Applied Economics Issues

Session 5: How Much Is It Worth? Valuation Without a Market

Ewen Gallic

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amU Aix Marseille Université

amse
école d'économie d'aix-marseille
aix-marseille school of economics

Today's session

1. **How much is it worth?** Valuation without a market
2. **Stated preferences**: what people say (with a class vote)
3. **Revealed preferences**: what people do
4. **Lab and field experiments**: what people choose (with a class experiment)
5. **Next session**: reading assignment

Part A (S1 to S4) gave us **effects**. Part B focuses on **values**.

1. How much is it worth?

Before we start: a vote

On Moodle: open the quiz "Contingent Valuation" and answer the three questions, alone (3 min). Then, submit your answers!

- The questions differ: do not compare them.
- If there were more of you, I would ask each of you only one question.
- There is no right answer: vote as if the vote were real.

We come back to your answers in a few minutes.

From effects to values

- Part A measures **effects**: a training program raises earnings by $\$x$; a heat wave raises mortality by $y\%$.
- To **decide** (through cost-benefit analysis, or with regulation), we also need **values**: what is a statistical life worth? Clean air? A forest?
- Most of these goods are **not traded**: there is no price to read.
- Part B: how economists measure the **willingness to pay** (for a gain) or **to accept** (for a loss), from what people
  - **say** in hypothetical situations (stated preferences),
  - **do** when they face real choices (revealed preferences),
  - **choose in experiments**.
- A model of how utility generates choices (a **structural model**) turns these answers into values.

1.1. The value of a statistical life

Why do we need a value for life?

- Many policies **reduce the risk of dying**: clean-air rules, road safety, heat-wave plans, climate policy.
- Cost-benefit analysis compares costs and benefits **in the same unit**: money.
- Costs are easy to price (equipment, wages). However, since avoided deaths are not traded, there is no explicit price for them.

Example: a rule costs €50 million a year and avoids 10 deaths a year.

$$\text{Adopt it if } 10 \times \text{VSL} > €50 \text{ million} \Leftrightarrow \text{VSL} > €5 \text{ million}$$

- Refusing to put a number on it is still a choice. Ignoring deaths means VSL $= 0$; "life has no price" means any safety rule is worth any cost.

The value of a statistical life (VSL)

- The **value of a statistical life (VSL)** is the willingness to pay for a **small cut in mortality risk**, divided by the size of the cut.
- "*the value of a life is the amount members of society are willing to pay to save one*" (Thaler and Rosen 1976, NBER).
- This is not the value of an **identified** life, but of a **small risk reduction**, spread over many people, that avoids one **statistical** death (Andersson and Treich, 2011).

$$\text{VSL} = \frac{\text{WTP for a risk reduction}}{\text{the risk reduction}}$$

The VSL: an example

Andersson and Treich (2011) provide a simple example to understand the concept: a city of **100 000** people, where road accidents kill **5** people a year.

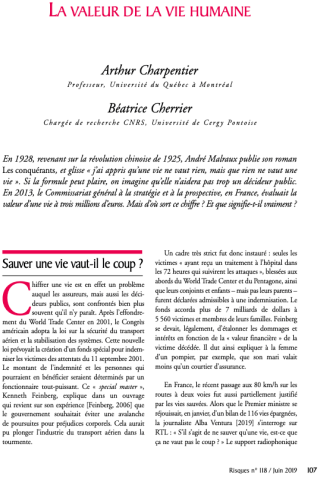
- A safety project cuts deaths to 2: **3 statistical deaths** avoided per year.
- Each resident would pay **$150** a year for it: $15 million in total.

$$\text{VSL} = \frac{150 \times 100\,000}{3} = \frac{150}{3/100\,000} = \$5 \text{ million}$$

Nobody pays $5 million for one person: many people each pay a little for a small drop in risk.

