

***FROM GALILEI, SMITH AND PIGOU TO
THE MACROECONOMIC CHARM OF
ECOLOGICAL TAXATION***

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A. DEUTSCHE ZUSAMMENFASSUNG

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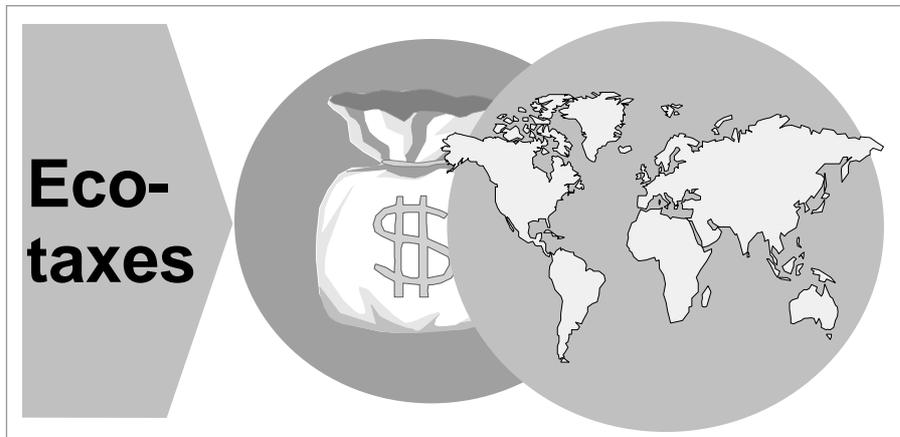
Ökosteuern sind im Prinzip ein sehr einfaches Konzept: man besteuert Sachen, die umweltschädlich sind und nicht Sachen, die der Umwelt zugute kommen. Argumente gegen Ökosteuern spiegeln denn auch eher massive Interessen im derzeitigen System wider, statt tatsächlich die Theorie zu betreffen. Was Ökosteuer-Gegner nicht sehen, ist, dass die Wirtschaft bloß ein Subsystem der menschlichen Gesellschaft ist, und dass diese wiederum auch nur ein Subsystem des Planeten ist. Wir sollten daher von Adam Smith lernen und einen Handlungsrahmen erschaffen, in den wir Smiths Idee von der *Invisible Hand* einsetzen können, um durch das Verfolgen unserer eigenen Interessen das Gemeinschaftsinteresse zu fördern. Nach Pigou müssen wir das Preissystem die ökologische Wahrheit sprechen lassen, um die Weltwirtschaft – in der momentan ökologisch-schonendes Verhalten mehr kostet – ins Gleichgewicht zu bringen. Zuletzt zeigt der Artikel, dass Ökosteuern auf der makroökonomischen Ebene verdoppelte oder sogar vielfache Dividenden haben, einschließlich positiver Effekte für die Beschäftigung, Allokation und für den technologischen Fortschritt. Schließlich und endlich stellen Ökosteuern ein gewaltiges Potential für die langfristige Reduzierung des gesamten Haushalts dar.

B. SUMMARY

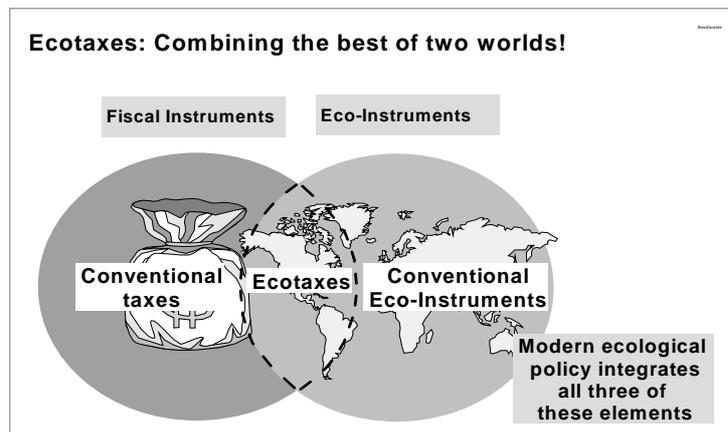
Ecotaxes are in principle a very simple concept: taxing things that are bad for our planet, instead of things that are good for it. Arguments against ecotaxes tend to reflect vested interests in the current system, rather than being objections to ecotaxes in theory. What these opponents fail to see is that the global economy is but a sub-system of human society, and human society is but a subsystem of the planet as a whole. The paper goes on to argue that we should learn from Adam Smith: that we need to create a system of governance, an invisible hand, to guide our self-interest to achieve common ends. As Pigou argued, we need to use the power of the price system to make economic prices speak the ecological truth, in order to redress the imbalance in our current economic system, in which ecologically rational behaviour is economically punished. Finally, the article points out the double or even multiple dividends of ecotaxes on a macroeconomic level, including positive effects on allocation, employment and technological progress, and the huge potential for budget reduction that ecotaxes have to offer.

C. INTRODUCTION

Ecotaxes are often referred to as Pigouvian taxes, after Alfred Pigou (1877 – 1959), who developed the concept in his famous Book Economics of Welfare, published in 1920. But the fact of the matter is, ecotaxes are over one hundred years old – for Pigou owes part of the idea to Alfred Marshall, who was his predecessor at the famous King’s College in Cambridge.



