# Road Accident Costing

## International Course on Road Safety Audit and Road Construction Safety, IIT Delhi, India

Sourabh B Paul

Indian Institute of Technology Delhi

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# Lecture Outline

- Introduction
- Methodological challenges
- Developing a common framework
- Case study: India
  - Sources of data
  - Primary survey
  - Unit cost estimation
  - National level assessment
  - Sensitivity analysis

Section 1

# Introduction

# Introduction

- The costs related to road accidents and their consequences are so complex and multi-layered that no one will claim to comprehend it completely
- Some components of these costs are tangible and a large part of it intangible - in fact the intangible part is way bigger than the tangible part
- That does not mean that tangible components are easy to estimate!
- There are several attempts to estimate it - mostly in developed countries. However, there is no agreement on a common framework
- The question is - if something is so complex and there seems to have no concurrence, why do we take such exercise?

# Rationale and significance

- The road accidents impose a huge social and economic cost in terms of untimely deaths, injuries, disabilities and loss of potential income
- Prioritise allocation of public funds on road crash prevention and injury reduction programmes
- Need information on costs of accidents and benefits of preventions programmes to formulate right policies and optimal strategies
- Even if we disagree on methodologies and exact estimates, we should have scenario specific estimates so that we can also have sensitivity analysis

# Broad approaches

- Broadly there are two methods:
  - *ex ante* method - value our willingness to pay to avoid accidents and related consequences. To look at the same in a different way, compensation we are prepared to accept to incur the risk of accidents (usually these two values differ)
  - *ex post* method - actual values for the various components of the total cost of road accidents

# Conventional welfare measures

- Compensating variation (C) and equivalent variation (E) of price changes
  - maximum amount an individual would be willing to pay (WTP) to secure the price change
  - minimum amount she would be willing to accept (WTA) to forgo the price change
  - The value of C and E are likely to be fairly close
- This conventional idea can be extended from price change to quantity change (like public goods, environmental good or bad, damages)
- The key idea here is that a society faces these circumstances exogenously unlike other consumptions goods bought from the market.

