

What happens if we treat commuting as intermediate consumption?

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Agenda

- GDP and welfare
- The special role of commuting
- Emission responsibility
- The Commuting Input-Output Table (CIOT)
- Next steps

GDP and Welfare

GDP is:

- The total value of all final goods and services produced by an economy
- The total value of all final goods and services used by an economy
- The total income attributed to labour and capital

What does this have to do with welfare?

GDP and Welfare



GDP and Welfare

Too much and for too long, we seem to have surrendered personal excellence and community value in the mere accumulation of material things. Our Gross National Product, now, is over eight hundred billion dollars a year, but that GNP [...] counts air pollution and cigarette advertising and ambulances to clear our highways of carnage. It counts special locks for our doors and the jails for the people who break them. It counts the destruction of the redwoods and the loss of our natural wonder in chaotic sprawl. It counts napalm and it counts nuclear warheads, and armored cars for the police to fight the riots in our cities.

Robert F. Kennedy, 1968

GDP and Welfare

Gross National Product does not allow for the health of our children, the quality of their education, or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials. It measures neither our wit nor our courage, neither our wisdom nor our learning, neither our compassion nor our devotion to our country; it measures everything, in short, except that which makes life worthwhile.

Robert F. Kennedy, 1968

GDP and Welfare

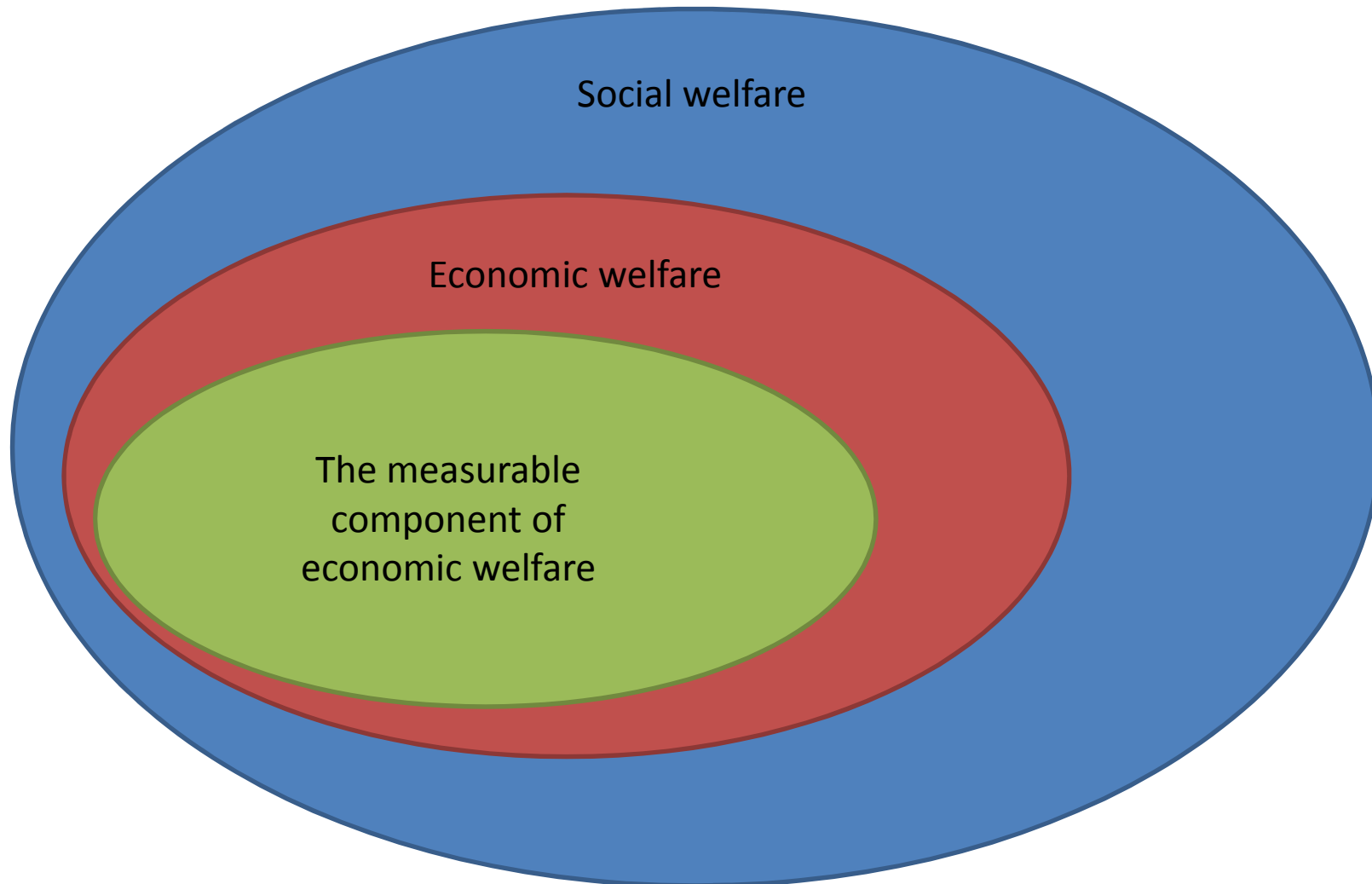
Pigou (1920): *The Economics of Welfare*