The VSL in practice

- U.S. agencies: $6 to $10 million (2013 dollars) (Viscusi 2015, AJHE); Department of Transportation today: $14.2 million.
- OECD: about $7 million on average for member countries (OECD, 2025, Chap. 6).
- Note: in January 2026, the U.S. Environmental Protection Agency stopped putting a dollar value on the health benefits of cutting PM2.5 and ozone.
- To go further (in French): Charpentier and Cherrier (2019).



LA VALEUR DE LA VIE HUMAINE

Arthur Charpentier
Professeur, Université du Québec à Montréal

Béatrice Cherrier
Chargée de recherche CNRS, Université de Cergy Pontoise

En 1928, revenant sur la révolution chinoise de 1925, André Malraux publie son roman Les conquérants, *et glisse « j'ai appris qu'une vie ne vaut rien, mais que rien ne vaut une vie ». Si la formule peut plaire, on imagine qu'elle n'aidera pas trop un décideur public. En 2013, le Commissariat général à la stratégie et à la prospective, en France, évaluait la valeur d'une vie à trois millions d'euros. Mais d'où sort ce chiffre ? Et que signifie-t-il vraiment ?*

Sauver une vie vaut-il le coup ?

Chiffrer une vie est en effet un problème auquel les assureurs, mais aussi les décideurs publics, sont confrontés bien plus souvent qu'il n'y paraît. Après l'effondrement du World Trade Center en 2001, le Congrès américain adopta la loi sur la sécurité du transport aérien et la stabilisation des systèmes. Cette nouvelle loi prévoit la création d'un fonds spécial pour indemniser les victimes des attentats du 11 septembre 2001. Le montant de l'indemnité et les personnes qui pourraient en bénéficier seraient déterminés par un fonctionnaire tout-puissant. Ce « *special master* », Kenneth Feinberg, explique dans un ouvrage qui revient sur son expérience [Feinberg, 2006] que le gouvernement souhaitait éviter une avalanche de poursuites pour préjudices corporels. Cela aurait pu plonger l'industrie du transport aérien dans la tourmente.

Un cadre très strict fut donc instauré : seules les victimes « ayant reçu un traitement à l'hôpital dans les 72 heures qui suivirent les attaques », blessées aux abords du World Trade Center et du Pentagone, ainsi que leurs conjoints et enfants – mais pas leurs parents – furent déclarées admissibles à une indemnisation. Le fonds accorda plus de 7 milliards de dollars à 5 560 victimes et membres de leurs familles. Feinberg se devait, légalement, d'évaluer les dommages et intérêts en fonction de la « valeur financière » de la victime décédée. Il dut ainsi expliquer à la femme d'un pompier, par exemple, que son mari valait moins qu'un courtier d'assurance.

En France, le récent passage aux 80 km/h sur les routes à deux voies fut aussi particulièrement justifié par les vies sauvées. Alors que le Premier ministre se réjouissait, en janvier, d'un bilan de 116 vies épargnées, la journaliste Alba Ventura [2019] s'interroge sur RTL : « S'il s'agit de ne sauver qu'une vie, est-ce que ça ne vaut pas le coup ? » Le support radiophonique

2. Stated preferences

Stated preferences

With **stated preferences**, respondents to surveys or experiments face hypothetical situations: they gain or lose nothing from their answers. There are two main approaches.

1. **Contingent Valuation**: survey asks WTP/WTA for a **hypothetical change**.
   - ***What is the max. you are willing to pay for this change?*** (single valuation)
   - e.g., residents of Chongqing state how much they would pay for a city program that cuts deaths from air pollution (Wang and Mullahy, 2006)
2. **Choice Experiments**: respondents choose among scenarios (**hence, hypothetical**) with varying attributes.
   - ***Which option do you prefer?*** (indirect, repeated choices)
   - e.g., in Hanley et al. (1998, ERE), respondents chose several times between two forest-management options and the *status quo*. Each option had a tax and three features (shape, species mix, felling). This allowed the authors to estimate the WTP for each feature.

2.1. Contingent valuation

Contingent valuation: four steps

1. **A scenario**: what changes, by how much, for whom.
2. **A payment**: who pays, how (a tax, a fee, a price), how often.
3. **A question**: WTP (or WTA), in one of several formats.
4. **An analysis**: mean or median WTP; check that the answers behave like values.