Nonetheless, from 1920 to 1980 ecotaxes were almost forgotten. Only some outsiders like William K. Kapp (1910 – 1976) in the fifties or from the seventies on, the Swiss Economist Hans-Christoph Binswanger (born 1929) and the German Biologist Ernst Ulrich von Weizsäcker (born 1939) continued to work in the Pigouvian tradition. Today however, the European Countries are beginning to grasp the tremendous potential ecotaxes have to offer. Briefly put, ecotaxes are better taxes than conventional levies, because they offer additional benefits for the environment, not just tax revenues. And they represent a better tool for ecological policy than other, more conventional eco-policy-instruments. In particular, they are in most cases superior to the simple policy of command and control that prescribes specific technological measures or specific behavior.



And if ecotaxes are used to reduce other, conventional taxes, then society can swap the excess burden of conventional taxation for the excess benefit of ecological taxation.

Not a bad deal in the end. After all, the lament about the terrible excess burden of taxation in general, particularly by conservative economists, it comes somewhat as a surprise that a tax that can bring

an excess benefit is not embraced with enthusiasm by these economist.

To sum up: Ecotaxes, if designed and administered intelligently, can be a powerful, elegant and attractive instrument of modern economic and ecological policy. But if we want to fully understand the power, the elegance and the attraction of ecotaxes, we will need to take a quick trip back in history – only about 400 years. We have to learn from the “Copernicans” about Gravity and the center, we have to learn from Adam Smith about Economic Gravity and the consequences for societal morality, and we have to extend Pigou’s microeconomic concept of ecotaxes on a macroeconomic level.

On that macro level, we may find that ecotaxes have to offer not only a double, but a multiple dividend that includes positive employment effects, technological innovation, and even the potential for an overall reduction of fiscal budgets. More ecotaxes may spell not only budget neutrality, but less taxes in total. But before we look into that additional promise, let's look back in the past.

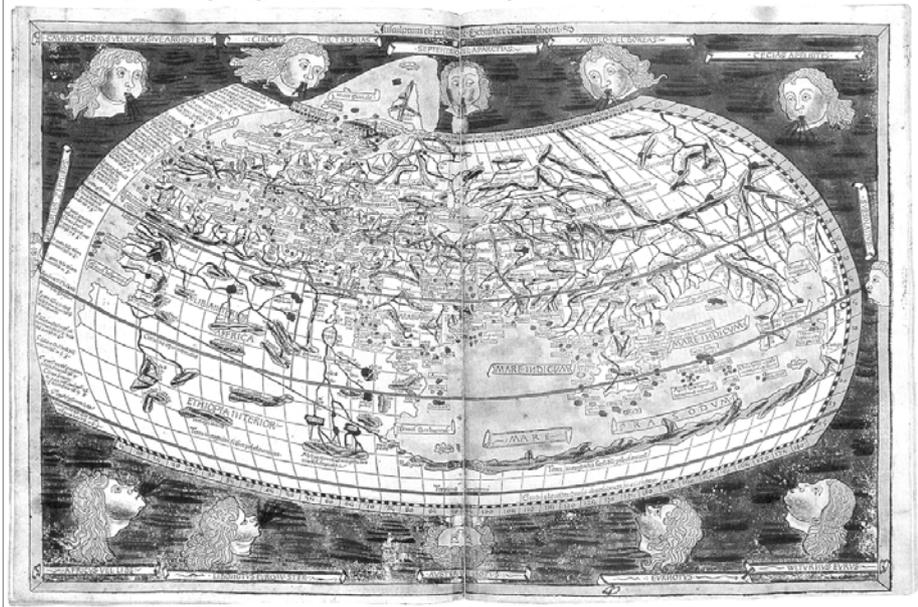
D. THE COPERNICAN REVOLUTION AND THE DEBATE ABOUT THE CENTER

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It is now almost 400 years ago, that Galileo Galilei (1564 – 1642) pronounced his famous „epuor si muove“. Today we know that the earth is not a flat disk, as the Egyptian geographer, astronomer and mathematician Claudius Ptolemaios (85 – 160) described it in his *Syntaxis mathematica* or *Kitab al-magisti*, as it was titled in Arab in the year 827.

Looking back into the 17th century and before, we cannot imagine how people could believe

Not very long ago, people thought the earth to be a disk



that the earth was flat. After all, we have all seen the pictures of our planet, taken from space, and nowadays, no one is anymore afraid of falling of the rim if he came to the extreme boundaries of that disk.

When I link the ecotax debate to the Copernican Revolution, I am far from implying that ecotaxes are anywhere near as revolutionary as the Copernican Revolution was. And I certainly do not believe that the protagonists of

Ecotaxes are anywhere as congenial or, for that matter, as courageous as Nicolaus Copernicus (1473 – 1543), Johannes Kepler (1571 – 1630), and Galileo Galilei were in their time.¹ If you stand for ecotaxes today, you need not fear being burned at the stake.

Indeed, the worst risk you may run is that the wrath of car drivers and anti-ecology politicians may pour down on you in some disagreeable fashion. In these days for instance, while gas prices in Germany are breaking the two D-Marks per liter mark, public opinion in Germany seems extremely hostile to ecotaxes. And here in the US, Charlton Heston would probably accept European gas prices – like gun control – only “over his dead body”.