- **Welfare** is determined by the satisfaction or dissatisfaction of desires.
- **Economic welfare** is the “part of welfare” that can be measured in monetary terms.

Abramovitz (1959): *The Allocation of Economic Resources*

- GNP is supposed to be “the objective, measurable component of economic welfare”.
- “causes which affect economic welfare favorably may conceivably affect social welfare unfavorably”.

GDP and Welfare



GDP and Welfare

- Eisner (JEL, 1988): Total welfare is the sum of economic welfare and non-economic welfare.
 - Non-economic welfare is clearly hard to measure.
 - But we should at least try to measure economic welfare as accurately as possible.
- Abramovitz (1959):
 - We should distinguish “consistently between final goods and intermediate goods in a fashion which properly reflects the welfare goal of the index”.
 - “The normal procedure of assuming that consumer outlays made are made for final products, while business spending is either for capital goods or intermediate goods is unsatisfactory”.
- Where do we draw the line between final goods and intermediate goods?

The Special Role of Commuting

Time spent in minutes in a week day,
commuting respondents

Country	Minutes
Australia	43
United States	79
Japan	82
Germany	66
Spain	65
France	62
United Kingdom	64

Source: [OECD](#)

- Environmental damage: Commuting accounts for roughly 8% of total GHG emissions in the UK (Jackson et al., 2006)
- Economic cost: Commuting expenditure was roughly 1.7% of U.S. GNP in 1977 (Zolotas, 1981).
- When the time loss is considered, that figure becomes 7.2% (Zolotas, 1981).

The Special Role of Commuting

Stutzer & Frey (2008): *Stress that Doesn't Pay: The Commuting Paradox*

The strain of commuting is associated with:

- raised blood pressure
- musculoskeletal disorders
- lowered frustration tolerance and increased anxiety and hostility
- being in a bad mood when arriving at work in the morning and coming home in the evening
- increased lateness, absenteeism and turnover at work
- adverse effects on cognitive performance

Road Rage



The Special Role of Commuting

- Commuting does not fulfil wants and desires, it does not increase satisfaction.
- This view is supported by existing legislation.
 - Commuting expenditure is tax-deductible in many countries.
 - There have been successful lawsuits which forced employers to treat commuting time as worktime.
- If GDP is supposed to measure (economic) welfare, we should not include commuting expenditure.
- Solution: treat commuting as intermediate consumption rather than final consumption
- What does this mean for our input-output tables?

