ETH zürich

The True Cost of Flying

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Institut für Umweltentscheidungen
Institute for Environmental Decisions

Externalities in Transport Systems

- An externality is defined as the costs (or benefits) of activities that affect individuals/firms without being reflected in the **price system**
- Examples: Societal costs of **pollution and climate change** due to the use of fossil fuels. These societal costs are not reflected in market prices for transport and hence are not included in the private costs of consumers
- Other examples: noise, accidents, traffic jams

Market failure – **policy measures/internalization** needed to avoid welfare losses; **true costs** should be charged

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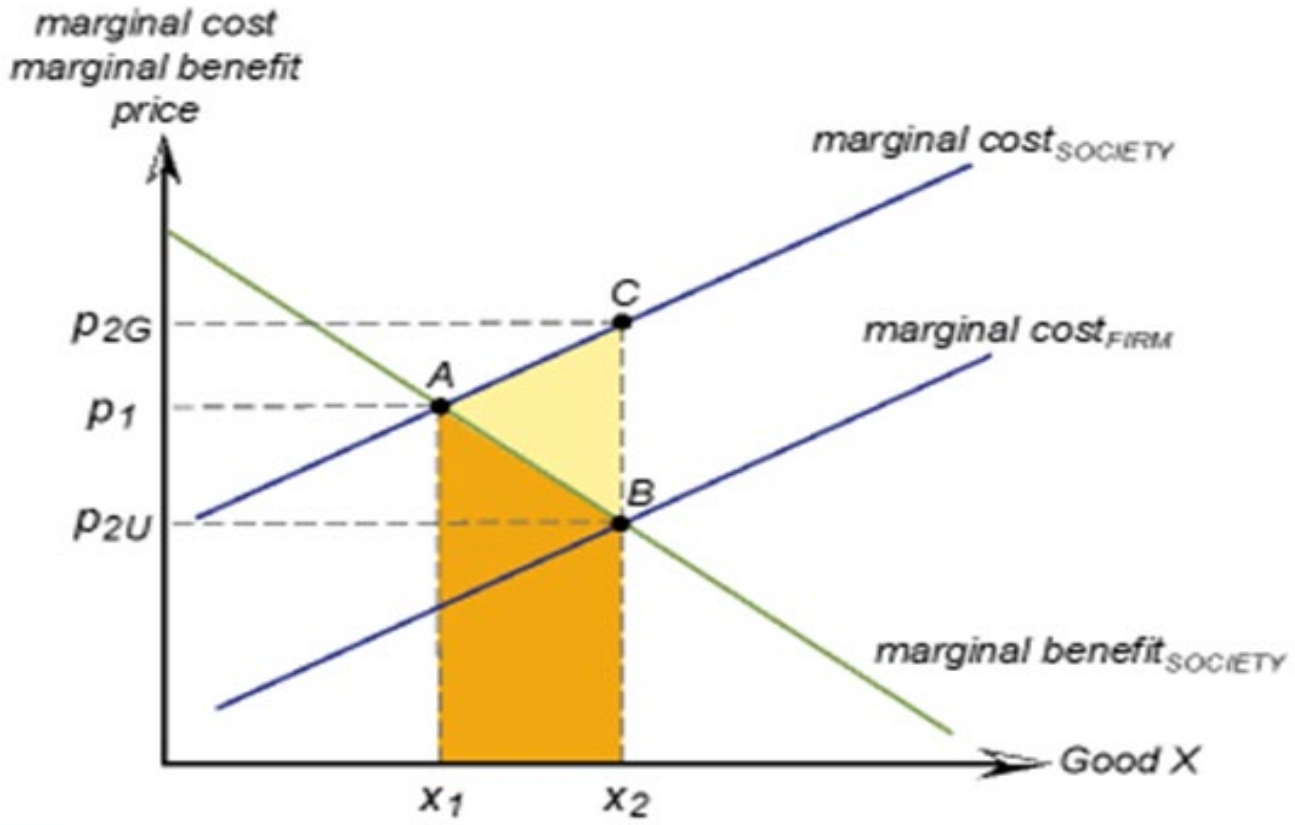
Inefficiency for Negative Externalities



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Flying (I) - Scale of Impact (Per Person)