¹ There is a notable difference between Copernicus and Galilei pointed out by ARTHUR KOESTLER in his book „Sleepwalkers“. As long as the new concept was only a astronomical theory, no pope had anything against it. Only when Galilei claimed practical relevance for the theory, the papal authorities became alarmed. This reminds one of conservative parties in Europe today, who also have nothing against ecotaxes, as long as they remain purely conceptual– but are fighting against any practical step to ecotaxation like it was devil's work...

But despite all the differences between the Copernican Revolution and the contemporary ecotax debate, humankind can still learn important lessons from the “Copernicans” and their struggle – lessons that apply both to the general idea of sustainability and to the more particular concept of ecotaxes. Let me explain what I mean.

The first lesson from the Copernican Revolution is that the new ideas offered a much more simple explanation of the movement of the planets than did the old Ptolemeian view. I am not saying at all that it was easy to prove the new theory. Still today, very few people could perform the mathematical operations that were necessary to show how the planets are moving on a circular orbit, and that in the center of all these orbits, there is the sun. Copernicus, Kepler, and Galilei were brilliant mathematicians, physicists and astronomers. Considering they did not even possess a pocket calculator, let alone a personal computer, or a huge Gray Machine, as today’s astronomers have, they deserve our admiration even more.

The fantastic thing was: The new theory, as difficult as it was to prove and still is today, is extremely simple to comprehend. Even a child can understand it. Because only one single force is needed to understand it: Gravity. Everyone who has ever played with a stone tied to rope, that he swung around his body, can see how the combination of center-gravity, represented by the rope, and centropetal mass, represented by the revolving stone, can produce a circular movement.

In dramatic contrast, the old theory of Ptolemy was extremely complicated. If the planets were aligned on circular spheres and moved by some mysterious mechanic force, how could the moons of Jupiter appear once before these spheres, once behind them? It was an excellent theory to explain the existence of angels, because only angel-like creatures could perform the movement of these moons. But it was a very poor and awkward theory to explain the real movements of the celestial bodies.

The modern day application of that first lesson is, that sustainability and ecotaxes also are extremely simple concepts.

Even a child can understand that if you want to maintain something valuable, you cannot take away more than you give back. Otherwise, you will use it all up. The way we treat our planet and its wonderful natural resources is like people living in a cabin, that are too lazy to go out and collect wood for their fireplace. They stay in the house and burn whatever they find in the cellar and on the attic. And if being criticized, they answer, well, there’s still lots of combustibles back in that old garage, so don’t worry.²

The same maxim of simplicity applies to the reasoning behind ecotaxes. All we are saying is, that when taxes are a necessary evil, why not tax things that are bad, instead of things that are good. Why not tax the vices of modern society, rather than taxing activities that are virtuous and useful. It may be difficult and labourous to convey that message, to write the necessary books and articles, to gather the statistical facts, and to catch the attention of the public, of media and politicians. But the message itself is a very simple and practical one.

² Another beautiful example for this kind of behavior and attitude can be found in the movie “Around the World in 80 Days” based on a novel by Jules Verne. When running out of time and fuel on his last trip over the Atlantic, Sir Phileas Fogg purchases the entire ship from the captain-owner. As the new owner, he orders everything burnable to be chopped down and fed into the furnace of the steam engine. Soon, of the proud sailor, only the naked rump is left. This is quite the way we treat the resources of our planet – only that we are not the owners...

The puritans of Massachusetts were both deeply moral and profoundly pragmatic people. Much as they despised sins like drinking, whoring or gambling: they did not really believe in the immediate disappearance of these vices. The least they could do, therefore, was to tax these activities. As long as sin was to prevail, sin taxes could at least render some revenues for the commonwealth.

The existing tax systems of most countries in the world do not for the most part come close to taxing vices and unavoidable evils, quite to the contrary! In too many countries, the highest tax burden is levied on labor and consumption, namely those economic activities that we value most. In Germany today, about two thirds of the total tax burden is levied on labor, both in the form of income taxes and social security contributions. Only about one tenth of the total burden of levies and contributions can be classified as resource taxation.

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Looking at these figures it seems imperious to revert that unfortunate trend, to tax labor much less, and to put higher levies on the modern sins of our times, namely the ecological ones.

The second important lesson that we can learn from the Copernican Revolution relates to the opposition to the new theory. As we know today, and as Galileo and his scientific friends probably knew already then, the opponents did not really object

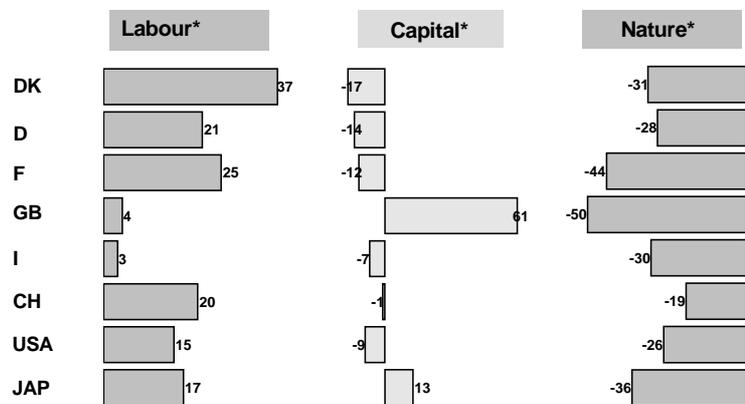
to the theory because of the theory. For the most part, they didn't even bother to study the theory. They objected to it for a thousand of other reasons, among them: political power, intellectual complacency and conservatism, and religious ideology. As a result, the opponents defended hegemony, not truth, they defended privileges and established interests, at the price of scientific and cultural progress.