The “regular” input-output table

	fuel industry	transport industry	other industries	total interm. cons.	cons.	inv.	gov.	final cons.	total use
fuels	5	50	50	105	80	0	15	95	200
transport services	5	10	50	65	90	0	45	135	200
other products	90	40	100	230	100	50	20	170	400
(sub-)total	100	100	200	400	270	50	80	400	800
wages	60	70	120	250					
profits	40	30	80	150					
value added	100	100	200	400					
total supply	200	200	400	800					
GDP (exp.)	400								
GDP (inc.)	400								

Intermediate consumption

Final consumption

Primary inputs

If we know commuting expenditure by product, we can do this:

	fuel industry	transport industry	other industries	total interm. cons.	commuting	cons. (other than comm.)	inv.	gov.	final cons.	total use
fuels	5	50	50	105	40	40	0	15	95	200
transport services	5	10	50	65	45	45	0	45	135	200
other products	90	40	100	230	0	100	50	20	170	400
(sub-)total	100	100	200	400	85	185	50	80	400	800
wages	60	70	120	250						
profits	40	30	80	150						
value added	100	100	200	400						
total supply	200	200	400	800						
GDP (exp.)	400									
GDP (inc.)	400									

Intermediate consumption

Final consumption

Primary inputs

If we know commuting expenditure by industry, we can do this:

	fuel industry	transport industry	other industries	total interm. cons.	commuting	cons. (other than comm.)	inv.	gov.	final cons.	total use
fuels	5	50	50	105	40	40	0	15	95	200
transport services	5	10	50	65	45	45	0	45	135	200
other products	90	40	100	230	0	100	50	20	170	400
(sub-)total	100	100	200	400	85	185	50	80	400	800
wages	40	50	75	165						
profits	40	30	80	150						
commuting	20	20	45	85						
value added	100	100	200	400						
total supply	200	200	400	800						
GDP (exp.)	400									
GDP (inc.)	400									

Intermediate consumption

Final consumption

Primary inputs

The commuting input-output table (CIOT)

	fuel industry	transport industry	other industries	commuting	total interm. cons.	cons. (other than comm.)	inv.	gov.	final cons.	total use
fuels	5	50	50	40	145	40	0	15	55	200
transport services	5	10	50	45	110	45	0	45	90	200
other products	90	40	100	0	230	100	50	20	170	400
commuting	20	20	45	0	85	0	0	0	0	85
(sub-)total	120	120	245	85	570	185	50	80	315	885
wages	40	50	75	0	165					
profits	40	30	80	0	150					
value added	80	80	155	0	315					
total supply	200	200	400	85	885					
GDP (exp.)	315									
GDP (inc.)	315									

Intermediate consumption

Final consumption

Primary inputs

Emission Responsibility

- In ecological economics, we want to know who is responsible for emissions of GHG etc.
- Consumer responsibility vs. producer responsibility
 - The goal is not to play a blame game.
 - The goal is to develop effective mitigation strategies.
- Environmentally extended input-output analysis (EEIOA) tells us which products are relatively “clean” and which are relatively “dirty”.
- But so far they do not consider the emissions generated by commuters.

Emission Responsibility

- Example:
 - I take my car, drive to the university, and deliver a lecture on microeconomics.
 - Who is responsible for the emissions?
- With a CIOT:
 - Commuting is allocated to industries, not consumers.
 - We can get a better picture of emission responsibility.
 - And we can develop more effective mitigation strategies.
- If firms were “responsible” for the emissions of their commuting employees, they would have incentives to reduce those emissions.
 - Organize car-pooling
 - Subsidize public transport tickets or e-mobility
 - Allow teleworking

Next Steps

- Data that we need:
 - Commuting expenditure by product
 - Commuting expenditure by industry
- Problems to be solved:
 - We know the consumption expenditure on fuels, vehicles, vehicle maintenance, transport services etc. But how much of this is for commuting and how much is for other purposes?
 - We need commuting expenditure by industry.