A. Ecological Economics, Green growth, A-growth or Degrowth?

B. Payments for Ecosystem Services – a step towards commodification?

Thomas Hahn, Uppsala/Cemus, 3 October 2019
Outline part A

1. Ecological Economics = interdisciplinary research area
2. World Economic Forum
3. A new macroeconomic model
4. Rebound effect and taxation
5. BAU, Green growth, A-growth or De-growth?
6. Sustainability transformation
7. Four economic principles
WHAT YOU ENVIRONMENTALISTS HAVE GOT TO UNDERSTAND IS THE DESTRUCTION OF THE PLANET MAY BE THE PRICE WE HAVE TO PAY FOR A HEALTHY ECONOMY!
School I: Neoclassical economics

- microeconomics
- welfare economics
- natural resource and environmental economics

Formalised by Arthur Pigou (1920)

Aim: to achieve economic efficiency
School II: Ecological Economics

- is an inter-disciplinary research area
- Origins from 1970 (Kennet Boulding, Herman Daly, Bob Costanza, Ann-Mari Jansson)
- = core of the theory of ecosystem services
- Builds to a large extent on environmental economics but rejects notions of
  - Fixed preferences as basis for valuation (Amartya Sen)
  - Optimal pollution
  - Discounting the future
Ecological economics is an interdisciplinary research area focusing on sustainable development. It integrates insights from various fields:

- **Ecology**
- **Physical Resource theory**
- **Neoclassical env. economics**
- **Institutional economics, Law**
- **Political science, Sociology**
- **Psychology, Business organization**
- **Human ecology + all other research on sustainable development**
Global Risks 2018

Based on a survey of over 1,000 experts from industry, government, academia and civil society
7 of the 9 worst Global Risks are ecosystem-based (2018)

1. Extreme weather events
2. Natural disasters
3. Failure of climate change mitig + adapt
4. Water crises
5. Biodiversity loss + collapse
6. Man-made environmental disasters
7. Food crises

Non-ecosystem-based risks:

1. Cyber attacks
2. Large-scale involuntary migration
<table>
<thead>
<tr>
<th>Year</th>
<th>Risk Description</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012*</th>
<th>2013*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>Breakdown of critical information infrastructure</td>
<td></td>
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<tr>
<td>2008</td>
<td>Chronic disease in developed countries</td>
<td>Asset price collapse</td>
<td>Asset price collapse</td>
<td>Asset price collapse</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>Oil price shock</td>
<td>Failed and failing states</td>
<td>Chronic disease</td>
<td>Chronic disease</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>China economic hard landing</td>
<td>Oil and gas price spike</td>
<td>Global governance gaps</td>
<td>Fiscal crises</td>
<td>Biodiversity loss</td>
<td>Cyber attacks</td>
<td>Water supply crises</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>Asset price collapse, developed world</td>
<td>Retrenchment from globalization (emerging)</td>
<td>Global governance gaps</td>
<td>Climatological catastrophes</td>
<td>Water supply crises</td>
<td>Mismanagement of population ageing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012*</td>
<td>Severe income disparity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013*</td>
<td>Chronic fiscal imbalances</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

2010 = end of the neoliberal era?

= beginning of the biosphere era?
Climate change, water shortage and biodiversity loss dominate Global Risks 2011-2018

The Global elite shift in 2011

Top 5 Global Risks in Terms of Likelihood

- **1st**: Asset price collapse, Asset price collapse, Asset price collapse, Storms and cyclones, Severe income disparity
- **2nd**: Middle East instability, Slowing Chinese economy (-6%), Slowing Chinese economy (-6%), Flooding, Chronic fiscal imbalances
- **3rd**: Failed and failing states, Chronic disease, Chronic disease, Corruption, Rising greenhouse gas emissions
- **4th**: Oil and gas price spike, Global governance gaps, Fiscal crises, Biodiversity loss, Cyber attacks
- **5th**: Chronic disease, developed world, Refranchment from globalization (emerging), Global governance gaps, Climate change