The modern day application of that second lesson is, that the opponents of sustainability and of ecotaxes do not seem to be interested in a scientific dialogue, but rather in ideology. Very few of our opponents criticize ecotaxes as outright wrong, or deliver strong scientific arguments against them. At least in Europe, most political parties have adopted some positive statements about ecotaxes in their programs and election platforms.

Rather, the argument against ecotaxes goes something like this: In principal, ecotaxes are a fine idea. But then come the "buts". The concept is good, but we cannot afford to be unpopular with our voters. The concept is great, but if one country starts it alone, it will lose in international competition. The concept is fine, but it will hurt the automotive industry. And so on.

Sometime these politicians remind one of the Theologian Augustine, who is told to have exclaimed as a young man: God, make me chaste, but not right now. Chastity at that age seemed a very fine concept, but certainly not the right strategy for the immediate future...

From 1970 to 1990, most OECD countries increased taxes on labour and decreased taxes on "Nature"



The third lesson from the Copernican Revolution is more fundamental, and it goes to the emotional and psychological roots of the debate. It goes to the heart of things, namely to the question: What is at the center? Only at the surface, the Copernican Revolutions dealt with the question: What is the center of the planetary system?

But for the defenders of the old Ptolemaic system, much more was at stake. Not so much the role of the Earth in the planetary system, but much more the role of the Church in the World, or our role as humans. Perhaps also the role of the Europeans in relation to other races and other continents. The teachings of Copernicus, Kepler, and Galilei seemed to offend humanity, to hurt our pride, to damage our self-esteem. Simply by claiming, the Sun is the center of our universe, not our own small planet, the three great astronomers had unknowingly developed a theory that was extremely unpopular with the ruling elites.

Our contemporary debate of sustainability, ecology and the environment is also a debate about the center. What is, and what should be, the center of our activities, of our lives, of people on this planet? Is it the Gross Domestic Product, is it the Globalized Economy of modern Capitalism, is it money and wealth? This seems to be the view of the people I like to call the antiecological Neoptolemeians of our age.

Or do we have to admit, in all humility, that money and markets are not the center of the world? That our Gross Domestic Product, our growth rates, our economic welfare are just a

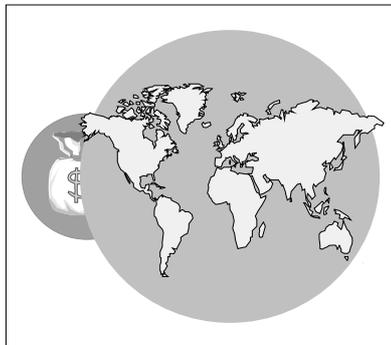
subsystem? And that Man in all his glory is only a small part of Nature and Creation?

For today's "Ecological Ptolemaians", the economy still constitutes the center of the world...

View of "Ecological Ptolemeian"



In Truth: Economy only Subsystem



If we look for a honest answer, it will be very difficult to deny that the Economic Sphere is only a subsystem of human society, albeit a very important one. Human society is only a subsystem of life and nature on this beautiful planet. And our green planet, wonderful and miraculous as it is, is only a

very small and tiny subsystem of the entire universe. If this seems like a humiliation, then perhaps we all have to rediscover the old virtue of humility.

Some people become ecologists out of fear. They fear that human society can become a threat to Nature, and that the progress of a society which does not respect the laws of Nature may end with the destruction of our planet. It is true that the ancient Phoenicians were able to destroy the beautiful cedars of the Lebanon, it is undeniable that our modern civilizations has already destroyed many natural forests, thousands of species of animals and plants, and seems unbound in its will to continue doing so.

But you may be surprised, I do not follow this line of thinking. Even in this fear, there is a hidden hybris: We are again overestimating ourselves. We humans can cause a lot of damage. But we are not stronger than Nature, by no means. I believe, the only real danger for us

humans lies in our capacity to destroy ourselves, to undermine the very grounds of our civilization, to eradicate beautiful valleys, wonderful coral reefs or other parts of Nature.

But we cannot eradicate Nature as a whole, we are not stronger than Nature. If we continue to disrespect the laws of Nature, it is our own civilization, our own culture, our own values that are endangered, not Nature itself. In the long run, we should not be afraid of Nature's destruction, but of our own destruction. If we confuse the danger for our own species with a danger for all nature, we are again confusing what is center and what is only subsystem. And if we want to prevent our own species' destruction, we have to fight for sustainability.

E. THE ECONOMIC AND MORAL REVOLUTION OF ADAM SMITH OR: SELFISHNESS AND GRAVITY

In order to understand the Laws of the Universe, Copernicus, Kepler and Galilei first had to understand the Laws of Gravity. You all know the story of Galilei throwing objects from the Leaning Tower of Pisa, and how he came to prove that a feather can fall as fast as a heavy stone if you were able to create a vacuum. Born only one year after Galilei's death, Sir Isaac Newton (1643 – 1727) was inspired when he saw an apple fall from a tree.

What the three “Copernicans” and Isaac Newton gave to the Science of Physics, the great Scottish economist Adam Smith (1723 – 1790) did for the Science of the Economy. His observations and discoveries were not only a revolution for the understanding of the Wealth of Nations, but also an upheaval in the understanding of the Laws of Ethics and Morality. As you may know, Adam Smith was not only an economist, he was also a Philosopher of Morality and his first book was Theory of Moral Sentiments (1759).

