Leaning diary: BIOMAP

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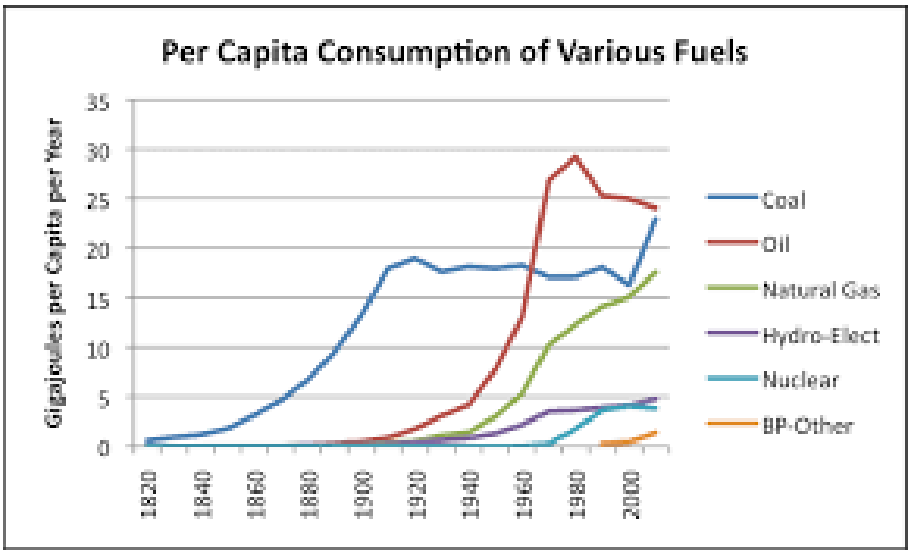
Background

Throughout the second half of the 20th century oil has been at the heart of foreign policy. The Suez Crisis in 1956, the 1973 Arab oil embargo, the consequences of the Iran (Persian)-Iraq(Arab) War in 1980, and the two Gulf Wars in 1990 and 2003 most visibly illustrate how oil has been implicated in international relations. Import-dependent states have been concerned with maintaining sustainable, secure access to oil at low prices, whereas oil exporting states, mainly in the developing world, have been concerned with balancing the desire to uphold prices and revenues while maintaining market share. Since then, global events and politics have had considerable impact on the price of crude oil. The economics law of free market based on demand and supply have been severally manipulated by politics and global events aimed at putting pressures on demand or supply depending on the interest of the political actors (1)

The recent energy independence and climate change policies encourage development and utilization of renewable energy such as bioenergy. Bioenergy has been utilized for cooking, heating, and lighting since the dawn of humans. The energy stored in annually produced biomass by terrestrial plants is 3–4 times greater than the current global energy demand (2).

The best sensible course of action for any nation that finds itself in such a situation is to move away consciously from this dependence disentangling itself from the destructive yoyo which its swings can cause to its developmental trajectory. Whatever you cannot reasonably control becomes a stochastic variable which is very difficult to deal with in every form of planning (1).



The role of policy

In the past, the need to generate revenue and foreign exchange for national economic development motivated governments to design centralized and sectoral policies to influence how forest resources were used. Policy-makers regarded forests as distant reserves to be managed as sources of public revenue, treated as reservoirs of new land for cultivation or protected as nature reserves. Over time, however, society's shifting and sometimes conflicting expectations created more difficult policy challenges related to both the forest sector and national development. The perspectives and demands of politically diverse groups are still proliferating, placing a significant strain on current institutions and policies.

Developing effective forestry strategies and policies to promote sustainable development involves an array of difficult choices. For example, while we know that forest clearing for crops and pasture, overcutting for fuelwood, uncontrolled commercial logging for timber and expanding infrastructure all contribute to deforestation and degradation, the fundamental problem facing policy-makers is how to address the underlying causes. These include poverty, hunger, access to land, a lack of jobs and income-generating opportunities, and growing economic demands for forest goods and services (3).

The various studies to date imply that, to take advantage of trade-expanding strategies, countries need to address existing policy failures and the incentive structure underlying deforestation by, for example, internalizing externalities, improving access to farmland, increasing agricultural productivity, expanding employment opportunities and providing increased tenure security for common and private property (4)

In general, negative externalities arise when a producer or consumer imposes costs on others for which the imposer cannot be charged, and positive externalities occur when a producer or consumer creates benefits for others for which the provider cannot receive compensation. Environmental externalities fit into this general pattern of external market failures. They are distinguished by involving the use of physical resources, particularly soil and water in agriculture. An example of a negative externality is the use of chemical pesticides in irrigated rice production. Pesticides are applied to paddy rice in fields of standing water. The chemical residues remain in the water when it is drained from the paddy field. Others, located downstream, later use that water for drinking, irrigation, livestock production, or producing fish in ponds. Those downstream users of the polluted water suffer if the pesticide residues cause health problems for humans or their animals or decrease the productivity of their farming or fishing. But these recipients of negative external effects have no way of charging the upstream rice farmers for

polluting the water. The market fails to include the negative external costs of pesticide residues in the upstream rice farmers' production costs. Consequently, there is a role for government intervention to correct the negative externality (5).