Top 5 Global Risks in Terms of Impact

- **1st**: Asset price collapse, Asset price collapse, Asset price collapse, Fiscal crises, Major systemic financial failure
- **2nd**: Refranchment from globalization (developed), Refranchment from globalization (developed), Refranchment from globalization (developed), Climate change, Water supply crises
- **3rd**: Slowing Chinese economy (-6%), Oil and gas price spike, Oil price spikes, Geopolitical conflict, Food shortage crises
- **4th**: Oil and gas price spike, Chronic disease, Chronic disease, Asset price collapse, Chronic fiscal imbalances
- **5th**: Pandemics, Fiscal crises, Fiscal crises, Extreme energy price volatility, Extreme volatility in energy and agriculture prices

Legend:
- **Economic**
- **Environmental**
- **Geopolitical**
- **Societal**
- **Technological**
Economics for the Biosphere + Anthropocene

- A macroeconomic model for sustainable development
- Human wellbeing is the goal, economics provides tools, the biosphere is a foundation
- Should be Chapter 1 in Economics!

CAN WE LIVE WITHIN THE DOUGHNUT?
Oxfam Discussion Papers 2012
Kate Raworth
The macroeconomic model (a model of “the economy”) according to text-books 1955
A more realistic picture of the economy

- Voluntary unpaid work
- Natural resources
- Ecosystem services (also unpaid work)
- Rule of law, democracy
- Freedom, equity, trust, Institutions, governance

Households

Firms

Goods & Services

Consumer spending

Wages & Rent

Labour & Capital

The Biosphere

The Economy

Waste

Heat
Tomorrow’s economists do not get adequate training to handle Global Risks or address the real economic issues.
Ecological Econ: Human wellbeing depend on the Biosphere regardless whether we understand it or not.

Neoclassical Env.Econ: The value of nature depends on human preferences.
The choice is NOT between environment OR poverty alleviation: we can reach BOTH goals!

Hence, we need to reduce emissions with 81%, not only 80%
The unnecessary (or even contra-productive) goal
Achieving SDGs is not sufficient for environmental sustainability: only 14% of SDG indicators measure natural resource security (Wackernagel et al. 2017)
Decoupling is required for Green growth

- 23% reduction in fossil CO2 is good! But it excludes imported goods and international transports.
- The Decoupling concept reinforces GDP-obsession. Welfare should be increased!
- “Be agnostic about GDP growth” (van den Bergh, Kate Raworth) (“a-growth”)

Change GDP to a real Welfare measure!
EU has also reduced GHG emissions by 22%

This article is about emissions of greenhouse gases (GHG emissions) classified by technical processes. These are recorded in GHG emission inventories submitted to the United Nations Framework Convention on Climate Change (UNFCCC) and form the official data for international climate policies.

In addition, Eurostat disseminates GHG emissions classified by emitting economic activities. Those are recorded in air emissions accounts (AEA). Furthermore, Eurostat estimates and disseminates so-called 'footprints' which are GHG emissions classified by products that are finally demanded by households or government, or that are invested in or exported.
No global decoupling between GDP and Natural resource use

* Now 90 Billion tonnes/year.
* In many EU countries it was reduced during the financial crisis, which inspired the degrowth movement.
Consumption-related GHG emissions/capita, Sweden

Växthusgasutsläpp från svensk konsumtion per person 2008-2016

- Hushållens konsumtion - utsläpp i Sverige
- Hushållens konsumtion - utsläpp i andra länder
- Offentlig konsumtion och investeringar - utsläpp i Sverige
- Offentlig konsumtion och investeringar - utsläpp i andra länder
- Totalt

Källa: Naturvårdsverket
Sweden’s territorial emissions/capita =4.25 ton CO2 (5.3 ton GHG) 
(42.5 billion tonnes/10 Million people) 
This is only half of consumption-related emissions (10 tonnes GHG/capita)
China’s per capita emissions of CO2 is higher than Sweden’s (territorial emissions)
Sweden’s territorial CO2-emissions/capita is lower than the global average.