No one before Adam Smith could demonstrate so clearly as he did, that economic welfare will prosper most if people are led by self-interest. No moral regime of religious idealists, no political control of the most enlightened and benevolent dictator, no rule of philosopher-kings or even saints could bring about as much prosperity, as the simple principle of free contracts between free citizens. If people can choose and decide freely, they will try to follow the best course they know, and they will only enter transactions that they consider superior to any other option. This way, everybody is the master of his own destiny, everybody has to blame himself if his decisions prove to be wrong. The collective intelligence of all market partners will lead to a better result than if things were controlled by prescriptions, orders and commands.

And the invisible hand of the market brings out the great paradox of self-interest: even though the baker is led by egotism, not charity, in the end there is more and better bread for everyone to buy than under any other economic regime.

This part of the Smithian Revolution seems widely accepted today. But even today, we have not really understood the full impact of Adam Smith on our commonplace understanding of morality, be it of Christian, Judaic, Moslem or Buddhist tradition. All these religious traditions have a great distrust of self-interest, and often feel that people are bad at heart, so they need to be controlled by some moral, religious or political authority that knows better what's best for all.

After 1700 hundred years of Christian preaching against self-love, Adam Smith has rehabilitated self-interest as a legitimate force and attitude. By showing that individual wealth

and commonwealth can be in harmony, he has opened a fantastic perspective for every society. Adam Smith is a protagonist of the mature citizen who is capable and justified in defining and defending his own interests, better than anybody else. This self-interest is the Law of Gravity of the Economic Process. And all economic theories or ideologies that try to deny or to outlaw Gravity cannot expect to have much of a future.

At the same time, Adam Smith was anything but an advocate of unabashed egotism, of cut-throat competition, or of Manchester Liberalism in its undomesticated form. He was not at all

The potential harmony of individual and collective welfare is the revolutionary message of Adam Smith

Rules of the game

- Laws
- Taxes
- Public Opinion

Efficient Markets

- Workable competition
- Prices reflect social costs correctly

uncritical of the motives and morality of capitalist individuals. Once he said “Whenever three or four businessmen meet together, we can be sure to expect some conspiracy against the general public.”

Other than many who claim to be Smithians today, Smith understood very well that efficient markets need the counterweight of public governance and regulation. Only in a

balance of competition and regulation, Adam Smith saw the chance to reconcile the pursuit of individual wealth with the interest of the commonwealth.

Much like the Copernican Revolution, the Economic and Moral Revolution initiated by Adam Smith holds important lessons for our fight for sustainability.

The First Lesson of the Smithian Revolution is that collective problems can never be blamed on a collective lack of morality. There is no point in fighting gravity. It is true that ecological destruction is caused by the selfish behavior of people, companies, governments, entire nations and even human society as a whole.

But big problems do not imply that there is equally big guilt. Ecological destruction cannot be cured by moral education. It is absolutely pointless and even counterproductive to blame people for using too much energy, for driving exaggeratedly big cars, for not thinking about the ecological consequences of products they buy in the supermarket.

Does anyone really believe we can expect people, who simply want to buy a toothbrush in the drugstore, to investigate whether this toothbrush was more or less resource-intensive in its production process, or in its logistical path to the drugstore, and what will be its ecological contribution when it is discarded? We may be able to keep people from throwing trash on public places, but even this simple task should not be left to moral education alone. It needs some backing by legal or monetary incentives.

The second lesson from Adam Smith relevant to our current environmental concerns goes one step further. Self-interest is not only the wrong culprit for ecological problems, quite to the contrary. Self-interest is totally indispensable for the solution of eco-problems. We need self-

interested consumers and investors, researchers and inventors. Because only they can find the new technologies, new consumption patterns, new production methods that are necessary to change our dinosaur industrial and transportation systems into the direction of sustainability.

The solar age has been proclaimed and envisaged by idealist. But it will take selfish businessman and money-driven entrepreneurs to implement it. Greed is the gravity of capitalism, and greed today is the driving force of the destruction of sustainability. But all the same: Greed is also the indispensable fuel of a new economy that will have to find its peace with nature.

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And there we need to apply **the third lesson from Adam Smith**, the lesson about the rules of the game. Gravity is here to stay and cannot be neutralized. But the effects of gravity can be both detrimental and benevolent, depending on the rules of the game. So much more than ever before, we need to concentrate our attention on the set of rules that govern our societies. Instead of fighting ideological skirmishes about regulation, we need to strive for global governance. And if we cannot change the players, then we have to think of changing the rules of the game.