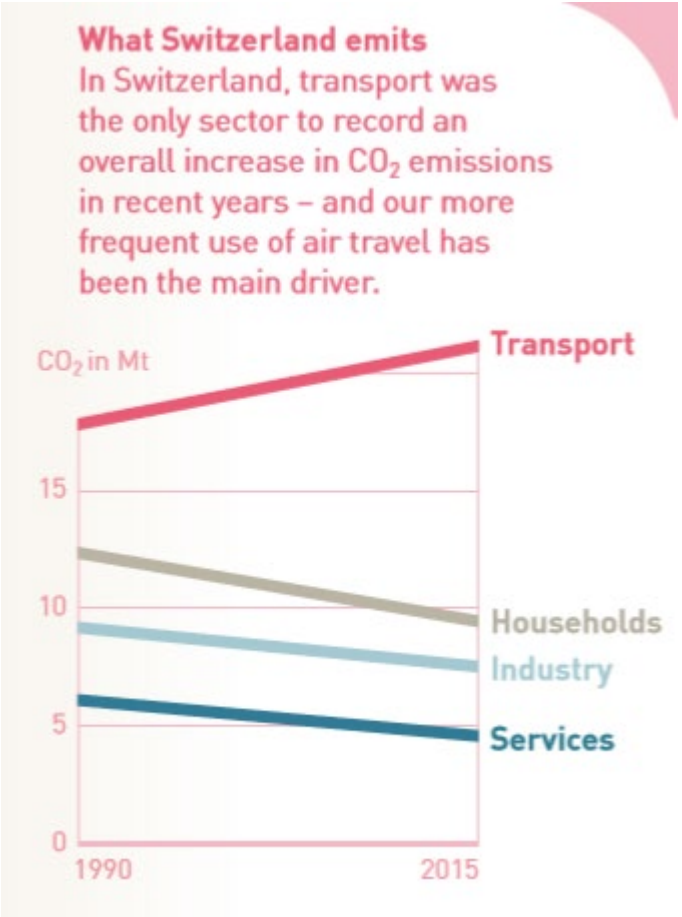
Think of a environment friendly individual..

- vegeterian
- rides her/his bicycle only

3.3 t CO_2/year

- Takes 2 flights
  - 1 short-haul (e.g. Berlin)
  - 1 long-haul (e.g. Denpasar, Bali)

8.1 t CO_2/year



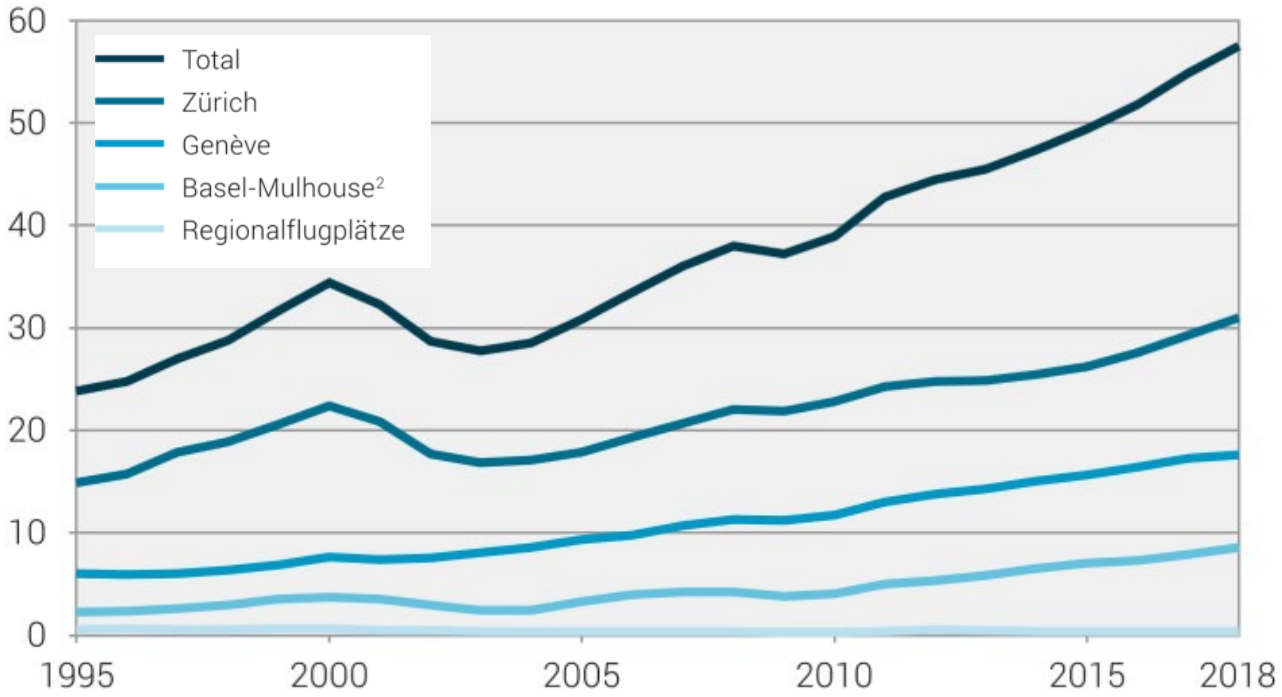
ETH Globe (2018)