Asking the question: four formats

Format	**The question**	**Weak point**
Open-ended	What is the most you would pay?	hard to answer; many zeros
Bidding game	Would you pay 1? 2? 5? ... until a no	anchored on the first amount
Payment card	Pick an amount in a list	the list shapes the answer
Referendum	Would you vote for it if it cost you €X? (X random)	one yes/no each: large samples

The NOAA panel (Arrow et al., 1993) recommended the referendum; it appears to be the hardest to manipulate (Carson and Groves 2007, ERE).

Example: air pollution in Chongqing

Wang and Mullahy (2006, Sci. Total Environ.) ran a survey in Chongqing in 1998 to estimate the WTP for a lower risk of dying from air pollution.

Design of the survey

- 500 residents, face to face.
- A city program cuts air pollution deaths from 20 to 15 per 100 000 a year, paid by a fee.
- Open-ended question; if hesitant (38%), a bidding game.

Results

- 96% answered; 22% of them: zero.
- Probit for WTP > 0, then a model of the amount.
- Median WTP: **14.3 yuan** per person per year (about 3€ in 2026).

Your turn: from a WTP to a value of a statistical life

Consider the following situation:

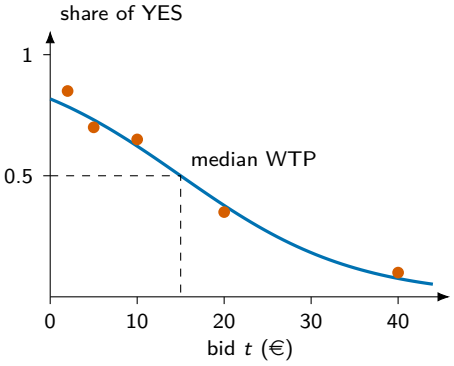
- Paying 14.3 yuan cuts my risk of dying by 5 in 100 000.
- **Small exercise: what is the implied value of a statistical life?**

Your turn: from a WTP to a value of a statistical life

Consider the following situation:

- Paying 14.3 yuan cuts my risk of dying by 5 in 100 000.
- **Small exercise: what is the implied value of a statistical life?**
- $14.3/(5/100\,000) =$ **286 000 yuan**, about €60 000 in 2026.
- 100 000 people pay 1.43 million yuan to avoid 5 deaths.
- Lost earnings (human capital method): 70 000 yuan, about a quarter of the VSL.
- WTP rises fast with income: income elasticity of WTP of 1.42 (not an income elasticity of demand).

The referendum format: from yes/no to WTP



- Each person sees one random bid t_i; YES if $\text{WTP}_i \geq t_i$.
- **Share of YES** at t: $P(\text{WTP} \geq t)$.
- Estimation with a **logit** (Hanemann 1984, AJAE):

$$P(\text{YES} \mid t) = \Lambda(\beta_0 + \beta_1 t).$$

- Median WTP: $P = 1/2$, so $t = -\beta_0/\beta_1$.

Note: solve $1/2 = \frac{1}{1+e^{-(\beta_0+\beta_1 t)}}$ for t.

Your vote from earlier: what do our data say?

Marseille plants trees to shade streets: 2 or 10 fewer days above 35°C per summer.
Paid by a one-off contribution of €2 to €40, added to next year's local taxes.

1. Using your answers, can we predict this class's median WTP? Will 10 days be worth 5 times 2 days?
2. **In R** (`session5-cv-lab.R`): we will calculate the share of "YES" by bid, the median WTP, and run a scope test.
3. Then we discuss: with about 40 answers, how precise are our estimates?

The scope test

In the class vote, there are two versions: 2 or 10 hot days avoided.

- The NOAA panel (Arrow et al., 1993) recommended a key check: the **scope test**. We will see a famous failure (the birds) in a few minutes.
- If people value the good, WTP should rise with its **size**.
- Random groups value different sizes, which allows us to compare their WTP.

