

Chapter 16 Shadow Prices from Secondary Sources

When knowledge of appropriate demand and supply curves is not readily available, we may use the methods in Chapter 12 through 15 to value the impacts. However, most of these methods are expensive and time consuming.

Least-cost approach would be used a previously estimated “shadow prices” or “plug-ins” for measuring the social value of the impacts on CBA.

Shadow price is a proxy value of a good, defined by what an individual must give up to gain an extra unit of the good as the marginal value. Shadow prices can be used to estimate when no market value for a good exists.

Examples of Shadow Prices

1. Value of a statistical life, Table 16-1.
2. Cost of crashes, Table 16-3.
3. Cost of crime, Table 16-4.
4. Value of time, Table 16-5
5. Value of recreational activities, Table 16-6.
6. Value of environmental impacts, Table 16-7.
7. Cost of noise pollution, Table 16-8.
8. Cost of air pollution, Table 16-9.
9. Social cost of automobiles, Table 16-10.

ETS (Emission Trading System)

CO₂ to be a market good from non-market goods

Ex. EU-ETS, CDM (Clean Development Mechanism)

General factors contributing to price volatility:

Fuel (Crude oil) prices, Weather,
Economic Conditions, Policy developments



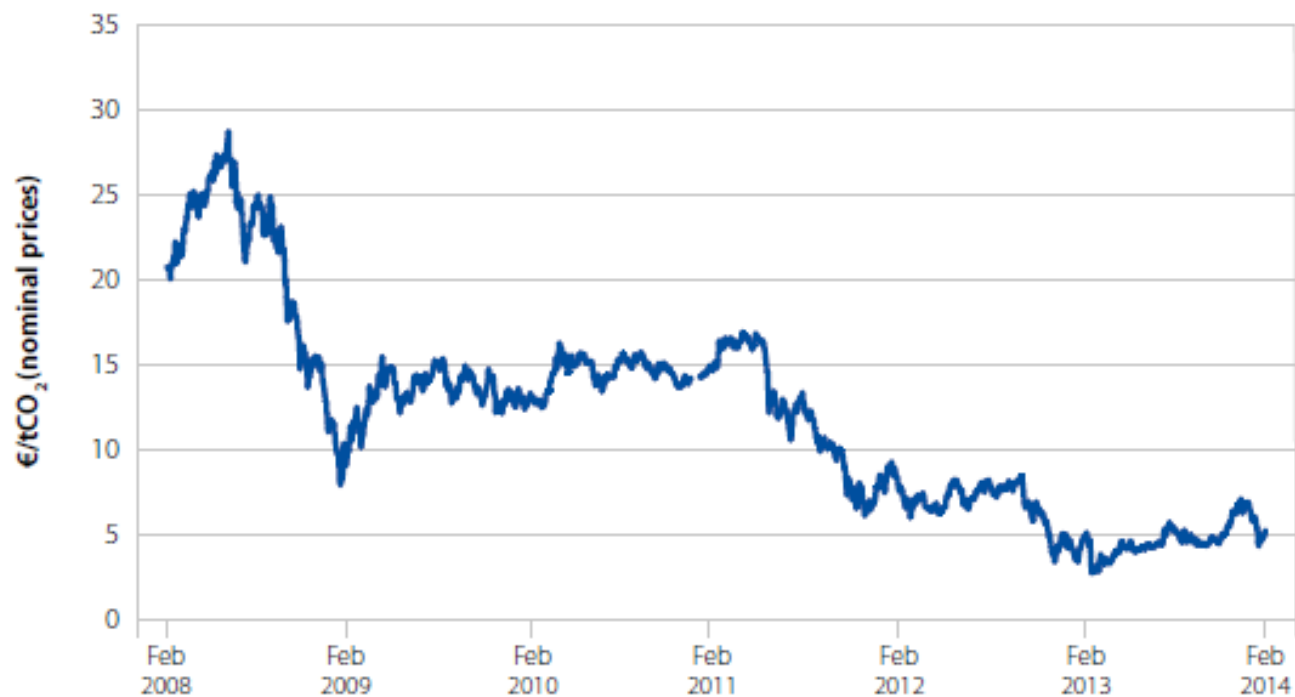
EUA Price: 28 €

CER Price: 20 €

in 2008

EUA: European Union Allowance in EU-ETS.
CER: Certified Emission Reductions in CDM of Kyoto Protocol.

Figure 1.11: Carbon price in the EU ETS



Source: ICE.

Source: Committee on Climate Change (2014)

Chapter 17 Shadow Prices: Applications to Developing Countries

CBA in developing countries have much in common with that in developed countries

Main distinguishing characteristic in developing countries is the much grater emphasis on adjusting the market prices of project output and inputs so that they more accurately reflect their value to society.