Flying (II) - Demand

Swiss airports in 2018:

- Passengers (coming/going/transiting): 57 554 795

67% more than in 2000



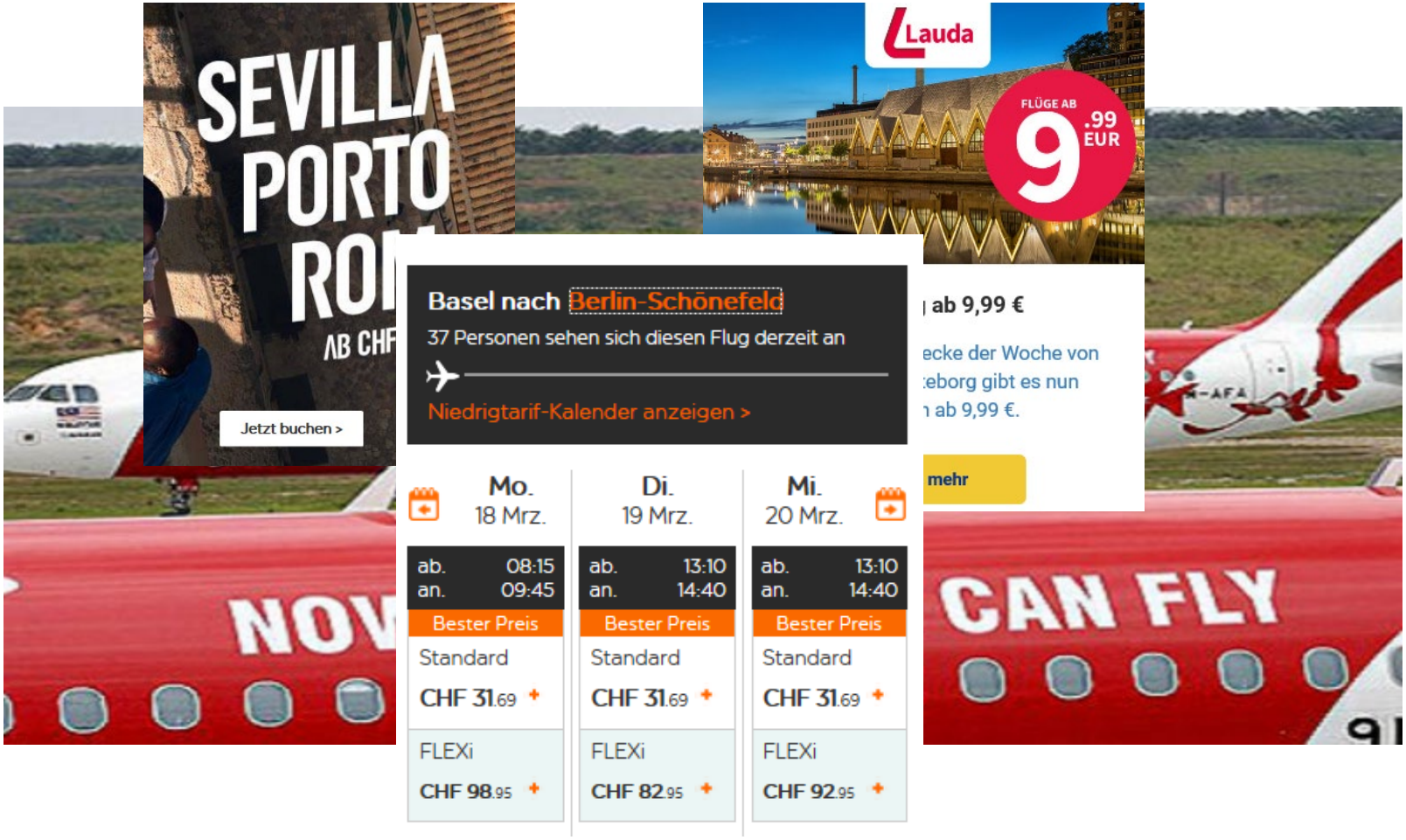
Flying (III) – Scale of Impact (Aggregated)