In our vote: 2 or 10 days, drawn at random. With 3 answers each, it is not a clean split sample: fine for a demo.

$$P(\text{YES} \mid t) = \Lambda(\beta_0 + \beta_1 t + \beta_2 \,\text{large}), \qquad \text{WTP}_{\text{small}} = -\frac{\beta_0}{\beta_1}, \quad \text{WTP}_{\text{large}} = -\frac{\beta_0 + \beta_2}{\beta_1}$$

Since $\beta_1 < 0$: scope $\Leftrightarrow$ $\beta_2 > 0$. Test $H_0 : \beta_2 = 0$ against $H_1 : \beta_2 > 0$.

The scope test: a numerical example

Suppose the logit gives $\beta_0 = 1.5$, $\beta_1 = -0.15$ and $\beta_2 = 0.9$.

Median WTP

$$\text{WTP}_{\text{small}} = -\frac{1.5}{-0.15} = \textbf{€10}$$

$$\text{WTP}_{\text{large}} = -\frac{1.5 + 0.9}{-0.15} = \textbf{€16}$$

Share of YES at a bid of €10

small: $\Lambda(1.5 - 0.15 \times 10) = \Lambda(0) = 0.50$

large: $\Lambda(1.5 + 0.9 - 1.5) = \Lambda(0.9) = 0.71$

- $\beta_2 > 0$: WTP rises with the size, **scope**. The gap: $-\beta_2/\beta_1 = €6$.
- 5 times more days, 1.6 times the WTP: not proportional, as diminishing marginal utility predicts (€5 per day for 2 days, €1.6 per day for 10).

$\Lambda(x) = 1/(1 + e^{-x})$.

Our vote, simulated: 40 vs. 2 000 answers

	True value	40 answers	2 000 answers
2 hot days avoided	€10	€8.8 [2.0, 15.6]	€10.6 [9.6, 11.6]
10 hot days avoided	€16	€12.8 [5.6, 20.1]	€16.1 [15.0, 17.2]
Scope test		$z = 0.8$, $p = 0.21$	$z \approx 7$, $p < 0.001$

Median WTP from a logit, 95% confidence intervals (delta method). Simulated data.

- 40 answers (4 per bid and version): the scope test **cannot** tell the versions apart.
- 2 000 answers: same design, intervals about **7 times narrower**.
  - the standard error of an estimate shrinks with the square root of the sample size. So going from 40 to 2,000 answers divides it by $\sqrt{2000/40} = \sqrt{50} \approx 7$.
- 5 times more days, WTP about 1.5 times higher: scope, but not proportional.

Can we trust a stated WTP? Four checks

- **Scope**: WTP should rise with the size of the good (our 2 vs. 10 days).
- **Income**: WTP should rise with income (this is what is observed in Chongqing).
- **Zeros**: is a zero a true zero, or a protest against the fee? A follow-up question ("why zero?") helps.
- **Anchoring**: in a bidding game, the first amount read shapes the answer.

Two behavioral challenges to valuation

Valuation assumes **stable preferences**. Behavioral economics questions this:

- **Endowment effect** (Kahneman et al. 1990, JPE): median price to sell a mug \$5.75, to buy the same mug \$2.25.
  - WTA $\gg$ WTP: which one values a *lost* forest?
- **Scope insensitivity** (Desvousges et al., 2010) (Chapter 5, p. 66): mean WTP to save 2 000, 20 000 or 200 000 birds: \$80, \$78, \$88.
  - A value, or a feeling about the cause? (Kahneman et al. 1999, JRU)

2.2. Choice experiments

Choice experiments: the idea in a nutshell

- CV values the good **as a whole**, with one question.
- A choice experiment describes the good as a **bundle of attributes** (Lancaster 1966, JPE); one of them is a **price**.
- Respondents make **several choices** between options and the status quo.
- Each choice is a **trade-off**: more of an attribute against a higher price.

$\Rightarrow$ We recover the value of **each attribute**, not only of the whole good.

A choice card: forest landscapes in the UK

Hanley et al. (1998, ERE), for the Forestry Commission: **4 cards** per person, with photographs.