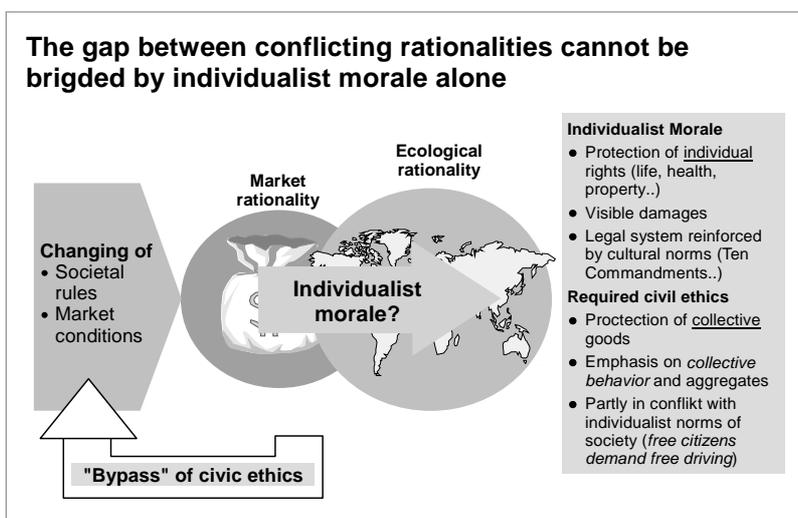
As a moral philosopher, Adam Smith knew very well that human selfishness is part of our nature, but that society can only function, if selfishness has its counterpart in a systems of controls within a legal, political and moral framework. To put it in the phraseology of game theory: Games are no fun, if players are not allowed to follow their own strategies and interests. But games will turn into chaos and not be funny anymore, if there are no rules that are respected by all players.

In a game of football or soccer, no one would think of criticizing the players for being selfish and desiring to win. But everyone understands, that for a good game, you need rules that prohibit foul play, and you need an umpire. And if the results of the game are unsatisfactory, then there is no point in criticizing the players. Rather, we then must change the rule of the game. But if we manage to find the right set of rules, then we can trust the self-interest of intelligent players. It will lead not only to a maximum of individual welfare, but also to a high degree of social welfare as a whole. If the rules are o.k., then everybody can enjoy the ball game.

This is why we cannot solve the moral question of the preservation of nature by appealing to the individual morale of the players. Good players are selfish. We need to take a cunning, a

strategical bypass, we need to use our collective intelligence. Ecological and other collective problems cannot be solved by appealing to people's sense of selflessness and charity. We need civic ethics that change the set of incentives which governs individual behavior.

Our traditional moral is mainly based on the ten commandments. Three of these commandments are meant to protect the respect of god, the other seven serve the protection of the individual and his rights. But



none of them is fit to protect collective goods.

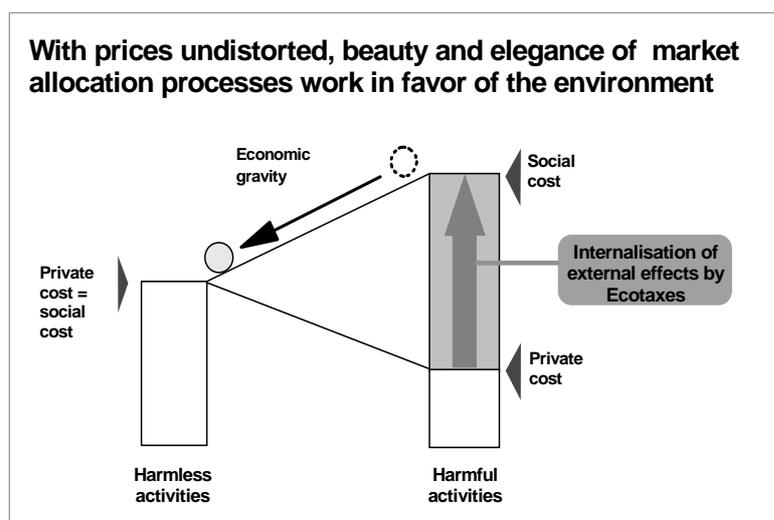
Let me add one more thing: In the debate about the role of rules, which is also a debate about the role of governments, of the State, we constantly seem to make the same big mistake. We keep reenacting the debates of the 19th century, and perhaps of the 20th century. But certainly not the debates we need for the 21st century. The regulatory debate of the past was a debate between extremes, namely State Socialism versus Market Capitalism. With very few exceptions, in most countries of the world Democratic Capitalism has triumphed over bureaucratic Socialism.

But in Europe and the United States, we should finally distance ourselves from the debates of the last centuries, we should leave those ideological battles to scholars and historians. The modern regulatory debate cannot be based on the question whether we need or don't need regulation. This is a ridiculous discussion, because no market society can exist without laws and government. Marx is dead, Bakunin is dead, and the neo-anarchists of the political Right should not be allowed to bring the specters of the past back to life.

No, the modern debate we absolutely need to lead is the debate about intelligent regulation. It is a debate how we can establish the necessary regulation as efficiently, as intelligently, and as nature-conserving as possible. And it is exactly this debate will finally lead us, after the Copernican Revolution of the 16th and 17th Century, after the Smithian Revolution of the 18th and 19th Centuries, to the Pigouvian Revolution of the 20th and the 21st Century.