Economic instruments

Energy taxes, incentives and subsidies are tools which governments use to manipulate the energy market for their benefit. These tools are designed to ultimately affect the purchasing behavior of businesses and consumers. The tools are also designed to capture "social" costs and to change behavior or "level the playing field" between energy types. The hope for these tools is often that they will facilitate a cleaner environment, lower prices, and/ or safer conditions that would otherwise have not existed

Energy Taxes and Fees Application of a tax is one of the oldest forms of generating revenue as well as modifying behavior. Excise taxes are found on crude oil, gasoline, electricity and other forms of energy. Excise taxes are used for many government activities, from road building to environmental protection. Excise taxes can be placed in the general operating fund unless otherwise earmarked and used to support day-to-day government activities. Fees are generally imposed to capture costs on energy production that formerly escaped valuation by the marketplace. These include issues like health risks to workers and consumers, liability for spills and accidental contamination, and waste disposal. Fees are generally placed into a "trust fund" that can be used to mitigate any issues that might arise during the use, transportation or disposal of the product. These are designed to reflect a more "real" cost for the product.

Energy subsidies can take several forms, including direct subsidies, indirect subsidies and R&D expenditures. Direct subsidies are payments made straight to producers or consumers for completing certain activities or for certain buying patterns. Examples include payments made to companies to drill for coal bed methane and to homeowners who purchase solar panels to generate electricity in their homes. Indirect subsidies

involve activities by governments that affect the cost of consumption or production of energy (6).

The market has a complex mechanism of distributing resources using price as a signal. For example, the rise in prices will increase supply and decrease demand. By properly reflecting the social cost in the price of goods against the environment, it will be possible to apply the appropriate price from an environmental point of view, thus taking advantage of market mechanics and facilitating the preservation of the environment.

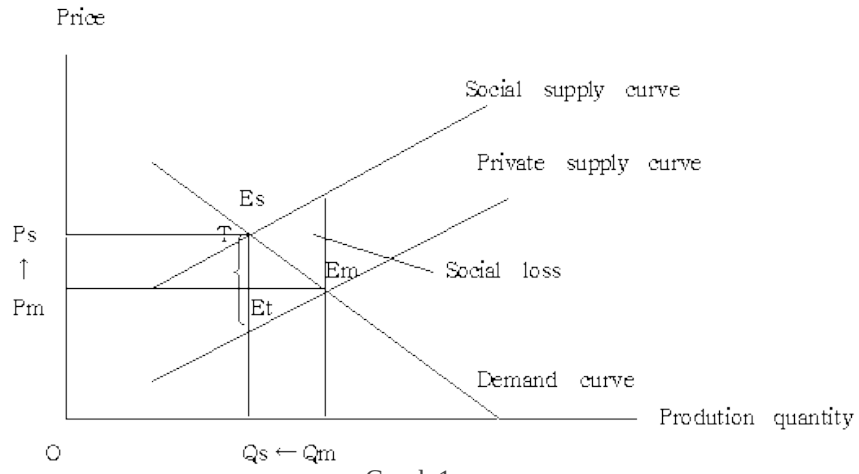
Internalizing the negative external factors of a deteriorating environment that accompany goods and services (social cost) by taking advantage of market transaction through taxation is the function of what is called the Pigouvian Taxation Theory.

The cost to society caused by a deteriorating environment (external diseconomies) should fundamentally be reflected in market prices by having producers of goods and services incorporate these costs into the production costs. However, regarding the various goods and services that put a burden on the environment, it is impossible to internalize the external diseconomies through direct negotiation between the victims and the perpetrators.

Therefore, market prices of such goods and services which should precisely reflect the cost of external diseconomies - only reflect the cost of raw materials, labor, and capital necessary for the production (private cost) and not the social cost per produced item. This promotes excess production and consumption.

In graph 1, the intersection point Em of the private supply curve and the demand curve shows the current state, in other words, a state where the external diseconomies are not internalized. Production price and quantity are shown as Pm and Qm, respectively. Efforts should be made to internalize external diseconomies. One way is to match the marginal social cost by adding the price equivalent to the marginal cost of external diseconomies per product to the marginal private cost, this in turn will

raise the market value and consequently serve as taxes and subsidies charges) that restrict production quantity (7).