	Forest A	**Forest B**	**Status quo**
Shape	organic edges	straight edges	straight edges
Felling	small scale	small scale	large scale
Species mix	evergreen only	mixed	evergreen only
Income tax, per year	£20	£15	£0
Your choice	☐	☐	☐

Note: the attributes and levels are those of the study; the two tax amounts are illustrative.

From choices to values: implicit prices

Utility of option j for person n:

$$U_{nj} = \beta_{\text{shape}}\,\text{shape}_j + \beta_{\text{fell}}\,\text{felling}_j + \beta_{\text{spec}}\,\text{species}_j + \beta_{\text{tax}}\,\text{tax}_j + \varepsilon_{nj}$$

- Conditional logit (McFadden 1974, J. Public Econ.): the probability of choosing j rises with U_{nj}.
- Marginal WTP for attribute k: the tax that leaves utility unchanged,

$$\text{WTP}_k = -\frac{\beta_k}{\beta_{\text{tax}}}$$

- Same logic as our vote: $-\beta_0/\beta_1$, with one value per attribute.

Illustration: the value of a forest's shape

	Coef.	WTP
Shape (organic)	0.457	£13.89
Felling (small scale)	0.424	£12.89
Species (mixed)	0.374	£11.37
Tax (£)	−0.0329	

181 respondents; WTP per household per year (Hanley et al. 1998, ERE).

Let us compute the WTP for organic edges.

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Let us compute the WTP for organic edges.

- $0.457/0.0329 =$ **£13.89**.
- "Ideal forest" (all three): £38.15.
- Open-ended CV on a separate sample: £29.16, below the sum of the parts.

$\Rightarrow$ The method shapes the value.

2.3. Wrap-up on stated preferences and limits

Contingent valuation or choice experiment?

	Contingent valuation	**Choice experiment**
What is valued	the good as a whole	each attribute, and bundles
The task	one question	several choices, with a status quo
Scope	a separate test	built in: levels vary
Weak points	yea-saying (saying yes to please), protest	attributes and levels chosen by the researcher; fatigue

In Hanley et al. (1998), shape ranks above felling partly because of **the photographs used**: presentation shapes values.

Stated preferences: limits

Stated-preference methods have some limits:

- **Cognitive burden**: when tasks are too hard, tired respondents may answer at random.
- **Hypothetical bias**: respondents are asked what they **would** do, their **actual behavior** may differ.
- **Attribute definition problems**: decomposing an option might be too complex and is subject to the researcher's choices.
- **Modelling errors**: the choice of a structural model can be wrong, and the assumptions it relies on may be violated.

3. Revealed preferences

Revealed preferences

With **revealed preferences**, values are inferred from **observed** **market behaviour** and **actual choices**.

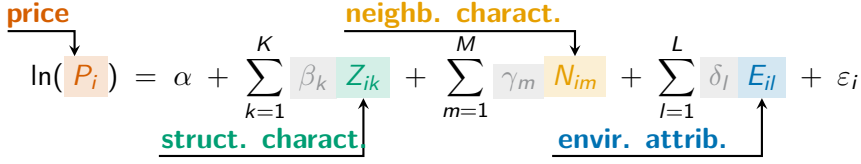
- Revealed-preference methods use **real market data** (prices, quantities, choices).
- As with stated preferences, a structural model links choices to utility.

Main methods:

- **Hedonic pricing**: the value of attributes (e.g., clean air) from their effect on market prices (e.g., housing).
- **Wage-risk studies**: the VSL from the extra pay of risky jobs.
- **Discrete choice models**: the tool of choice experiments, applied to real choices (e.g., transport mode). ⚙

Revealed preferences: hedonic pricing

- **Hedonic pricing methods** allow us to value **non-market attributes** by analyzing how they affect observed market prices.
- Goods are treated as bundles of **characteristics**:
  - e.g., for houses: size, location, quietness of the neighbourhood, amenities, ...
- For example, see Rosen (1974, JPE) for theoretical foundations, and Chay and Greenstone (2005, JPE) or Bajari et al. (2012, AER) for empirical studies.