- Civil aviation accounts for **2 – 2.5% of current CO2** emissions (65% international; 35 national)
- Swiss civil aviation accounts for **1% of global** civil aviation and for **10% of Swiss CO2** emissions
- Air transport accounts for **5% of global warming** globally and 19% in CH
- The CO2 emissions per person & kilometer went down from 100g in 1990 to **55g** in 2017
- The numbers of passengers and passenger-km increased drastically (nearly doubled since 2004)

Flying (IV) – External Costs of Swiss Aviation

- 1.34 billion CHF/year ➔ **2.7 Rp** per person&kilometer
- 1 billion accounts for the climate effects (**2.2 Rp**)
- Swiss railway system: **3.3 Rp** per person&kilometer; maximum of **2 Rp** for climate effects

Prices for flying - Who Could Resist?



Prices for flying are low because:

- Kerosine is not taxed (other than fuel for cars)
- CO2 has no price (CO2 levy on oil and natural gas in CH)
- No value added tax (VAT) for flights

True costs of flying - Example Including Taxes

Flight ticket Basel – Berlin: CHF 31.70

- Fuel tax: CHF 18.30
- CO_2 levy: CHF 17.20

Basel-Berlin: 690 km
3.58 l/person & 100km[1)]
= 24.7 l/person
x 0.74 CHF/l[2)]