Graph 1

As proven by international experiences, energy and environment related taxes serve as an effective tool for inducing higher energy prices, which further help raise energy productivity. Therefore such taxes may serve as a long-term incentive that helps curb energy demand, promote technological innovation and raise energy efficiency (8).

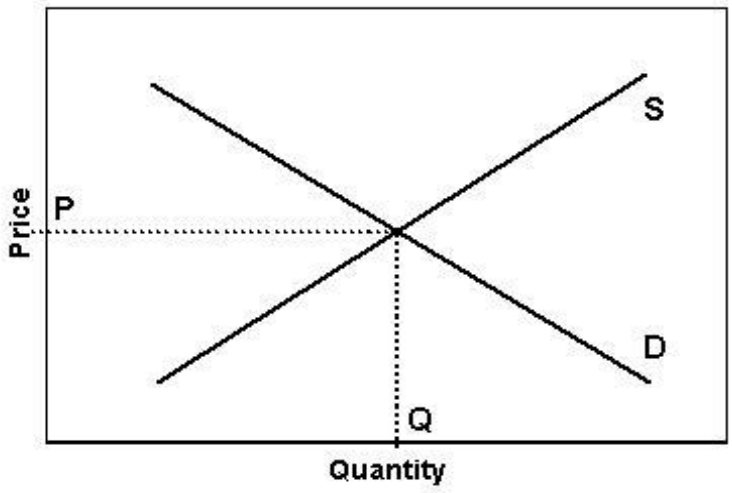
Market behavior

Price is arrived at by the interaction between demand and supply. Price is dependent upon the characteristics of both these fundamental components of a market. Demand and supply represent the willingness of consumers and producers to engage in buying and selling. An exchange of a product takes place when buyers and sellers can agree upon a price.

When a product exchange occurs, the agreed upon price is called an "equilibrium" price, or a "market clearing" price. Graphically, this price occurs at the intersection of demand and supply as presented in Figure 2.

In Figure 1, both buyers and sellers are willing to exchange the quantity Q at the price P. At this point, supply and demand are in balance. (9)

Figure 1. Price Equilibrium

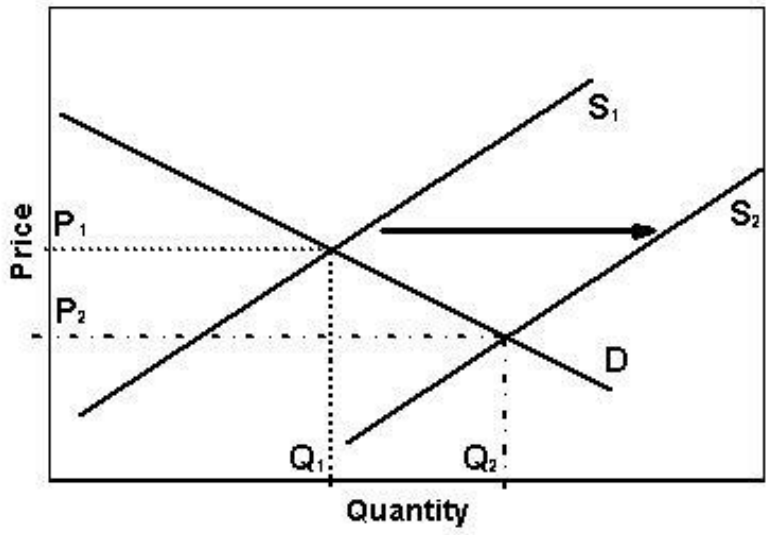


When either demand or supply shifts, the equilibrium price will change. Look at the modules on understanding supply for a discussion of why of that market component may move. Some examples are given below to show what happens to price when supply or demand shifts occur.

In Figure 2, price falls from P1 to P2 if a bumper crop is produced. If the demand curve in this example were more vertical (more inelastic), the price-quantity adjustments needed to bring about a new equilibrium between demand and the new supply would be different. To see how elasticity of demand affects the size of adjustment in prices and quantities when supply shifts, try drawing the demand curve (or line) with a slope more vertical than that depicted in Figure 2. Then compare the size of price-quantity changes in this with the first situation. With the same shift in supply, equilibrium change in price is larger when demand is inelastic than when demand is more elastic. The opposite is true for quantity. A

larger change in quantity will occur when demand is elastic compared with the quantity change required when demand is inelastic.