- With $\ln(P_i)$ on the left, $\beta_k \approx$ the % change in price for one more unit of attribute k, all else equal. The **implicit (hedonic) price** is $\partial P / \partial Z_k = \beta_k \times P$.

Revealed preferences: the value of a statistical life

Wage-risk studies: riskier jobs must pay more (Thaler and Rosen, 1976).

A job pays $1 400 more per year for an extra 1-in-10 000 risk of death (i.e., extra death risk of 0.0001).
What is the implied value of a statistical life (VSL)?

Revealed preferences: the value of a statistical life

Wage-risk studies: riskier jobs must pay more (Thaler and Rosen, 1976).

A job pays \$1 400 more per year for an extra 1-in-10 000 risk of death (i.e., extra death risk of 0.0001).
What is the implied value of a statistical life (VSL)?

- Suppose 10 000 workers have a job with an extra death risk of 0.0001 per year. On average, one of them will die during the year.
- Each worker would accept \$1 400 less per year if the extra risk fell from 0.0001 to 0.
- Together, they would give up $1\,400 \times 10\,000 =$ **\$14 million** to avoid that one expected death.
- This corresponds to a value of **small changes in risk**, not the *price of a life*.
- Close to the value used by the U.S. Department of Transportation (\$14.2 million).

Revealed preferences: limits

- Only goods with a **market signal**:
  - air quality, if it moves house prices (Chay and Greenstone 2005, JPE);
  - not biodiversity or cultural heritage, which leave no trace in prices.
- No **new goods**: no WTP for a new carbon tax, or for climate risks people have not faced yet.
- Choices **reflect constraints**, not only preferences:
  - poorer households may not visit a park because the trip costs too much;
  - bus vs. car may reflect what is available, not what people prefer.

4. Lab and field experiments

Experimental economics: lab/field experiments

- **Lab and field experiments** can also be used to measure preferences:
  - **risk aversion** (e.g., lottery choices à la Holt and Laury (2002, AER)),
  - **time discounting** (an amount today vs. another in t days (Tanaka et al. 2010, AER)); we meet discounting again in Session 6;
  - **social preferences** (e.g., effect of reputation on a public goods experiment to tackle the tragedy of the commons (Milinski et al. 2002, Nature)).
- Again, lab experiments offer **internal validity** but may be questioned regarding their external validity.
- We mentioned earlier the "WEIRD" critique (Western, Educated, Industrialized, Rich, Democratic). For risk aversion, see the large study of L'Haridon and Vieider (2019, Quant. Econ.).

Your turn: a lottery or sure money?

On Moodle: open the quiz "Risk Preferences" (3 lists of 10 choices, 5 min).

In each row, choose between

- **A**: a lottery paying €20 with probability p (10%, 50% or 90%), nothing otherwise;
- **B**: a sure amount, from €1 to €19.

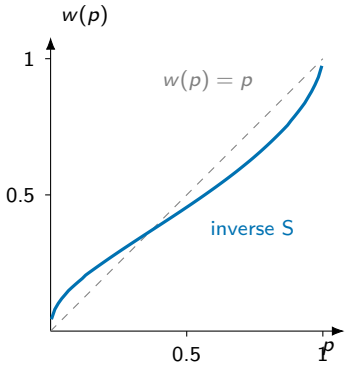
There is no right answer: choose as if one row were paid for real.

What a choice list reveals: the certainty equivalent

Sure amount (€)	1	3	5	7	9	11	13	15	17	19
Choice ($p = 50\%$)	A	A	A	A	**B**	B	B	B	B	B

- The switch reveals the **certainty equivalent**: here $\text{CE} = (7 + 9)/2 = €8$.
- Expected value: $0.5 \times 20 = €10$. $\text{CE} < \text{EV}$: **risk averse**.
- Risk premium: $\text{EV} - \text{CE} = €2$, given up to avoid the risk.
- No question about attitudes: **preferences are revealed by choices**!

