

# Project Economic Analysis

- ◆ Economic appraisal aims at assessing the economic viability of a project from the point of view of the economy as a whole and determining whether the implementation of the project improves a country's net economic welfare.
- ◆ When a project is financially feasible, investors and financial institutions would be willing to finance and undertake the project.
- ◆ When the government is deciding about implementing a project, that decision is made based on whether the project is economically viable.
- ◆ Even if the project is financially bad, government may support it through the budget if it is economically viable.

## Financial Analysis vs. Economic Analysis

	Financial	Economic
Perspective (Point of view)	Project investors/sponsors/ financiers	The whole economy
Benefits and Costs	Financial cash flows	Economic value based shadow prices, opportunity cost, and externalities

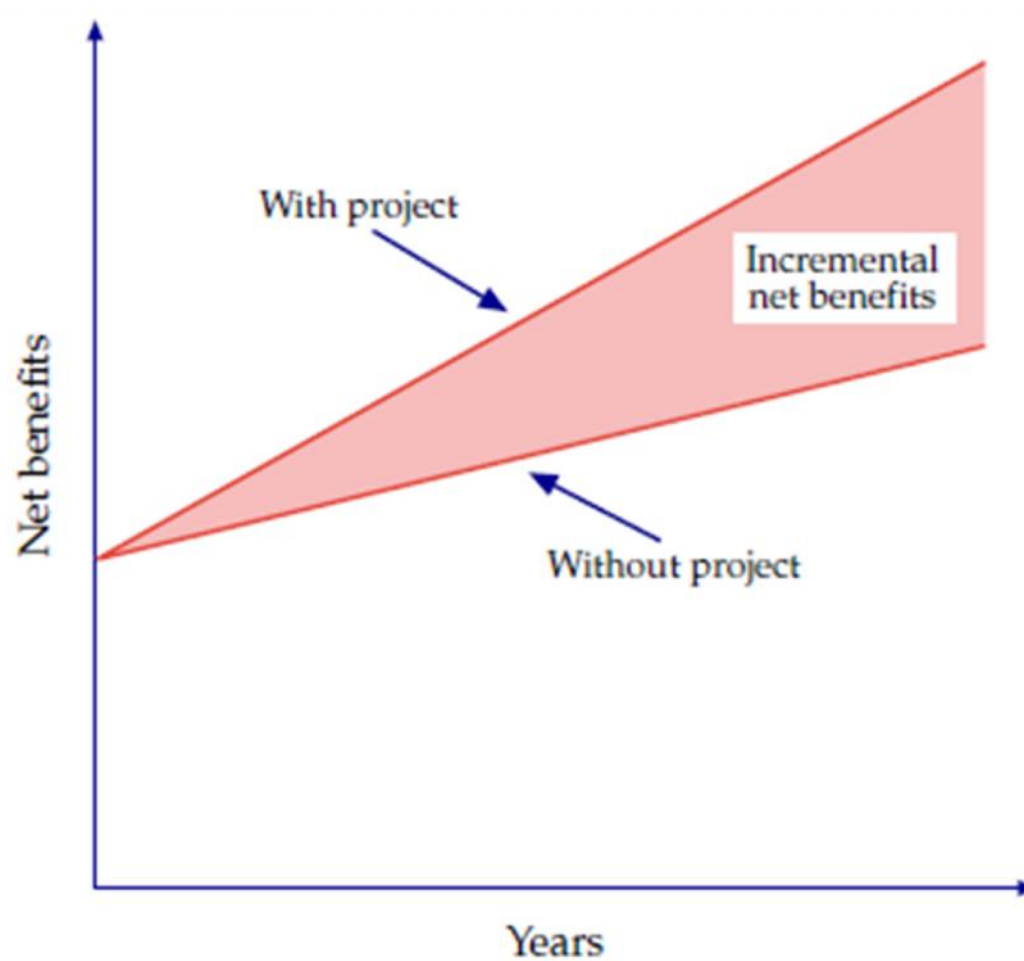
How to make a decision?

		Economic analysis	
		+	–
Financial analysis	+	?	?
	–	?	?

# Project Economic Benefits and Costs

- With and without project comparison (*counterfactual*)
- Most projects are incremental in nature unless they are green field projects
- Identification of project benefits and costs (*getting the economic cash flows right*)
- Valuation of economic benefits and costs; alternative name for economic prices is shadow prices
- Economic analysis means doing the cash flow analysis in economic prices and including external benefits and costs (*shadow pricing and valuation of externalities*)
- Project economic viability: Benefits – Costs (*Economic cash flow plus discounting by economic discount rate*)

## With and without project comparison



# Vietnam Highway Rehabilitation Project

*Costs and Benefits with and without Project, 1994–2005*  
(US\$ millions)

Year	<i>Cost without project</i>		<i>Cost with project</i>		<i>Benefit streams</i>		
	<i>Maintenance (a)</i>	<i>Vehicle operation (b)</i>	<i>Construction maintenance (c)</i>	<i>Vehicle operation (d)</i>	<i>Construction cost savings (a-c)</i>	<i>Vehicle operation cost savings (b-d)</i>	<i>Net benefit flow</i>
1994	0.302	50.702	31.196	50.702	-30.894	0.000	-30.894
1995	0.353	63.144	14.449	63.144	-14.096	0.000	-14.096
1996	0.402	77.685	14.449	35.327	-14.047	42.358	28.311
1997	0.439	94.613	0.140	41.508	0.291	53.105	53.395
1998	0.491	114.600	0.151	48.970	0.341	65.630	65.970
1999	0.528	130.278	0.155	58.003	0.373	80.275	80.648
2000	0.573	166.845	0.159	68.900	0.414	97.945	98.358
2001	0.614	200.352	0.163	82.227	0.450	110.125	118.575
2002	0.666	241.962	0.172	98.392	0.494	143.570	144.064
2003	0.725	290.664	0.185	117.899	0.540	172.765	173.305
2004	0.765	345.234	0.205	142.454	0.561	202.780	203.341
2005	0.813	407.161	0.218	173.366	0.565	233.794	234.389

Source: World Bank (1993b).