F. ALFRED PIGOU AND THE NECESSARY ECO-FISCAL REVOLUTION OF OUR TAX SYSTEMS

Some people understand Fiscal Revolution as something as simple as “no more taxes”. But as we all know, there is no such thing as a free lunch, and if we want public goods, we need to accept public taxation. The Eco-fiscal Revolution I am talking about and pleading for is more complex and more controversial than something you could understand simply by reading my lips. I don't think it would help if



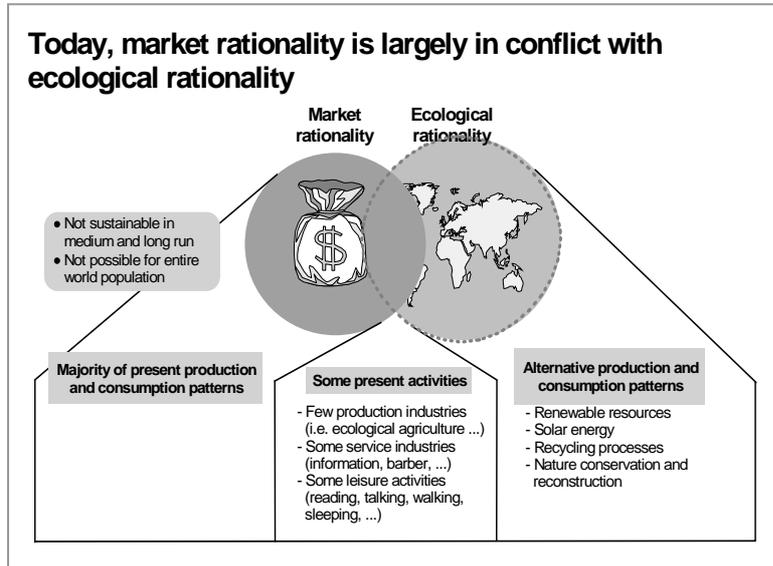
I whispered “Much more ecotaxes” to you. The eco-fiscal revolution goes back to Arthur Cecil Pigou (1877-1959), who researched about the conditions for social welfare in a market economy.

His most important findings are a confirmation of Adam Smith, but they also add more precision to the concept of the invisible hand. In market economies, the economic actions of people are guided by the price system.

If the price system works well, prices tell the truth about relative costs, and social welfare can be attained. What Pigou found out was how disastrous the consequences can be when prices fail to tell the truth. Whenever prices are erroneous, the system will still find an equilibrium,

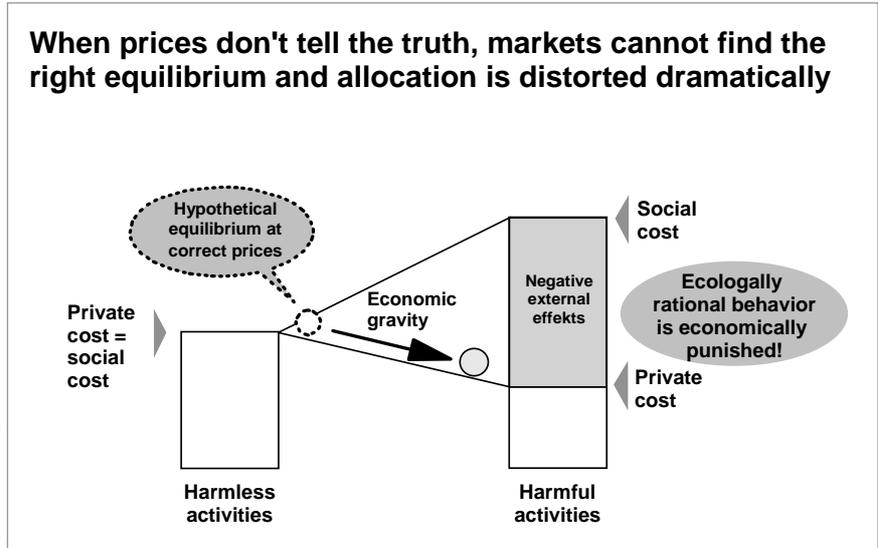
but that equilibrium will also be erroneous. It is the result of wrong information. If prices do not tell the truth, then something very simple will happen: Ecologically bad things, that in reality are more costly to society, will appear cheaper than ecologically good things. The market, with all its dynamic and power, will move in the wrong direction. Resources will be wasted, and social wealth will be destroyed.

We have a problem with sustainability today, not because people are selfish, not because



people follow the signals of the price system, but – very simply – because the price system is

giving them the wrong signals. In a railroad system, if signals show the wrong signs, then trains will collide. In our market systems, if prices show the wrong signs, then the logic of the markets will inevitably collide with the larger logic of the entire system. The biggest collision of objectives, the largest conflict of rationalities we witness today is the conflict between the rationality of markets and the rationale of sustainability.



It was the German Biologist von Weizsäcker, who coined the formula that economic prices today do not speak the ecological truth.³ The consequences of such misleading information are easy to see: People are maximizing economic welfare at the expense of our global, of our ecological welfare. The invisible hand turns into a misleading hand, and so it becomes detrimental instead of beneficial.

But the answer to this problem is as straightforward as its cause. All we must do, is to correct the wrong signals. Once prices are corrected, market dynamics will stop destroying the

³ I am proud to say the Ernst von Weizsäcker is a cofounder and board member of our ecotax association.

environment and will work in favor of the environment. But this correction, the market cannot bring it about by itself. To function properly, the invisible hand of the market needs the visible hand of the government.

This is the microeconomic charm of ecotaxes. They correct wrong signals and thereby help the Economy to find an equilibrium that is not in contradiction with sustainability.

G. THE MACROECONOMIC CHARM OF ECOLOGICAL TAXATION

But there is also a macroeconomic charm of ecotaxes. And that charm cannot be discovered if you adhere to the Coase Theorem. ROLAND COASE (born 1910) is a lawyer who greatly enriched economic theory, and he is a genius. But for decades in the training of economist, his theory has both enlightened, but also blurred economic thinking about ecological problems.