From certainty equivalents to probability weights



- If the lottery is worth $w(p)\,u(20)$ with $u(x) = x$, then $\text{CE} = w(p) \times 20$, so $w(p) = \text{CE}/20$ (L'Haridon and Vieider 2019, Quant. Econ.).
- An expected-value maximizer has $w(p) = p$.
- Typical finding: small probabilities **overweighted**, large ones **underweighted** (Prelec, 1998).

$\Rightarrow$ At small p: CE $>$ EV, as with lottery tickets. At large p: CE $<$ EV, a premium paid for certainty.

Our lists: what do they say?

Three lotteries: €20 with probability 10%, 50%, 90%.

1. We estimate this class's CE at $p = 50\%$. At $p = 10\%$, is the CE above or below the expected value (€2)?
2. **In R** (`session5-risk-lab.R`): CE by list, risk premium, $w(p) = \text{CE}/20$.
3. Then we discuss: who (if anyone) switched more than once? Would real money change our choices?

Risk preferences around the world

L'Haridon and Vieider (2019, Quant. Econ.): lists of this kind, for real money.

- 2 939 students in **30 countries**; one choice paid at random.
- Likelihood insensitivity (the inverse S) and loss aversion **everywhere**.
- Students in poorer countries are **more risk tolerant** (less risk averse) on average.
- Individual characteristics (gender, cognitive ability...) explain little of individual differences.
- This paper offers, by comparing the same experiment across countries, an answer to the WEIRD critique.

Valuation in development economics: two field experiments

Cohen and Dupas (2010, QJE)

- Kenya: the price of a bednet is **randomized** across clinics.
- Random prices trace a **demand curve**.
- From free to \$0.60: uptake falls by **60 pp**, with no gain in use or targeting.

Berry et al. (2020, JPE) details

- Ghana: willingness to pay for a water filter, elicited with Becker et al. (1964) (**B**ecker, **D**egroot, **M**arschak).
- BDM: you buy at a random price if it is below your bid, so bidding your value is optimal.
- WTP is **low** relative to cost; implied health values are well below those used in policy.

Both questions at once: randomization gives the **effect**, prices or bids give the **value**.

5. Wrap-up and next session

Take-aways

1. **Values come from behavior**: what people say (stated), do (revealed), or choose in experiments.
2. **Check that answers behave like values**: scope, income, protest zeros, anchoring; WTP vs. WTA.
3. **Effects and values together**: randomization gives the effect, prices or bids give the value.

Next: Session 6, the price of one ton of CO_2. The VSL, the WTP, and time and risk preferences are its inputs.

Reading for Session 6 (December 9, 2026)

The reading debrief moves to Session 6: **same two papers, same preparation**.

- Nordhaus (2019, AER): Climate change: the ultimate challenge for economics.
- Pindyck (2013, JEL): Climate change policy: what do the models tell us?

Bring your map of Pindyck's argument, your summary of Nordhaus, and your answer to the critical question:

on what exactly do Nordhaus and Pindyck disagree?

6. Appendix

References I

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8. Backup slides

Revealed preferences: discrete choice models

- With **discrete choice models** and market data, the choices made by agents among discrete alternatives are modelled using probabilistic models.
- It is assumed that a probability can be associated with each alternative. This probability is modelled as a function of the attributes of the alternative.
- Seminal paper: McFadden (1974, J. Public Econ.) (choice of transport mode to assess urban travel demand, using survey data):
  - The utility of choosing alternative $j \in \mathcal{J}$ of individual n can be written $U_{nj} = \mathbf{X}_{nj}\beta + \varepsilon_{nj}$,
  - If the ε_{nj} are i.i.d. with a Gumbel distribution, the prob. that indiv. n chooses option i is:

$$P_{ni} = \frac{\exp(\mathbf{X}_{ni}\beta)}{\sum_{j=1}^{J} \exp(\mathbf{X}_{nj}\beta)}$$

  - You recognize the **conditional logit model**. Go back

The BDM mechanism (Becker et al., 1964)

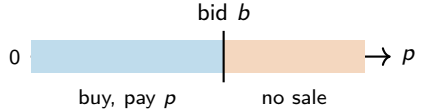
How it works

1. You state a **bid** b for the good.
2. A **price** p is drawn at random.
3. If $p \leq b$: you **buy**, and you pay p (not b).
   If $p > b$: no sale, you pay nothing.