# Identification of Project Benefits and Costs

- In theory:
  - All benefits accruing to the whole economy
  - All costs incurred by the whole economy
- In practice:
  - Only benefits and costs that can be quantified and are significant

# Benefits and Costs Under Different Perspectives/Methods

	Economic	Financial				Accounting
		Fiscal impact	Free CF	Total investment	Investors	Income statement
Output revenue	+		+	+	+	+
Salvage value	+		+	+	+	
Investment cost	>	> <sup>(1)</sup>	–	–	–	
Operating costs	>		–	–	–	–
Opportunity costs	>		–	–	–	
Change in WC	>		–	–	–	
Externalities	+ / >					
Depreciation						–
Debt financing					+	
Principle payment		> <sup>(2)</sup>			>	
Interest payment		> <sup>(2)</sup>			>	>
Taxes		+	> <sup>(3)</sup>	>	>	>
Subsidies		>	+	+	+	+
Discount rate	Econ. cost of capital	G bond yield	After-tax WACC	Before-tax WACC	Cost of equity	

(1) Investment cost financed by the government; (2) Debt service payment by government; (3) CIT as if project is unleveraged.

# Valuation of Economic Benefits and Costs

- Competitive demand price measures the benefit of each marginal unit to the demander (demand curve).
- Competitive supply price, or marginal cost, measures the opportunity cost of each marginal unit from the suppliers' standpoint (supply price).
- The benefits and costs to the society as a whole are equal to the difference between the sum of benefits and sum of costs.
- If this net benefit is positive, it is a viable project; if net benefit is negative the project is non-viable.



# Direct Benefits/Costs and Externalities

- ◆ Direct benefits/costs in the output/input-to-benefit linkage
  - ✓ Conversion of financial prices into economic prices
    - ◆ Adjust for all subsidies and taxes
    - ◆ Adjust for other forms of market distortions (price controls, monopoly)
- Economic prices equal financial prices if there are no distortions (e.g. taxes, subsidies) in the economy
- Transfers among stakeholders within the economy are ignored (loan, loan repayment, income taxes and subsidies)
- ◆ Positive/negative externalities
  - ✓ Adjust for diversions between private benefits/costs and social benefits/costs
  - ✓ The challenge of measuring intangibles

# Types of Distortions and Markets they Affect

- ◆ Market distortions caused by tax
- ◆ Market distortions caused by subsidy
- ◆ Market distortions caused by tax and subsidy
- ◆ Market distortions caused by government price control and rationing
- ◆ Market distortions due to monopoly
  
- ◆ These distortions occur in the markets of:
  - ✓ Goods and services (in prices)
  - ✓ Foreign exchange (in exchange rate)
  - ✓ Cost of capital (discount rate)
  - ✓ Labour (wage rates)

# NGHE AN TATE & LYLE SUGAR PROJECT

Nominal US\$ in million

Year	Benefits						Costs				Net Economic Cash Flow
	Revenue from sugar sales	Net benefits of project labor	Net benefits of sugarcane farmers	Net benefits of truck operators	Terminal value	Sum	Operating costs	Change in working capital	Investment costs	Sum	
1996	0	19	0	0		19	0	150	1,548	1,698	<b>-1,680</b>
1997	0	797	0	0		797	0	560	14,042	14,602	<b>-13,804</b>
1998	0	1,646	396	0		2,042	0	630	38,585	39,215	<b>-37,173</b>
1999	1,978	1,560	2,705	18		6,261	7,144	310	10,376	17,830	<b>-11,569</b>
2000	12,947	660	5,843	111		19,561	9,689	220	1,585	11,494	<b>8,067</b>
2001	25,560	635	7,566	209		33,969	14,633	1,822	3,307	19,762	<b>14,207</b>
2002	30,478	724	7,753	237		39,192	16,817	710	3,406	20,934	<b>18,258</b>
2003	33,954	841	3,663	251		38,709	17,848	502	3,508	21,859	<b>16,850</b>
2004	35,725	866	618	258		37,468	18,384	256	3,613	22,253	<b>15,214</b>
2005	37,588	892	3,514	266		42,260	18,935	269	3,722	22,926	<b>19,334</b>
2006	38,668	919	3,251	274		43,111	19,504	156	3,833	23,493	<b>19,618</b>
2007	39,491	946	-1,794	282		38,926	20,089	119	3,948	24,156	<b>14,770</b>
2008	40,332	974	-482	291		41,116	20,691	122	4,067	24,880	<b>16,236</b>
2009	41,191	1,004	4,236	299		46,731	21,312	124	4,189	25,625	<b>21,106</b>
2010	42,068	1,034	4,910	308		48,320	21,951	127	4,315	26,393	<b>21,927</b>
2011	42,574	1,065	6,893	318		50,849	22,610	73	4,444	27,127	<b>23,722</b>
2012	42,957	1,097	4,104	327		48,485	23,288	55	4,577	27,921	<b>20,564</b>
2013	43,344	1,130	-1,759	337		43,052	23,987	56	4,715	28,757	<b>14,294</b>
2014	43,734	1,164	-212	347		45,032	24,706	56	4,856	29,619	<b>15,413</b>
2015	44,127	1,198	-2,366	358	128,110	171,427	25,448	57	5,002	30,506	<b>140,921</b>