Figure 2. Movement Along Demand Curve



Marketing is so much more than creating a catchy phrase or a jingle people will sing for days. Understanding consumer behavior is a vital aspect of marketing. Consumer behavior is the study of how people make decisions about what they buy, want, need, or act in regards to a product, service, or company. It is critical to understand consumer behavior to know how potential customers will respond to a new product or service. It also helps companies identify opportunities that are not currently met.

A recent example of a change in consumer behavior is the eating habits of consumers that dramatically increased the demand for gluten-free (GF) products. The companies that monitored the change in eating patterns of consumers created GF products to fill a void in the marketplace. However, many companies did not monitor consumer behavior and were left behind in releasing GF products. Understanding consumer behavior allowed the pro-active companies to increase their market share by anticipating the shift in consumer wants (10).

Governance

However, the rapid expansion of bioenergy use entails sustainability risks and increases competition between various alternative uses for land and biomass resources. Firstly, additional demand for biomass increases pressures on agricultural land use, thereby incentivising the conversion of natural land and increases in agricultural intensification. Apart from conflicts with conservation aims, emissions associated with land use change (LUC) can significantly deteriorate the greenhouse gas (GHG) balance of bioenergy. Secondly, displacing food and feedstock production with energy crop cultivation results in rising price levels for agricultural commodities, which may in turn negatively impact food security and cause indirect land use changes (ILUC). Moreover, energyrelated biomass uses compete for biogenic resources not only with various material applications, but also among each other, while competition for public support, research funds and investment capital exists with other climate change mitigation options. It is therefore necessary to establish a governance framework that succeeds not only in safeguarding the sustainability of bioenergy production, but also the efficiency of resource use (11).

International bioenergy trade

The markets of biomass for energy are developing rapidly and becoming more international. A remarkable increase in the use of biomass for energy needs parallel and positive development in several areas, and there will be plenty of challenges to overcome. The main objective of the study was to clarify the alternative future scenarios for the international biomass market until the year 2020, and based on the scenario process, to identify underlying steps needed towards the vital working and sustainable biomass market for energy purposes.

Wood pellets are a renewable energy carrier which is produced from sawdust or other ground woody materials. International standards define product requirements i.e. moisture, energy density, abrasion resistance,

particle size and shape for wood pellets (ISO 17225-2) which allowed wood pellets to turn into a commodity. Over the past 10 years, the production of wood pellets increased steadily, driven by a corresponding constantly rising demand. For 2006, the production was estimated between 6 and 7 Mt (excluding negligible production in Asia, Latin America and Australia), expanding globally to 14.3 Mt in 2010 (IEA Bioenergy, 2011) and surpassed 26 Mt in 2015.

Production and consumption patterns differ between the countries. An overview for the year 2015/2016 is given in Figure 0.3. On a country basis the U.S. stands out as the largest pellets producer by far with 7.4 Mt in 2015 (FAO-Estimate) and 6.3 Mt in 2016. Canada is the country with the most dynamic development, having increased the export from 1.6 Mt in 2015 to 2.4 Mt in 2016. Other large producers are Germany (2.2 Mt) and Sweden (1.5 Mt). With regard to pellet consumption, the United Kingdom is the largest consumer with 6.7 Mt pellets in 2015, followed by the U.S. with 2.9 Mt, Denmark (2.8 Mt) and Italy (2.1 Mt).

