Introduction

Since the mid-seventies, the “project approach” to development aid has come under criticism and, more than three decades later, “project aid” is no longer the only, or, for some international aid agencies, the preferred form of development assistance.

This reflects a change in development thinking. Early views (in the 50’s and 60’s) that exclusively focused on the shortage of financial resources for sector investments as the critical constraint for development, have been increasingly broadened, shifting the attention to the policy and institutional context within which investment projects take place. Reflecting such shift, various forms of “program” or “policy-based” assistance, (as opposed to specific project financing), have emerged as new aid modalities.

The formulation and selection of investment projects is now increasingly subordinated to the development of sector-wide programs, (in turn framed by medium-term public expenditure frameworks) which are meant to ensure that projects are consistent with good macro and sectoral policies and are financially and institutionally sustainable.

But if planning investment projects is no longer the only, or the main, concern of aid agencies, the task has not gone away or lost its critical importance for aid-recipient governments (central and local) in developing countries. Welfare is improved through investment in change and a substantial part of available resources are invested in projects. Good policies and institutions are critical, but without appropriate investments, the best policies, and most performing institutions, will not deliver sustained economic and social development.

Having lost their absolute prominence as *development aid* instruments, investment projects remain therefore a key instrument of *development administration*, and continue to be an important vehicle of international assistance. Indeed, aid agencies realize that “program approaches” to aid

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1 “Investment lending” that finances projects still absorbs about two thirds of the World Bank lending portfolio, the remaining third going to “policy-based lending” i.e. different forms of general or sector budget support tied to *policy and/or institutional reform*. 
delivery should not obscure the wide array of aid modalities that is often necessary to deploy, and the importance of specific investment projects among them. There is therefore a continuing role for projects as both (a) a way of managing government interventions and (b) a mode of donors’ intervention, where this is made consistent with the objectives of national programs developed and owned by national authorities.

Project planners in governments and aid agencies continue therefore to face the challenge of ensuring the technical quality, the financial sustainability and the economic, social, institutional and environmental viability of development projects.

**Course Description**

**Goals and Scope of the course**

The Course aims at providing students with:

1. An introduction to financial, economic and risk analysis of investment operations and its application to the planning and appraisal of international development projects.

2. An opportunity to acquire and practice basic skills for the appraisal (ex-ante evaluation) of selected urban/rural infrastructure and income-generating development projects of moderate scale and complexity.

To these ends, the course will introduce the basic concepts and techniques for integrated appraisal of public and private investment projects, including financial and economic analysis, risk analysis and the assessment of projects’ distributional effects (winners and losers) and impact on poverty.

**Schedule and Format**

The class will meet twice a week (on Fridays and Saturdays) from 9:00am to 12:30pm, for 6 weeks. The Friday sessions will include the main lecture; review of the homework assigned the preceding week and class discussion. The Saturday sessions will include a second shorter lecture and in-class Lab work to model and analyze three major project cases:

(i) a rural income-generating project
(ii) a transport infrastructure project and
(iii) a small urban water supply project.

**Assignments and Final Exam**

Students will be required to:

- Carry out two “minor” homework exercises (see Detailed Course Schedule below).
- Complete the appraisal of three “major” project cases, through a combination of in-class guided lab work and individual off-class work
- Take a final exam (“take-home”).
The final grade will reflect performance on all the above and will be calculated based on the following weights: Exercises (20%), Major cases (45%) Final Exam (35%)

Readings and reference materials

There is no single textbook for this course, but the main reference text (available on the NYU Classes site) is:


The following texts will also be selectively used. They are available on the NYU Classes site and can also be downloaded from the Asian Development Bank and World Bank websites.


All required and suggested readings and reference materials will be specified and made available to students through the NYU Classes site.

Computer Hardware and Software

Students are expected to bring to class a laptop running a version of the MS Windows OS (XP, 2000, Vista or Windows 7) and a compatible version of MS Excel. Additional software for risk analysis (Oracle Crystal Ball academic time-limited version) will be provided free of charge to all students for installation on their machines.

NOTE: Students who use a laptop running a Mac OS, should also install the MS Windows OS, as Crystal Ball only runs on it
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<td>— The Total Investment (or Banker's) POV</td>
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<td>— Financial vs. Economic Analysis</td>
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<td>— Other POV (The fiscal/budget POV, The domestic economy's POV)</td>
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PART 1: The "Discounted Cash Flow" (DCF) technique
- Project Timeline
- Typical Project cash flow profiles
- Discounting and Compounding
- time units (years/other)

PART 2: Construction of Projects Cash Flow Models
- Cash Flow by Flow categories
- Cash Flow by Inflows/Outflows type
- Financial Modeling of projects with Excel (basic rules)

PART 3: Investment Criteria
- Net Present Value (to select among mutually exclusive projects)
- Benefit-Cost Ratio (to rank mutually non-exclusive projects)
- Other metrics (Internal Rate of Return, Pay-back period)
- Excel functions (NPV, IRR, etc.)
- estimation and use of debt service ratios (ADSCR and DSCR)

PROJECT APPRAISAL LAB Review the case of an agricultural diversification project, to understanding different points of view (POV) in project appraisal, including the POV of
(i) the individual farmers involved
(ii) the total project financial efficiency
(iii) the domestic economy, and
(iv) the Ministry of Agriculture.