4.9 ton

1960 2010

https://data.worldbank.org/indicator/EN.ATM.CO2E.PC
Rebound effect

- = Jevons’ paradox (1865)
- Technical innovation -> energy efficiency -> energy price decreases and demand increases
- How can the rebound effect be stopped?

- Carbon tax! And similar tax reforms!
The total revenue from environmental taxes in the EU-28 in 2017 was EUR 368.8 billion; this figure equates to 2.4 % of gross domestic product (GDP) and to 6.1 % of the total revenues derived from all taxes and social contributions. Despite all talking, no tax shifting has occurred since 2002! It’s a scandal!
Four strategies concerning GDP growth

• Business As Usual (BAU): No major regulations needed, focus on innovation and decoupling will follow
• Green/Sustainable growth: Green tax reform and other regulations will incentivize innovation and decoupling will follow
• A-growth: Focus should be sustainability transformations, invest in sustainable tech and divest in fossil. GDP growth should not be a goal but GDP might increase during the transformation.
• De-growth: Sustainable tech must increase but fossil sectors must decrease faster, even during the transformation.
Sustainability transformation

Probably results in slightly smaller GDP/capita in Sweden, a lot higher in Bangladesh.

PPP dollar/capita today:
Sweden: 50,000
Bangladesh: 4,200
Save the climate system? Yes please, but only as long as GDP increases!

**Beslut**

Sverige får ett klimatpolitiskt ramverk och en klimatlag (MJU24)


**Utskottets förslag till beslut:** Bifall till propositionen. Utskottet föreslår med bifall till motionerna 2016/17:2670 yrkande 1 i denna del och 2016/17:3167 yrkande 1 ett tillkännagivande om att klimatpolitik ska vara långsiktigt effektiv och bedrivas så att minskade utsläpp av växthusgaser förenas med tillväxt. Avslag på övriga motionsyrkanden.

**Riksdagens beslut:** Kammaren biföll utskottets förslag.

https://www.riksdagen.se/sv/dokument-lagar/arende/betankande/ett-klimatpolitiskt-ramverk-for-sverige_H401MJU24

- This means, in plain English, that climate politics should be "efficient" and that "reduced emissions of GHG should be combined with economic growth"
- The Swedish "Climate law" cannot challenge GDP growth
- (mix between BAU and Green growth)
Johan Rockström: Önsketänkande med grön tillväxt – vi måste agera

Jag vill vara tydlig från start, detta är en pessimistisk krönika. Jag kommer att sätta frågetecken kring två grundläggande utgångspunkter som jag själv alltid försvaret, nämligen (1) att det är möjligt att stoppa den globala uppvärmningen vid 1.5 grader, och (2) att det är möjligt att uppnå "grön tillväxt" dvs frikoppling (decoupling)

https://www.svd.se/onsketankande-med-gron-tillvaxt--vi-maste-agera
Four important economic principles

1. Opportunity cost  (basis for all costs)
   - The cost of a particular choice (resource use) is the forgone net benefit of the best alternative choice, e.g. Yangtzi River.

2. External cost
   - Market price does not include all costs

3. Incentives
   - The expected awards or punishment (“disincentive”) of a particular action

4. Cost effectiveness
   - To reach an environmental target at least cost
Example of opportunity cost

The forests in Upper Yangtze River regulates water flows: this value is estimated to be ten times higher than the timber value!

The opportunity cost of cutting the trees is the forgone benefits of keeping the forests (flood regulation, biodiversity, recreation…)
External costs

• Sir Nicholas Stern, former Chief Economist of the World Bank, released his Report on the Economics of Climate Change in November 2006. It was requested by the UK Government and has been endorsed and supported by Nobel Prize winners, the World Bank, and other leading institutes. Its main messages:

  • “Climate change is the biggest market failure in human history” (Emissions of GHG give rise to external costs)
  • “The benefits of strong, early action on climate change outweigh the costs of action” (CBA framework)
  • “We can manage the transition to a low carbon economy! It will only cost 1% of the global GNP every year.
The Stern Report