Why bid your true value v?

- Your bid decides *whether* you buy, never *what* you pay.
- $b > v$: you may have to buy at $v < p \leq b \rightarrow$ a loss.
- $b < v$: you may miss a purchase at $b < p \leq v \rightarrow$ a lost gain.

$\rightarrow$ Bidding $b = v$ is a **weakly dominant strategy**.



Water filters in Ghana (Berry et al. 2020, JPE)

- Practice round with a bar of soap first.
- Filter prices drawn from GHS 0 to 12 (cost: about GHS 21).
- 269 of the 272 winners actually paid.
- Caveats: the rule is hard to grasp, people are short of cash, and bids come out below take-it-or-leave-it demand (risk aversion).

Scope test: the migratory birds (Desvousges et al., 2010)

The scenario in Chapter 5

- Migratory waterfowl (ducks, geese, swans, etc.) in the Central Flyway drown in uncovered waste-oil ponds (the birds mistake those oil ponds for bodies of water).
- Covering the ponds with nets would prevent these deaths.
- **Open-ended** question: the most you would pay for the program?

Split sample: three versions of the questionnaire

	Version 1	Version 2	Version 3
Bird deaths prevented	2,000	20,000	200,000
Respondents (N)	288	286	281

Each respondent sees **one** version only. This setup offers an external scope test.

What should we expect?

Theory (theoretical validity, Chap. 5)

- If saving birds yields positive marginal utility, more birds saved → higher WTP:

$$WTP_{2\,000} < WTP_{20\,000} < WTP_{200\,000}$$

The test, for each pair of versions (j, k):

$$H_0 : F_j = F_k \quad \text{(same distribution of WTP)} \qquad \text{vs.} \qquad H_1 : F_j \neq F_k$$

Random assignment: under H_0, the groups differ only by sampling noise.

- WTP is far from normal → the authors use **nonparametric** tests:
  - **Wilcoxon rank sum**: uses ranks, robust to outliers;
  - **Permutations**: uses values, sensitive to outliers.
- If WTP reflects preferences, we expect to **reject** H_0.

Results: same WTP for 100 times more birds

Table 5-1. WTP ($)

	2,000	20,000	200,000
Mean	80	78	88
Std. dev.	187	132	166
Median	25	25	25
Mode	0	100	100
Max.	1,550	1,000	1,000
N	288	286	281

Shapiro–Wilk: 0.43, 0.60, 0.54 → not normal.

Table 5-2. *p*-values

	Wilcoxon	Permut.
2k vs. 20k	0.178	0.425
20k vs. 200k	0.457	0.185
2k vs. 200k	0.145	0.288

Monte Carlo estimates.

- H_0 is **never rejected**, not even at 10%, not even 2k vs. 200k.
- **Scope insensitivity**: the answers do not track the size of the good.

Go back

A value, or a feeling about the cause?

Two meanings of "valuation" Go back

Economic valuation

- Valuation is the **money equivalent** of a change in the good.
- WTP is the most you would pay for *this* change.

→ It should depend on the quantity: 2,000 vs. 200,000 birds.

Affective valuation (Kahneman et al., 1999)

- Valuation is the core of an **attitude**: it gives an object an *affective value*, from very negative to very positive.
- Its **sign** and **intensity** are judged relative to similar objects.
- Attitudes apply to anything we like or dislike, or want to protect or harm.

The authors claim that stated WTP is an **attitude expressed on a dollar scale**.

- People react to a typical case (*one oiled bird*), not to the number of birds → which explains **scope insensitivity**.
- The dollar scale has no upper bound → answers are very dispersed.
- Dollar answers correlate strongly with ratings of how much people care.