From a microeconomic perspective, it is almost irrelevant which method you use to solve ecological problems. As Coase demonstrated in his famous article, an ecological problem can be solved by Pigou taxes, it can be solved by subsidies, and it can be solved by bilateral negotiations.

But this analysis was centered on very local examples of eco-problems, with very few players. A factory on a river and some people who live downstream are not exactly a worldwide group of players. Alas, our real ecological problems are global, not local, and they involve billions of people, not two or three. They cannot be solved in an Edgeworth Box.

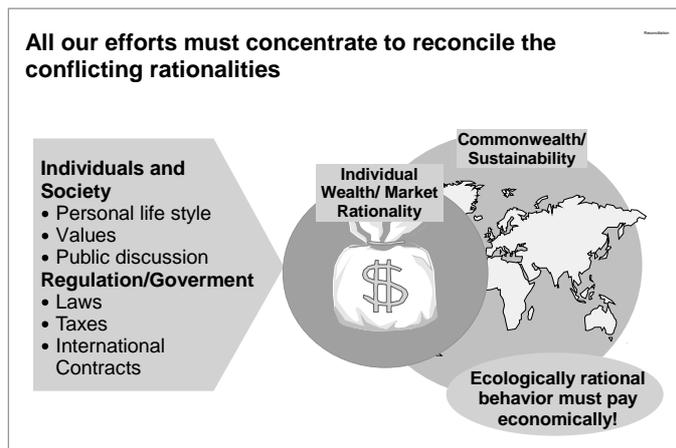
On a macro level, the choice of instrument is not irrelevant. Some instruments are totally useless. You cannot subsidize six billion people to behave ecologically responsibly. You cannot bring about negotiations between the individual car driver and the Kyoto Agreement. And there is certainly no point in bringing about a global change of behavior patterns by a resorting to morale suasion.

In Germany today, conservatives are much in favor of an instrument called self-obligation. But the practical results have not been very convincing. In the age of shareholder value, why should a company voluntarily agree to invest into the ecology, if there is no return to shareholders if you invest, and no political or economical sanction, if you don't invest?

The real charm and attraction of ecotaxes can only be fully understood if we lead a macroeconomic debate about them, and not a purely microeconomic discourse.

Only on a macroeconomic level we can grasp the attraction of the double or even multiple dividend of ecotaxes, with positive effects on allocation, employment and technological progress. Ecotaxes are taxes on evils, not on goods, whereas most conventional taxes burden things that we consider positive, like employment and consumption. By shifting from conventional taxes to ecotaxes, we shift the tax burden from goods to evils, and we replace bad and stupid forms of taxation by intelligent and benevolent levies.

Ecotaxes create a technological dividend, because they give the correct signals for sustainable, longtime investments. And they create an additional benefit by reducing the moral gap between our economic and ecological objectives and obligations. If a CEO today wants to serve the goals of his shareholders, he has to violate the interests of his children and grandchildren. So all our efforts should concentrate on reconciling these, today's conflicting rationalities.



If we reduce this conflict of norms and objectives, we can reap a moral dividend which will help us all to be less cynical about our common goal of preserving the environment.

Only on a macroeconomic level can we grasp the great potential for budget reduction, that ecotaxes have to offer. And this is a particular attraction that I often miss on the usual list of arguments for green taxes. For if we consider the allocative effects not only of the fiscal ex-

penditures, but also of the fiscal revenues, we will be able to employ both sides of the government's budget to attain our policy goals. And if we reach a lot of the desired effects already by raising modern sin taxes, then we need to spend less of the taxpayer's money on the other side of the budget. Because a large part of the funds governments are spending today for employment or environmental purposes they have to spend only to repair the damages and the ecological sins their budgets are causing on the income side. So there is absolutely no conflict between raising ecotaxes and lowering the total tax burden, quite to the contrary!

In summary, our search for sustainability and our strife must form a synthesis of three great intellectual revolutions:

- By following the tradition of the **Copernican Revolution** we can take a new view of the Center of the Universe. Not the shortsighted interests of a anthropocentric and money-centered view will preserve nature and ecology, but only the shift in perspective that puts sustainability first and accepts the true hierarchy between the Ecosystem as a whole and its diverse subsystems.
- Using the lesson of the **Smithian Revolution of Economics and Ethics**, we can work with economic gravity, rather than vainly trying to deny or overcome gravity. Economic self-interest is the most dynamic force in the history of mankind, and we can only solve the ecological problem if we bring this force to work in favor of Nature, rather than against it.
- Reverting to the **Eco-fiscal Revolution inspired by Marshall and Pigou**, we can overcome the instrumental indifference bequeathed to us by the Coase Theorem. And by lifting the debate from a micro- to a macroeconomic level, we can take an entirely new and fresh look at our systems of taxes and other contributions. We have to recognize the enormous allocative power of these systems and we have to find out how we can put this power in the service of Nature preservation. Not to use the steering power of the tax system is like not using the brake energy in an electrical car to feed it back into the battery.

If we combine intelligent regulation and intelligent taxation, we can overcome the presumed conflict between Economy and ecology and we can reach both higher economic welfare and more preservation of Nature. Perhaps no one has better summed up the simple principle of ecotaxes than the mayor of Landshut, a small Bavarian town near Munich. He is a conservative, his name is Josef Deimer, and he asked a very intelligent question:

**People will do everything for money –
why not good?**