- **Its main messages:**
  - “Mitigation – taking strong action to reduce emissions – must be viewed as an investment”
  - “If these investments are made wisely, the costs will be manageable (1% of GNP), and there will be a wide range of opportunities for growth and development along the way”
  - If we continue “business as usual”, we risk major social and economic disruption (5-20% of GNP), similar to the economic depression of 1930s
  - Strong global regulations need to be implemented within the next 5-10 years
## Prisoners’ dilemma

= incentives to fish too much

Neighbour (N)

<table>
<thead>
<tr>
<th>Outcome (M, N)</th>
<th>Fishing moderately</th>
<th>Fishing too much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishing moderately</td>
<td>4, 4</td>
<td>1, 5</td>
</tr>
<tr>
<td>Fishing too much</td>
<td>5, 1</td>
<td>2, 2</td>
</tr>
</tbody>
</table>

Nash equilibrium
### Prisoners’ dilemma

<table>
<thead>
<tr>
<th></th>
<th>50 other villagers (V)</th>
<th>Elinor Ostrom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>5, 5  10, 5  2, 7</td>
<td>7, 7</td>
</tr>
<tr>
<td>Cost</td>
<td>1, 1  2, 1  1, 5</td>
<td>5, 5</td>
</tr>
<tr>
<td>Net</td>
<td>4, 4  8, 4  1, 2</td>
<td>2, 2</td>
</tr>
</tbody>
</table>

My action is "a drop in the ocean"

<table>
<thead>
<tr>
<th>Myself (M)</th>
<th>Outcome (M, V)</th>
<th>Fishing moderately</th>
<th>Fishing too much</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fishing moderately</td>
<td>4, 4</td>
<td>1, 2</td>
</tr>
<tr>
<td>*3,92</td>
<td>Fishing too much</td>
<td>8, 4*</td>
<td>2, 2</td>
</tr>
</tbody>
</table>

Nash equilibrium. Tragedy of open access
Degradation of ecosystem services often causes significant harm to human well-being.

Economics is not equal to money!

- “The total economic value associated with managing ecosystems more sustainably is often higher than the value associated with conversion” (Opportunity cost)
- “Conversion may still occur because private economic benefits are often greater for the converted system” (external costs)
- “Governments should first stop subsidies to such conversions, then subsidize production of ecosystem services” (incentives)
Four important economic principles

1. **Opportunity cost**  (basis for all costs)
   - The cost of a particular choice (resource use) is the forgone net benefit of the best alternative choice, e.g. Yangtzi River.

2. **External cost**
   - Market price does not include all costs

3. **Incentives**
   - The expected awards or punishment (“disincentive”) of a particular action

4. **Cost effectiveness**
   - To reach an environmental target at least cost
Cost effectiveness

What is an ‘effective’ cost? As low as possible of course!
Definition: to reach a non-monetary target at the lowest monetary cost, alternatively to get as much of the target as possible for a limited budget. Assume there are two firms that together must reduce pollution by 50%. What is the cost effective allocation?

<table>
<thead>
<tr>
<th>Tons pollution</th>
<th>MC</th>
<th>MC_redA</th>
<th>MC_redB</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td></td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>

MC = Marginal Cost for reducing pollution

Definition: Cost effectiveness occurs whenever $MC\_{red\ A} = MC\_{red\ B}$

A reduce 8 tons, B 4 tons
Cost-effectiveness including system change

- Baltic Sea Action Plan: Conventional analysis concludes that cost-effective measures to achieve the goal cost 4 billion €/year
- However, the cost can be much smaller if you adapt diet to what is ”Baltic Sea smart”

- Södertälje municipality received White Guide Junior Award for Best School-Food in 2014 and Sara Jervfors was awarded a personal prize.
- The transformation was a change of food system at almost zero cost: same budget as before despite 50% organic
- By changing design (”changing the system”) transformations can be achieved much easier (much cheaper)
B. Payments for Ecosystem Services

1. Public goods and other market failures
2. Payment for ecosystem services (PES)
3. Six degrees of commodification
4. Biodiversity offsets
5. Commensurability and Commodification
6. Can markets save biodiversity?
7. Transforming institutional drivers yes, but don’t forget Economic Drivers!
Public goods and other market failures

- **Pareto efficiency** = a feasible allocation is efficient if there is no other feasible allocation such that the utility of a least one person is higher and the utility of nobody is lower.

