

Social accounting and consumer/producer surplus; taxation and dead weight loss, social rate of discount

**HW 5 out (covers session 11, 12)**

LS\_12: Special Issues of Public Capital Budgeting Analysis II, B\_2, B\_3

Primary and secondary market structures, distribution, Positive/negative externalities, shadow prices

LS\_13: Case Studies: Elderly driving, Lead in Gasoline

**FINAL EXAM (Covers Lectures 8-13)**

**Evaluation Weights and Grading Scale (in terms of % correct).**

<b>Evaluation</b>	<b>Weight</b>
Class Attendance	5%
Midterm	30%
Final	30%
5 Problem Sets	35%
<b>Total</b>	<b>100%</b>

A	95-100 %
A-	90-94.9 %
B+	85-89.9 %
B	80-84.9 %
B-	75-79.9 %
C+	70-74.9 %
C	65-69.9 %
C-	60-64.9 %
D+	55-59.9 %
D	50-54.9 %
D-	45-49.9 %
F	<44.9 %
Pass/Fail	>=70 %

Attendance rules: student must be in class at beginning and throughout the class to earn points, and in class through the close of class.

For each failed LS attendance day, a student loses 1%, limited to 5%.

**90-747B Course Calendar and Tasks**

LS\_ denotes lecture session; RWJ\_ denotes the chapter in the required RWJ E-textbook to be read **before** that lecture session; and HW\_ denotes homework (out). Handouts and case studies will be on Canvas under separate modules as will lecture-specific power points.

	<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>
<b>March '24</b>	11	12	13	14	15
<b>Student Tasks:</b>	LS_1, RWJ_1, HW_1 out		LS_2, RWJ_2	Office Hours	<b>Review_1</b>

	<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>
<b>March '24</b>	18	19	20	21	22
<b>Student Tasks:</b>	LS_3, RWJ_3, HW_2 out		LS_4, RWJ_4	Office Hours	<b>Review_2, HW 1 due midnight</b>

	<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>
<b>March '24</b>	25	26	27	28	29
<b>Student Tasks:</b>	LS_5, RWJ_4, HW_3_out		LS_6, RWJ_5	Office Hours	<b>Review_3 HW_2 due Sunday Midnight</b>

	Monday	Tuesday	Wednesday	Thursday	Friday
<b>April '24</b>	1	2	3	4	5
<b>Student Tasks:</b>	LS_7, RWJ_8,9, HW_4_out		<b>Midterm Exam</b>	Office Hours	<b>HW_3 Due Midnight</b>

	Monday	Tuesday	Wednesday	Thursday	Friday
<b>April '24</b>	8	9	10	11	12
<b>Tasks:</b>	LS_8, RWJ_6		LS_9, RWJ_15, HW_5*	Office Hours	<b>Review_4 HW_4 due Midnight Carnival</b>

	Monday	Tuesday	Wednesday	Thursday	Friday
<b>April '24</b>	15	16	17	18	19
<b>Student Tasks:</b>	LS_10, RWJ_27		LS_11, B_1 B_2 <b>Review 5-6:30PM</b>		<b>HW_5* due midnight</b>

	Monday	Tuesday	Wednesday	Thursday	Friday
<b>April '24</b>	22	23	24	25	26
<b>Tasks:</b>	LS_12 B-3 B_4		LS_13, Case Studies	JP Review	
<b>April '24</b>	29				
	<b>Final Exam 1PM</b>				

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