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 development 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 a key instrument of development administration, and still an important vehicle of international assistance. In fact enthusiasm for a “program approach” to aid delivery should not obscure the wide array of aid modalities that is often necessary to deploy, as well as the importance of specific investment projects among them.

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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
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 and economic 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 financial and economic appraisal of selected urban/rural infrastructure and income-generating development projects of moderate scale and complexity in a developing country.

To these ends, the course will introduce the basic concepts and techniques for integrated appraisal of public and private investment projects in developing countries, 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 5 weeks, as follows.

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Friday 19 October 2012</th>
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<tbody>
<tr>
<td></td>
<td>Saturday 20 October 2012</td>
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<td>Week 2</td>
<td>Friday 26 October 2012</td>
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<td>Week 3</td>
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<td>Week 5</td>
<td>Friday 16 November 2012</td>
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<td>Saturday 17 November 2012</td>
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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 list in Detailed Course Schedule).
- Complete the appraisal of two “major” project cases, through a combination of in-class guided 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%)

**Textbooks**

The main textbook used throughout the course is:

The following texts will also be selectively used in the course. They can be downloaded from the Asia Development bank and World Bank websites.

**Readings and reference materials**

All required and suggested readings and reference materials will be made available to students through the class Blackboard.

**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 by the instructor to all students for installation in individual laptops.

**NOTE:** Students who use a laptop running a Mac OS, should also install the MS Windows OS, as Crystal Ball only runs on it
### Course Schedule

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Project Financial Analysis (Sect.1)</th>
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<tbody>
<tr>
<td>Friday 19 Oct.</td>
<td><strong>Course Presentation</strong></td>
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<tr>
<td><strong>Lecture 1-A</strong></td>
<td><strong>PART 1: Projects, Project Cycle and Project Appraisal</strong></td>
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<td>— projects vs. other policy instruments</td>
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<td>— projects as instruments of development planning and administration</td>
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<td>— projects as modality of development aid</td>
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<td>— project cycle management (PCM)</td>
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<td>— the project planning process</td>
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<td>— dimensions of project appraisal</td>
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<td>— financial and economic appraisal methods (CBA, CEA, CUA)</td>
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<tr>
<td><strong>PART 2: Basic Concepts in Project Appraisal</strong></td>
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<td>— projects as welfare improvements</td>
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<td>— projects as incremental changes</td>
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<td>— incremental costs and opportunity costs</td>
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<td>— incremental benefits, cost savings and avoided costs</td>
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<tr>
<td><strong>PART 3: Multiple Points of view in Project Appraisal</strong></td>
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<td>— Multiple POV in Project Appraisal</td>
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<td>— the POV of the project sponsor/owner (equity holders)</td>
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<td>— The Total Investment (or Banker's) POV</td>
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<td>— The project (Financial Efficiency) POV</td>
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<td>— The project (Economic efficiency) 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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<tr>
<td><strong>Class discussion</strong></td>
<td><strong>Open discussion</strong></td>
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<tr>
<td>Saturday 20 Oct.</td>
<td><strong>Lecture 1-B</strong></td>
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<td><strong>PART 1: The &quot;Discounted Cash Flow&quot; (DCF) technique</strong></td>
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<td>— Project Timeline</td>
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<td>— Typical Project cash flow profiles</td>
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<td>— Discounting and Compounding</td>
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<td>— time units (years/other)</td>
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<tr>
<td><strong>PART 2: Construction of Projects Cash Flow Models</strong></td>
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<td>— Cash Flow by Flow categories</td>
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</tbody>
</table>
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

Understanding different POV in project appraisal. The case of an agricultural diversification project from the point of view of (i) the individual farmers involved (ii) the total project financial efficiency (iii) the domestic economy, and (iv) the Ministry of Agriculture.

HOMEWORK ASSIGNED

Assignment #1 (due on Thursday 25 October)
- The concept of opportunity cost
- Multiple Points of View (POV) in project appraisal
- Investment Criteria
- Ranking of alternative projects

Week 2

Project Financial Analysis (Sect. 2)

Friday 26 Oct.

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
- Inflation and rates of exchange
- Inflation and Interest Rates

PART 2: Financial Cost of Capital
- Discount Rates in Financial Analysis from different POV
- Required Return on Equity (ROE)
- Weighted Average Cost of Capital (WACC)
- Consistency Check for the Two Financial Points of View

Class discussion

Open discussion
| Saturday 27 Oct. | Lecture 2-B | PART 1 - Scale, Timing, and Length of life  
|                 |             | — Determination of Scale in Project Selection  
|                 |             | — Timing of Investments  
|                 |             | — Adjusting for length of life in project appraisal  
|                 |             | — Projects with Interdependent and Separable Components  
| **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.  
| **HOMEWORK ASSIGNED** | Assignment #2 (due on Thursday 1 November) | — Optimum timing of project start  
|                 |             | — Optimum size of project design  
| Week 3 | Projects Risks Analysis |  
| Friday 2 Nov. | Homework Review | In-class review of previous week lab work and Assignment #2  
| Lecture 3-A | PART 1: Assessing Project Risks  
| | — Sensitivity Analysis  
| | — Scenario Analysis  
| | — Monte-Carlo Simulations  
| **PART 2: Risk Analysis by Monte-Carlo Simulation** | | — Building a forecasting model  
| | — Selecting key risk variables  
| | — Running simulations  
| | — Assessing correlation conditions among risk variables  
| | — Analyzing the results of simulations  
| | Class discussion | Open discussion  
| Saturday 3 Nov. | 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

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<tr>
<th>Week 4</th>
<th>Projects Economic Analysis</th>
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<tr>
<td>Friday 9 Nov.</td>
<td>Review of Major Case 1 A review of lessons learned from the appraisal of the IWF project (1st Lab case)</td>
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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

Project Appraisal Lab
Continue the appraisal of the “Incentives to Women Farmers” (IWF) project from Nicaragua. Completion of financial analysis from the individual farmers’ point of view and project risk analysis.
— NB: Some questions in the final exam will refer to the appraisal of this project
### Class discussion
- Open discussion

**Saturday 10 Nov.**
**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 Operating Authority.

**Week 5**

**Projects Distributional Analysis**

**Friday 16 Nov.**
**Review of major Case 2**
In-class review of previous week lab work

**Lecture 5-A**

**PART 1: Distribution Analysis**
- Externalities and the project FNPV and ENPV
- Identification of Stakeholders
- Stakeholders sharing the FNPV
- Distribution of ENPV among stakeholders

**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 a Transport Infrastructure Project: the case of the “Toll Bridge over the Mango River” (TBMR) project from Nicaragua. Completion of the project appraisal from the economic efficiency and distributional point of view, and related risk analysis.
- NB: Some questions in the final exam will refer to the appraisal of this project
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<tr>
<th>Date</th>
<th>Lecture</th>
<th>PART 1 : Course Recap</th>
</tr>
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| Saturday 17 Nov | Lecture 5-B | — In-class presentation and 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 ASSIGNED**                                                              |
|           |         | An individual Take-Home Final Exam is assigned. Deadline for submissions is midnight of Monday 2 Dec. 2012  
Please e-mail to the Instructor at Leonardo.romeo@nyu.edu |