- In a free market both seller and buyer have veto right. A market transaction therefore results in increased efficiency.

- However, the classic market failures are: externalities, public goods and natural monopoly.

- Public goods are non-excludable and non-rival: people cannot be excluded from benefitting from it and the benefits enjoyed by one person does not reduce the benefits that could be enjoyed by others.

- Investments in public goods tend to be too small because the investor cannot reap the benefits. Argument for taxation.
Payments for Ecosystem Services (PES) = popular policy for biodiversity conservation

- Payment often to a certain land-use; land-use is commodified, not outcomes
- Level of payment is NOT a valuation of biodiversity but set pragmatically to compensate for forgone net benefits of growing wheat, in other words to overcome the opportunity cost of biodiversity conservation
- Hence, rather a “compensation” than “payment”
- 97-99% paid by governments and other public sources (WB, GEF)
- Government PES uses the “price signal” (like a tax) = economic instrument
- It is NOT a market instrument, since it does not rely on the price mechanism (market mechanism), i.e. “the autonomous mechanism that determines the price in a market economy, as an equilibrium between supply and demand”
- The term “market-based instrument” is confusing! No trade!

Hahn et al. 2015
<table>
<thead>
<tr>
<th>Degree of commodif.</th>
<th>Main category</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Moral suasion and non-utilitarian regulations</td>
<td>Information appealing to moral responsibility. Recognising social equity and nature’s intrinsic value, e.g. endangered species acts and nature reserves</td>
</tr>
<tr>
<td>1</td>
<td>Non-monetary regulations based on instrumental utilitarian values</td>
<td>Nature reserves and other land-use plans focusing on nature’s instrumental value to human wellbeing</td>
</tr>
<tr>
<td>2</td>
<td>Non-monetary regulations based on metrics (units of nature)</td>
<td>Ecological compensation with no role for price signals or market transactions</td>
</tr>
<tr>
<td>3</td>
<td>Non-monetary regulations designed to maximise calculated economic efficiency</td>
<td>City park designed and managed to maximise calculated recreation values</td>
</tr>
<tr>
<td>4</td>
<td>Economic instruments (not traded)</td>
<td>Taxes and subsidies Subsidy-like PES paid by governments</td>
</tr>
<tr>
<td>5</td>
<td>Economic instruments (voluntary market trade)</td>
<td>Market-like PES Markets for ecosystem services (MES), e.g. biodiversity offsets trading conservation credits</td>
</tr>
<tr>
<td>6</td>
<td>Financial instruments</td>
<td>Forest bonds Biodiversity derivatives</td>
</tr>
</tbody>
</table>
PES in Costa Rica

- Costa Rica is one of the most well-known examples of national PES, often framed as a neoliberal market-based conservation mechanism.

- Costa Rica PES is successful because it’s NOT neoliberal:
  - enabled by Forest Law (1996) that banned land-use change
  - largely financed through a carbon tax (+ water tariffs)
  - government is the only buyer (hence it’s not a market)
  - government priorities high poverty areas and “biological corridors” (in accordance with CBD)

- Other countries (Ecuador, Bolivia) also explore these four criteria.
Biodiversity offsets (Ecological compensation)

• Every year about 86,000 ha of green area is “developed” only within the EU member states.

• The EU has suggested, in its 2020 Biodiversity Strategy that these losses should be compensated for by ecological restoration:
  
  “Even when every effort is made to avoid, minimize and restore, human activities can still have negative impacts on biodiversity. To avoid a net loss of biodiversity and ecosystem services, damages resulting from human activities must be balanced by at least equivalent gains.”

