



Distributive Analysis

Project Appraisal
November 2016

Feasibility Study

- ◆ Financial analysis
 - ✓ Is the project financial viable from the view of the project investors and financial institutions?
- ◆ Economic analysis
 - ✓ Is the project economically viable from the view of the whole economy (society)?
- ◆ Distributive (or stakeholder) analysis
 - ✓ What are the impacts of the project on different groups?
 - ✓ Who are winners and losers and how much are the gains/losses if the project is implemented?
 - ✓ The sustainability of the project depends not only on whether it is feasible in financial and economic terms (NPV, IRR), but also on whether the affected groups support or object to it.

Distribution of impacts on different groups

- ◆ Identify groups affected by the project:
 - ✓ Equity investors in the project
 - ✓ Labors working for the project
 - ✓ The government
 - ✓ Buyers/users of the project's output
 - ✓ Competing producers of the project's output
 - ✓ Input suppliers to the project
 - ✓ Competing buyers/users of the project's inputs
 - ✓ Groups affected by externalities caused by the project.
- ◆ Attach the effects of the project with specific cash flows (benefits or costs) in the appraisal model.
- ◆ Net impacts are quantified by calculating the difference between the economic NPV and financial NPV (ECOC is used as the discount rate) for each specific cash flow.
- ◆ Allocation of the net impacts of the project to the affected groups.

Distribution of impacts: Benefits

Cash flow ($NPV^e - NPV^f > 0$)

Affected groups

Increased consumer surplus

Users of project's output

Increased producer surplus

Suppliers to the project

Increased tax/Reduced subsidies

Government

Price controls: Ceiling price

Users of project's output

Price controls: Floor price

Suppliers to the project

Use of labors with $SWRF > 1$

Labors working for the project

Tradable output with $SERF > 1$

The rest of the economy

Capital with $WACC > ECOC$

The rest of the economy

Positive externalities

Those affected by the externalities

Distribution of impacts: Costs

Cash flow ($NPV^e - NPV^f < 0$)

Affected groups

Reduced consumer surplus

Competing users of project's inputs

Reduced producer surplus

Competing producers of project's output

Reduced tax/Increased subsidies

Government

Price controls: Ceiling price

Suppliers to the project

Price controls: Floor price

Users of project's output

Tradable inputs with $SERF > 1$

The rest of the economy

Capital with $WACC < ECOC$

The rest of the economy

Negative externalities

Those affected by the externalities

Nghe An Tate & Lyle Sugar Project

<u>Cash inflow</u>	Financial NPV	Economic NPV	Difference
Net revenue	316,818	243,706	-73,112
Training benefit	0	480	480
Benefit to cane farmers	0	34,002	34,002
Benefit to truck haulers	0	2,140	2,140
<u>Cash outflow</u>			
Operating costs	154,577	148,608	-5,969
CIT	20,193	0	-20,193
Change in working capital	4,354	4,354	0
Capital expenditures	91,884	88,042	-3,842
NPV	45,809	39,324	-6,485

WACC and ECOC are assumed to be 10% in real term. So both financial and economic cash flows are discounted by the same discount rate of 10%.

- ◆ Net financial benefit to investors: \$45.8m
- ◆ Net economic benefit to the whole society: \$39.3m
- ◆ Thus, while beneficial to the investors, the project generates a net loss of \$6.5m to the rest of the economy.
- ◆ The question is how this loss is distributed over groups (other than the investors) affected by the project.

Nghe An Tate & Lyle Sugar Project: Distributive Analysis

Cash inflow	Financial NPV	Economic NPV	Difference	Government	Project labor	Cane farmers	Truck haulers
Net revenue	316,818	243,706	-73,112	-73,112			
Training benefit	0	480	480		480		
Benefit to cane farmers	0	34,002	34,002			34,002	
Benefit to truck haulers	0	2,140	2,140				2,140
Cash outflow							
Operating costs	154,577	148,608	-5,969		-5,969		
CIT	20,193	0	-20,193	-20,193			
Change in working capital	4,354	4,354	0				
Capital expenditures	91,884	88,042	-3,842		-3,842		
NPV	45,809	39,324	-6,485	-52,919	10,291	34,002	2,140

- ◆ Government: -\$52.9m
 - ✓ Loss of import tax revenue: \$73.1m
 - ✓ Benefit of corporate income tax: \$20.2m
 - ◆ Local workers in the project: \$10.3m
 - ✓ Benefit in increased wages during construction: \$3.8m
 - ✓ Benefit in increased wages during operation: \$6.0m
 - ✓ Benefit due to training: \$0.5m
 - ◆ Cane farmers: \$34.0m
 - ◆ Truckers: \$2.1m
- \$6.5m
to the rest of
the economy

DPE Power Project

	FNPV @ WACC	FNPV @ ECOC	ENPV	Difference
Cash inflow				
Electricity output	2,357.9	1,876.8	2,617.4	740.6
Cash outflow				
Fuel cost	1,511.8	1,203.4	1,050.7	-152.7
Fixed operating cost	85.4	68.0	68.5	0.5
Variable operating cost	81.3	64.7	65.1	0.3
Maintenance & repair costs	141.1	112.2	115.2	3.0
Management fee	39.7	31.6	33.1	1.5
CIT	40.7	29.0	0.0	-29.0
Investment cost	362.1	352.3	366.8	14.6
NPV of NCF	95.8	15.7	918.1	902.4

Financial cash flows are discounted by WACC (7.5%), while economic cash flows are discounted by ECOC (10%).

- ◆ Net financial benefit to investors: \$95.8m
- ◆ Net economic benefit to the whole society: \$918.1m
- ◆ The project is beneficial to the investors and at the same time generates a net benefit to the rest of the economy.

The difference between the financial cost of capital and economic cost of capital

- ◆ Financial cash flows are discounted by the WACC while economic cash flows are discounted by ECOC. Therefore, a part of the difference between financial and economic NPV comes from the difference in the discount rate.
- ◆ If financial CF is discounted at WACC, we have:
 - ✓ Financial NPV @ WACC = \$95.8m
- ◆ If financial CF is discounted at ECOC, we have:
 - ✓ Financial NPV @ ECOC = \$15.7m
- ◆ The difference of -\$80.1m reflects the cost on the rest of the economy as the project is financed with a subsidized cost of capital (7.5% financial cost of capital as compared to 10% economic cost of capital).

DPE Power Project: Distributive Analysis

	FNPV @ WACC	FNPV @ ECOC	ENPV	Difference	Electricity users	PV Gas	Local labor	Government budget	Rest of the economy, SER
Cash inflow									
Electricity output	2,357.9	1,876.8	2,617.4	740.6	740.6				
Cash outflow									
Fuel cost	1,511.8	1,203.4	1,050.7	-152.7		-152.7			
Fixed operating cost	85.4	68.0	68.5	0.5					0.5
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Management fee	39.7	31.6	33.1	1.5					1.5
CIT	40.7	29.0	0.0	-29.0				-29.0	
Investment cost	362.1	352.3	366.8	14.6			-3.0	2.9	14.7
NPV of NCF	95.8	15.7	918.1	902.4	740.6	152.7	3.0	26.1	-20.0