96 Fr/ton CO_2 [3)]
For this flight:
0.18 tons

Ticket costs now: CHF 67.20

- VAT (7.7%): CHF 5.15

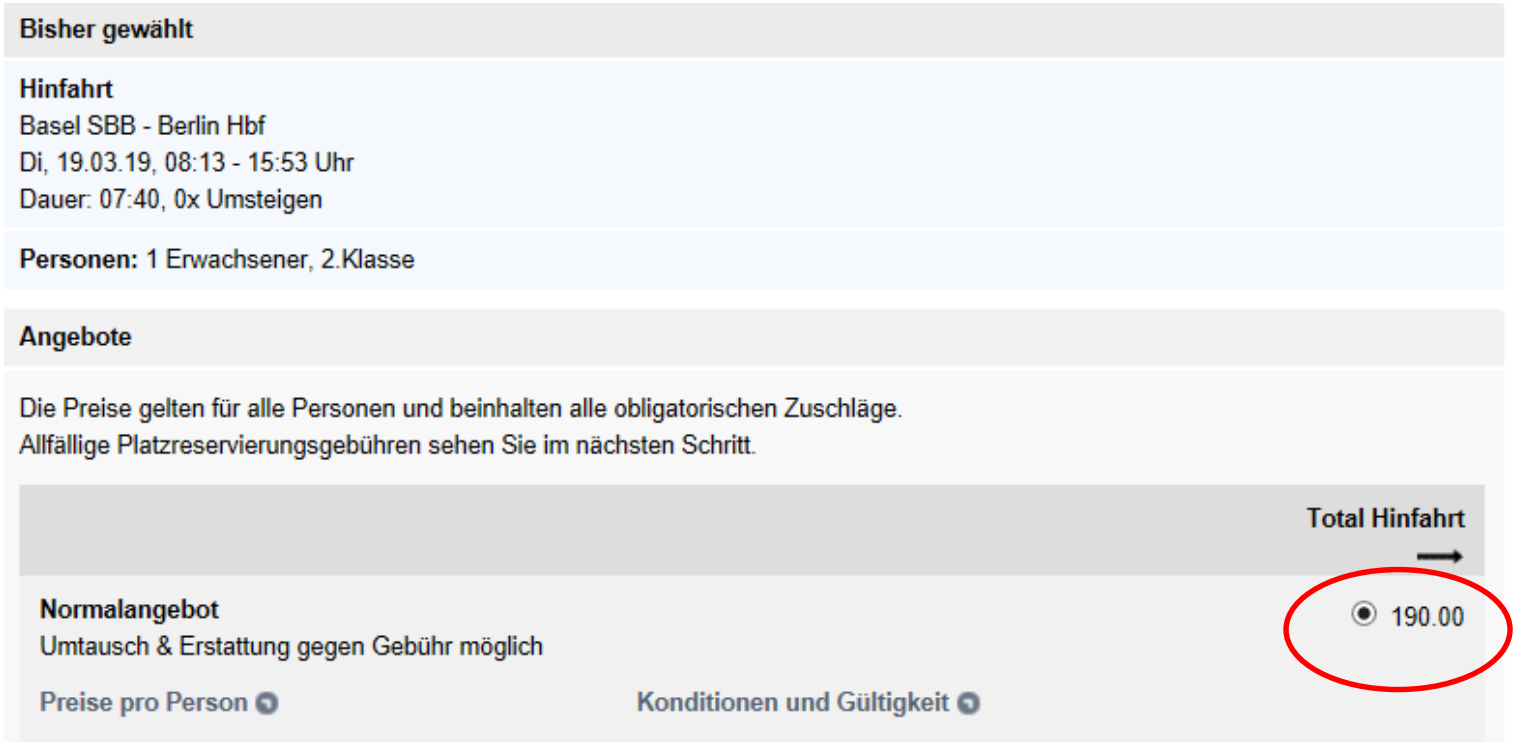
True ticket costs: CHF 72.35

Problem solved?

[1)] BDL, Klimaschutzreport 2018
[2)] Fuel tax for domestic flights
[3)] FOEN/BAFU: CO_2 act

Costs of other transport means

Taking the train instead?



Why Do Prices Differ?

- A railway network needs much more **infrastructure** (investments, service and maintenance) than flying
- Flying is a very competitive market, **competition** at the global scale; railway systems often do not have many competitors (at the national scale)
- What makes the differences even bigger: the **costs of time**

Price Signals Are Required

- If we want to reduce flying (or at least prevent an increase), flying should be taxed as all other forms of mobility or transport (**no subsidies**)

- Prices for flight tickets should cover "**all**" private **and societal costs**
  - In September 2019 the National Council accepted a ticket levy of between 30 and 120 CHF, differing according to class and distance
  - For 2020; a participation in the EU ETS is planned for flights
  - From 2021 on: Swiss airlines participate in CORSIA


CORSIA
CARBON OFFSETTING AND REDUCTION
SCHEME FOR INTERNATIONAL AVIATION

CORSIA

- All ICAO (International Civil Aviation Organization) member states with airplane operators conducting international flights are required to monitor, report and verify CO2 emissions

- New idea: Offset CO2 emission growth after 2020
  - →2021 – 2023 pilot phase
  - →2024 – 2026 first phase, voluntary
  - →2027 – 2035 second phase, mandatory, except for LLDC and Landlocked/Island CD

Offsetting

- Business model for firms like myclimate, atmosfair etc
- You buy shares for projects (in other countries) that reduce the CO2 emissions there
- Example: Planting trees in South America; efficient power plants in India etc
- Problems: Double counting; quality/reliability of the projects; changes inflight behavior?

Emissions Trading

- Basic Principle: each ton of CO2 that is emitted needs a permit/certificate
- In the EU: Flights are integrated in EU ETS since 2012, with a cap for CO2 emissions from flights (-1.74% starting as of 2021) and 85% of certificates being allocated for free and the rest is auctioned
- Switzerland will join in 2020; however, no double-charging is allowed to take place

Ticket Levy

- The effects are unclear: steering the demand versus additional income for the government's budget
- For Switzerland it is planned that 51% of the fiscal revenues are distributed back to the tax payers and 49% are used for climate funds
- For European countries (DE, AUS, FR, GB) with ticket levy or tax the fiscal effect seems to be most important
- Detour effect is counter-productive

Need for Price Signals And More…

- More innovative technologies related to flying
  (still lighter airplanes; “kerosene” without CO2 or GHG emissions; bio fuels; electric airplanes; sun-to-liquid)
  → higher ticket prices are necessary
- More competition for other means of transport?
- More influence on mobility demand irrespective of prices (example: smart mobility apps; but: privacy related issues?)
- Cap the number of flights per person?
- More regulation, for instance via personal and tradeable CO2 budgets for mobility

Open Questions

- How to incentivize new technological developments (high price for CO2; first-mover advantage)
- How to finance innovative technologies? (Financial sector is often rather risk averse…)
- If there is a levy on tickets: what to do with the revenues?
  (pay back versus climate change adaptation measures)
- Could could we make sure that enough countries participate so that there is no tankering/ no detour flights?
- How to induce changes in judgments of individual flights?

And What Again Is the Goal?

- To avoid flying in any case and comprehensively? (commodities versus passengers; developed versus developing countries)
- Isn't global networking also important?
- What about distributional impacts? (Only rich people fly?)
- Is it possible/ desirable to «educate» consumers? Should we «nudge» them more?

References & Links

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