• The problem is how to design Biodiversity Offset programmes

• There are many controversies – can you really compensate for unique ecosystems? Does ecological restoration work? Can this new instrument actually lead to “license to trash”?

Biodiversity Offsets (B.O.) have strong proponents

- Biodiversity offsets are promoted by The CBD and The EU (2020 Biodiversity Strategy)
- The first three “steps” of the Mitigation hierarchy are the same as for Environmental Impact Assessment (EIA): Avoiding, Minimising, and Restoring on-site afterwards.
- The fourth step is Offsetting (compensation) somewhere else.

The mitigation hierarchy

http://bbop.forest-trends.org/pages/mitigation_hierarchy
Commensurability and commodification

• Biodiversity offsets are interesting because they consist of two transactions where the first one concerns commensurability and the second commodification.

• First, a degraded area is ecologically compensated by a restored area. Here, commensurability is generally restricted to the same type of habitats or the same ecosystem services.

• Secondly, the actor providing the biodiversity offset is compensated with money. This transaction can be done according to a predefined list where one hectare of restored grassland has a fixed price (as in Germany) or according to market negotiations (as in the US). Hence the degree of commodification can be low or high in biodiversity offsets schemes.
Sustainable development is often based on full commensurability (substitutability) = central assumption in neoclassical economics

Biodiversity offsets are based on restricted commensurability. Only the US programs may be called market solutions.
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## Valuation of ecosystem services

<table>
<thead>
<tr>
<th>Methods and decision support in:</th>
<th>Suitable for ecosystem services which …</th>
</tr>
</thead>
</table>
| **Monetary terms**  
(Contingent valuation, Cost-benefit analysis) | … we have sufficient knowledge about and for which monetary valuation is ethically uncontroversial e.g. timber, water purification, recreation values |
| **Quantitative terms**  
(mapping, defining status and trends, statistics, multicriteria analysis) | … can be measured but difficult to translate to money due to complex multi-functionality and tradeoffs/synergies in e.g. wetlands and forests |
| **Qualitative terms**  
(stakeholder dialogue, SWOT-analysis, scenario, multicriteria analysis) | … are difficult to measure due to sensitivity to threshold effects/irreversibility and or significant insurance values. Improved knowledge is needed to handle uncertainty |
### Table 2
Framework for ES valuation and policy integration

<table>
<thead>
<tr>
<th>Information in</th>
<th>Qualitative terms</th>
<th>Quantitative terms</th>
<th>Monetary terms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stated purpose</strong> <em>(as observed in national legislation)</em></td>
<td>Concern for non-measurable objectives like social equity, precautionary principle and safeguarding the insurance value of biodiversity.</td>
<td>Concern for reaching quantitative targets in cost-effective ways without expressing targets in monetary terms.</td>
<td>Concern for economic efficiency expressed in monetary terms and justified as a means to internalise externalities.</td>
</tr>
<tr>
<td><strong>Methods for describing values. Decision-support.</strong></td>
<td>SWOT analysis, identification, historical assessment, narratives, stakeholder consultation, Delphi methods, multicriteria analysis.</td>
<td>Technical/scientific mapping and assessment of trends e.g. water flows, pollination, and species abundance, multicriteria analysis.</td>
<td>Cost-benefit analysis is the frame, methods for monetary valuation include replacement cost, contingent valuation, and hedonic pricing.</td>
</tr>
<tr>
<td><strong>Policy integration by non-monetary regulation and without market trade (DC 0, 1, 2, 3)</strong></td>
<td>Land use planning, protected areas, and species acts targeted to intrinsic values (DC0) or instrumental values (DC1).</td>
<td>Land use planning, protected areas, and species acts designed to reach measurable targets (DC0 or DC1 depending on institutional design). Liability for ecological compensation, using physical metrics, e.g. German compensation pools (CD2).</td>
<td>Land use planning and protected areas designed to maximise economic efficiency. (DC1 or DC3 depending on institutional design).</td>
</tr>
<tr>
<td><strong>Economic instruments (no market trade) (DC 4)</strong></td>
<td>Subsidy-like PES paid by governments targeted at high biodiversity, multiple ES or poverty areas, e.g. EU agri-env. and PES in Ecuador and Costa Rica.</td>
<td>Subsidy-like PES paid by governments targeted at well-defined measurable units, e.g. PES for carnivores in Sweden.</td>
<td>PES when payment is informed by the stated value of the targeted ecosystem service, not by opportunity costs, e.g. Wimmera, Australia.</td>
</tr>
<tr>
<td><strong>Economic instruments (market trade) (DC 5)</strong></td>
<td>N/A</td>
<td>Biodiversity offsets trading conservation credits, e.g. US habitat banking, and market-like PES financed by users, e.g. Vittel watershed in France.</td>
<td>Monetary value set by market actors.</td>
</tr>
<tr>
<td><strong>Financial instruments (DC 6)</strong></td>
<td>N/A</td>
<td>Monetary value set by markets, e.g. biodiversity derivatives.</td>
<td></td>
</tr>
</tbody>
</table>