- Markets are more distorted in developing countries

- Segmented labor market

- Overvalued exchange rate

- Tariffs, taxes, and import controls

- Formal and informal credit markets

- Use shadow prices/accounting prices instead of market prices

- Accounting prices incorporate adjustments for market failures

LMST Accounting Price Method

Developed by UNIDO (UN Industrial Development Organization), I.M.D *Little* and J.A. *Mirrlees*, synthesized by Lynn *Squire* and Herman G. van der *Tak*

LMST methodology

Use world prices as shadow price for all project inputs and outputs that are classified as tradable. World prices are less distorted than domestic prices.

Trade Opportunity Cost

- Imported input valued at import price
- Exported output valued at export price

Examples

Steel plant (with government funds)

--- High tariff on imported steel, tariff is incorporated in the domestic price of steel, it can be viewed as a transfer between domestic steel buyers and the government.

Agricultural crop

--- Artificially low prices of agricultural crop, use world prices instead.

LMST Method in Practice

Shadow pricing involves multiplying each market price by accounting price ratio (APR)

- $\text{APR for good } i = \frac{\text{accounting or shadow price of good } i}{\text{market price of good } i}$
- $\text{Shadow price of good } i = \text{APR for good } i * \text{market price of good } i$
- Small country assumption

1. Import
2. Export
3. Nontradable good (electricity)

Accounting Price for Import Good

- **CIF (Cost, Insurance and Freight)**
- Price * Exchange rate (2 pesos = 1 USD, Official Rate)
= World Price in domestic currency
- Accounting Prices
 - CIF price: APR = 1
 - Tariff : APR = 0 (due to transfer)
 - Transport cost: APR = 0.5
 - Distribution cost: APR = 0.8
 - Weighted APR: 0.85
- Shadow price= Market Price*APR

Item	US Dollar	Market Value (Pesos)	APR	Accounting Value (Pesos)
CIF (Border Price)	40	80	1.00	80
Tariff	-	10	0.00	0
Transport	-	8	0.50	4
Distribution	-	5	0.80	4
Total		103	0.85	88

Trade Terms and Payer of Cargo

	Export Custom	Carry to port	Unload truck	Load charge	<u>Sea Freight</u>	Unload charge	Load truck	Carry to City	Insuran ce	Import custom	Import tax
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EXW	C	C	C	C	<u>C</u>	C	C	C	C	C	C
FCA	S	S	C	C	<u>C</u>	C	C	C	C	C	C
FAS	S	S	S	C	<u>C</u>	C	C	C	C	C	C
FOB	S	S	S	S	<u>C</u>	C	C	C	C	C	C
CFR	S	S	S	S	<u>S</u>	S	C	C	C	C	C
CIF	S	S	S	S	<u>S</u>	S	C	C	S	C	C
CPT	S	S	S	S	<u>S</u>	S	S	S	C	C	C
CIP	S	S	S	S	<u>S</u>	S	S	S	S	C	C
DAT	S	S	S	S	<u>S</u>	S	S	S	S	C	C
DAP	S	S	S	S	<u>S</u>	S	S	S	S	C	C
DDP	S	S	S	S	<u>S</u>	S	S	S	S	S	S

Shipper(S)



Consignee(C)

Accounting Price for Export

- **FOB (Free on Board)**
- FOB Price = World Price in domestic currency
 - Export tax is a transfer between foreign purchaser (no standing) and the government: $APR = 1$
 - Transport for export: $APR = 0.5$ (reflect real resource costs)
 - Factory gate price: $APR = 1$
- Shadow (accounting) price = 199 pesos (less than 200 in Market Value)
- Shadow price in domestic use = 209 pesos ($200 - 1 + 2 + 8$)

Item	US Dollar	Market Value (Pesos)	APR	Accounting Value (Pesos)
FOB Price	100	200	-	-
Export tax	25	50	1.0	50
Transport for export	1	2	0.5	1
Factory gate price	74	148	1.0	148
Transport (domestic)	-	4	0.5	2
Distribution (domestic)	-	10	0.8	8

Chapter 20 How Accurate is CBA?

Sources of Error in CBA Studies

1. Omissions: to exclude some impact category completely.
e.g. opportunity cost of land acquisition, environmental damages, etc.
2. Forecasting Differences: to arise due to the difficulty of predicting technological change, cognitive biases, changing project specifications, etc. by “uncertainty” and “over optimism”.
3. Valuation Differences: Difficulty of accurate monetary estimates of the social value.
4. Estimation/ Measurement Differences: Impact are often observed, recorded or interpreted inaccurately.