HOMEWORK Assignment # 1
- The concept of opportunity cost
- Multiple Points of View (POV) in project appraisal
- Investment Criteria
- Ranking of alternative projects

Week 2 Project Financial Analysis (PART 2)

Homework Review In-class review of previous week lab work and Assignment #1

Lecture 2-A PART 1: Use of consistent prices in project appraisal
- Definition of Prices and Price Indices
- Incorporating Inflation in the Financial Analysis
- Impacts of Inflation on Financial Cash flow
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| PROJECT APPRAISAL LAB | Appraisal of a Rural Income-generating project: the case of the “Incentives to Women Farmers” (IWF) project from Nicaragua. Presentation of the project logic and distribution of a template for financial and economic analysis. In-class work to complete the financial analysis from the total project point of view. |

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| PART 2: Risk Analysis by Monte-Carlo Simulation | Building a forecasting model |
| PART 2: Risk Analysis by Monte-Carlo Simulation | Selecting key risk variables |
| PART 2: Risk Analysis by Monte-Carlo Simulation | Running simulations |
### Lecture 3-B

**PART 1: Using CB to select key risk variables**
- developing Tornado Charts
- developing Spider Charts
- Simultaneous assessment of project sensitivity to multiple risk variables

**PART 2: Using CB to build a custom probability distribution from available data**
- Getting and formatting the historical data
- Identifying trends and disturbances
- Determining range and intervals of the errors frequency distributions
- computing and adjusting the errors probability distributions
- replacing deterministic with probabilistic values in risk variables

**PART 3: Using CB to fit a theoretical probability distribution to available data**
- Getting and formatting available data
- Direct sampling vs. sampling from a fitted distribution
- Using CB to fit theoretical distributions to available data.
- Goodness-of-fit testing: visual inspection of plotted data and CB statistics
- replacing deterministic with probabilistic values in risk variables

**PROJECT APPRAISAL LAB**
Complete the appraisal of the “Incentives to Women Farmers” (IWF) project from Nicaragua from the individual farmers’ point of view and carry out the project risk analysis.
(NB: Some questions in the final exam will refer to the appraisal of this project)

### Week 4

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| **Lecture 4-A** | **PART 1: Microeconomics Foundations of project appraisal**
- Economic vs. Financial Prices
- Three postulates of welfare economics
- Economic prices in undistorted markets
- Economic Prices in distorted markets
- consumer surplus
- producer surplus

**PART 2: Economic valuation of Inputs and outputs** |
— Traded and non-traded goods
— Incremental and non-incremental inputs and outputs
— Valuation of traded inputs and outputs
— Valuation of non-traded inputs and outputs
— Valuation of Land
— Valuation of labor
— Valuation of non-marketed goods
— The economic opportunity cost of capital (EOCK)

**PART 3 - Financial-to-Economic Conversion Factors (CF)**
— Calculating CF for traded inputs and outputs
— Calculating CF for non-traded Inputs and Outputs

**Class discussion**
Open discussion

**Lecture 4-B**

**PART 1 - Appraisal of Transport Projects**
— Forecasting Traffic
— Reduced Operating Expenditures
— Savings on Vehicles Operating Costs
— Savings of Time
— Accident Reduction
— Economic Development
— Secondary Benefits
— Investment Costs
— Routine and Periodic Maintenance Costs
— Timing of Investment

**PROJECT APPRAISAL LAB**
Appraisal of a Transport Infrastructure Project: the case of the “Toll Bridge over the Mango River (“TBMR) project from Nicaragua. Presentation of the project logic and distribution of a template for financial and economic analysis. In-class work to complete the financial analysis from the point of view of the Bridge Operating Authority.

**Week 5**

**Projects Distributional Analysis**

**Review of major Case 2**
In-class review of previous week lab work

**Lecture 5**

**PART1: Distribution Analysis**
— Externalities and the project FNPV and ENPV
— Identification of Stakeholders
— Stakeholders sharing the FNPV
PART 2: Poverty Impact
— Poverty Impact Ratio
— Poverty impact of transport projects
— Poverty impact of water supply projects

PROJECT APPRAISAL LAB
Continue the appraisal of the “Toll Bridge over the Mango River “(TBMR) project and complete the appraisal from the economic efficiency POV including a distributional analysis to determine winners and losers. Carry out the project risk analysis.
(NB: Some questions in the final exam will refer to the appraisal of this project)

Week 6 Course Recap

Lecture 6
PART 1: Financial appraisal of Water Supply Projects
— Population Projections and Demand Forecast
— Incremental and non-incremental demand
— Unaccounted-for Water (UFW)
— Peak Factor and required supply capacity (System Capacity)
— Least-Cost Analysis and selection of alternative WSP design
— Financial Project Revenue. Tariffs and Connection Fees
— Financial Project Costs. Investment, O&M, Raw Water Taxes

PART 2: Economic appraisal of Water Supply Projects
— Valuation of Project Economic Benefits
  ▪ Financial/Economic Conversion Factors (SCF, SERF and SWRF)
  ▪ Financial and economic cost of water from various sources
  ▪ Existing and New Consumers
  ▪ Incremental and non-incremental consumption
  ▪ Benefits difficult to value in monetary terms (Health, Time Savings)
— Valuation of Project Economic Costs
  ▪ Investment Costs
  ▪ O&M Costs
  ▪ Opportunity Cost of Water
— Sensitivity analysis of the project’s economic indicators.
— WSP risks and risk mitigation strategies
— Financial sustainability and required subsidies
— Distributional aspects and poverty impact

PROJECT APPRAISAL LAB
In-class guided appraisal of a small-scale Water Supply project, serving as a comprehensive recap
of concepts and techniques covered in the course.
(NB: Some questions in the final exam will refer to the appraisal of this project)

| FINAL EXAM | An individual Take-Home Final Exam is assigned. |