DC=Degree of Commodification. N/A=Not applicable
The examples provided are described in text.

Hahn et al. 2015
Can markets save biodiversity?

• In neoliberal theory, markets are thought to be more efficient than government regulation, almost by definition (lowering transaction costs)

• The assumption is that both seller and buyer have incentives to make sure that quality is high. "Market relations are built on trust”

• However, if the traded goods/services are public goods, both seller and buyer have incentives to compromise quality. Strong government regulation and enforcement is needed to ensure quality.

• Markets for ecosystem services (MES) therefore require MORE, not less, regulations. Hence transaction costs are likely to INCREASE when public goods are traded on market (compare school and old age health services)
Inter-governmental Platform for Biodiversity and ES (IPBES)
Regional assessment for Europe and Central Asia (ECA)
IPBES ECA Chapter 4 on Drivers: Complex causality

Effects on biodiversity, nature’s contribution to people (NCP), and good quality of life

INDIRECT DRIVERS
- Cultural drivers
- Demographic drivers
- Institutional drivers
- Economic drivers
- Science and technological drivers

DIRECT DRIVERS
- Land use change
- Invasive alien species
- Natural resource extraction
- Climate change
- Pollution
Fig. 4.7
Causal loop diagram illustrating drivers (causes) of natural resource extraction

(IPBES 2018/Elbakidze & Hahn)
Indirect drivers to biodiversity losses

• Almost all direct drivers have been slowed down in the EU thanks to regulations/institutional divers (Environmental regulations for N, P, SO2, CO2, invasive species, Common Fishery Policies)

• However, most direct drivers have been reinforced due to economic drivers like growth, trade, and employment policies (mining and other natural resource extraction globally, pollution, CO2, invasive species, forestry, agriculture...)

• Net effect on biodiversity is often negative, due to increased GDP, lower prices of minerals (which causes less interest in circular economy) and technological change which usually respond to economic incentives. However, technology also responds to environmental regulations and taxation.

• As long as GDP growth is an overarching political goal (Cultural driver), it is difficult to halt biodiversity loss
Table SPM 2  Impact of indirect drivers (rows) on direct drivers (columns) of biodiversity loss and nature's contributions to people in Europe and Central Asia.

The colour shows the impact of an indirect driver on a direct driver’s effect on biodiversity and nature’s contributions to people along a gradient from negative to positive effects. Abbreviations: WE = Western Europe, CE = Central Europe, EE = Eastern Europe, CA = Central Asia.

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Conclusions

- Payments for Ecosystem Services and Biodiversity Offsets can be designed with more or less “market” components. The devil is in the detail! Some degree of commodification can be effective.

- Good news: economic instruments have no inherent preference for “pure markets”/neoliberalism – they can fit different political cultures.

- Market actors have limited incentives to ensure quality of traded public goods, hence markets cannot be entrusted to “save biodiversity”.

- We need to transform both institutional drivers and economic drivers. This requires a change in the belief system (cultural driver), especially in how GDP is used as a proxy for well-being or success.
Thanks!

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