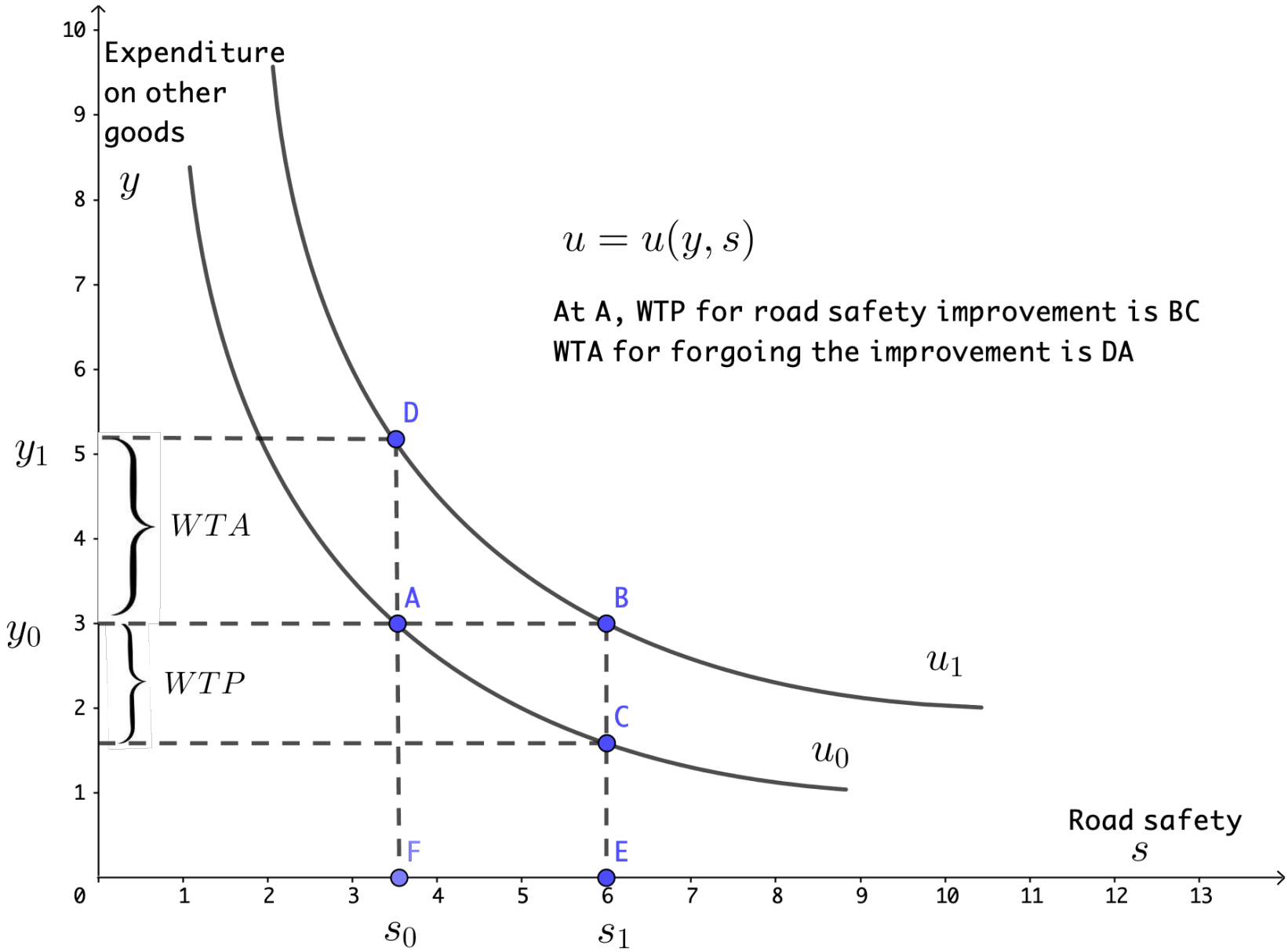


**Figure 1:** WTP and WTA

# Methods to estimate *ex ante* value

- Basic four techniques
  - contingent valuation
  - hedonic pricing
  - revealed preference
  - standard gamble
- Considerable variation in estimates
- Estimates are very inconsistent

# *Ex Post* (or Human Capital) Approach

- Uses objective measures
- Often these measures are obtained from labour market outcomes (that's why it is called human capital approach)
- Draw on detailed accident reports of police (FIR), hospitals, insurance companies, courts, and employers
- Use discounted forgone earnings as estimates of loss of productivity
- We may simulate different scenarios of productivity measurement and the final estimate varies accordingly

Section 2

# Case study: India

# Road traffic injuries in India

- 1,51,417 persons were killed and 4,69,418 people were injured in 2018 in the Country (MoRTH 2019)
  - 8th leading cause of death
  - 9th leading cause of overall health loss
  - 4th leading cause of death for the young/adults between 15-49 years

# Past studies

- There have been a few studies conducted in India
  - Cost of Road Accidents in Delhi (1978): cost analysis using Insurance data
  - Road User Cost Study included Accident cost, WB through CRRI (1982): medical expenses, legal fees, property damage, insurance costs, and loss of output due to death
  - Accident Costing for Developing Countries, TRL (1995): Covered four countries including India
  - Accident Cost Study by MOST, Research Scheme R-79 (2000): 16 cities across India, 4 accident categories, Vehicle and Property damages

# Our study

- Government and Private Hospitals
- The ratio of “Serious injury” to “Minor injury” was highly underestimated. We use realistic ratios for fatality
- We use life expectancy charts for different age groups
- Motor Accident Claim Tribunal judgements for amount of pain and grief instead of fixed percent assumed for grievous injuries