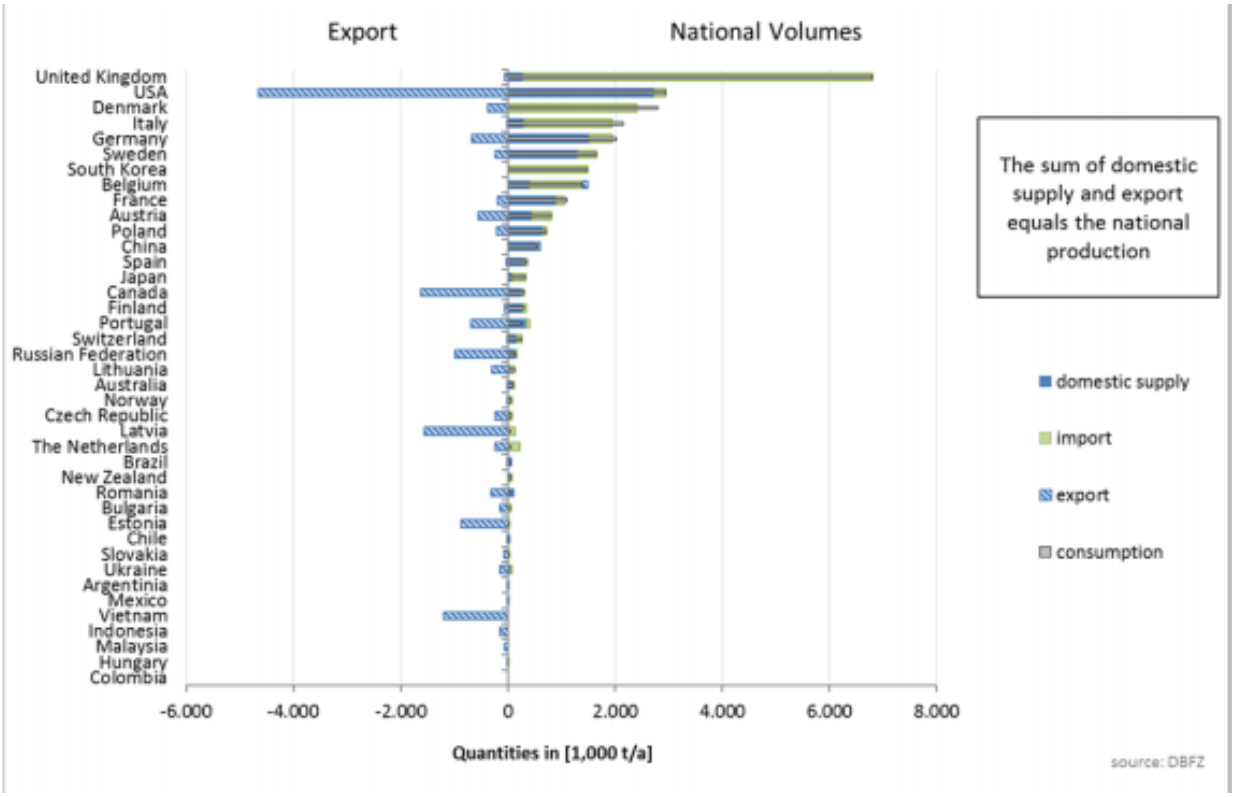


Figure 3 - Domestic Production and Import | Export per country for chosen countries in 2015/2016;

For Europe, the European Pellets Council identifies the further improvement of efficiency and quality of pellet production, of logistics and heating appliance efficiency (12).

Bioenergy EU policies

EU Member States have agreed on a new policy framework for climate and energy, including EU-wide targets for the period between 2020 and 2030. The targets include reducing the Union's greenhouse gas (GHG) emissions by 40 % relative to emissions in 2005 and ensuring that at least 27 % of the EU's energy comes from renewable sources. They should help to make the EU's energy system more competitive, secure and sustainable, and help it meet its long-term (2050) GHG reductions target

The development of new processes, such av gasification for bio-methane, methanol, DME, pyrolysis oil, torrefied pellets and charcoal, and production of ethanol, ethane and other chemical products, will need large investments in coming years. The most important factor to facilitate this development is a stable framework of general incentives, such as carbon tax and ETS. Direct economic support is needed for research, development, demonstration and market introduction. It is important that EU state aid regulation is adapted to this situation, and that general incentives like carbon taxation can be fully implemented. The interpretation of the state aid rules today works as a protection for fossil fuels on the transport fuel market (13).

This is important context for the thorny question of whether, and how, carbon emissions from burning bioenergy, renewable energy made available from materials derived from biological sources should be included in prospective carbon taxes

The debate over biofuels and economics has tended to focus on mandates and subsidies rather than carbon taxes. unsurprisingly, given the absence

of carbon-taxing in the U.S. and the prevalence of large biofuel subsidies, primarily via the Renewable Fuel Standard (14).

Future trends

An energy transition is under way in many parts of the world. Renewables stand now for 14 % of total supply, 23 % of electricity generation and more than 50 % of new power generation. Solar PV and wind are in key roles. A crucial factor behind this is continously decreasing costs, leading to grid parity of renewable power generation in a growing number of countries. Energy use is still growing; energy-related carbon emissions grow only little. The climate pledges of the Paris agreement are positive, but far from sufficient steps and not binding. Energy efficiency, decarbonising the heat and transport sector, securing sufficient investment (in low-carbon capacity) and robust policies remain as big challenges (15). Really cutting emissions and reducing use of fossil energy is still a big task!

Some clear reasons to present trends can be easily found

-Uncertainty concerning policies and subsidies

- Lower than expected) prices for fossil fuels after 2008 (low demand, new sources, practically no restrictions of production)

-Carbon trade has not offered any strong incentive since long

-Production costs for bio energy have stayed roughly the same, but decreased for many other forms of renewable energy

-Fear of rising feedstock prices and sustainability issues have kept investments in bio-based energy on a modest level

The role of bio energy in the future is far from clear and can be affected by many factors and unprecedented developments.

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