Chapter 6
Policy Instruments and Financial System

Keywords Negative externalities · Invisible hand · Market failure · Marked-based instruments · Border taxes · Environmental, social, and governance (ESG) factors

This Chapter's Learning Goals
- You know the problem of negative externalities.
- You know the concept of the invisible hand.
- You know how policy instruments can be used to reduce externality problems.
- You know the relevance of the financial system for sustainable development.
- You know various factors that still hamper the influence of the financial system so far.

6.1 Policy Instruments

It is a central assumption of classical economics that the price correctly reflects all costs. In such a world, the price guides the economy like an "**invisible hand**." Supply and demand automatically adjust to changes in price, so that the overall economic welfare in the market is finally maximized. In such a world, the introduction of economic policy measures such as taxes or subsidies leads to a deviation from market equilibrium. Accordingly, economists expect that the introduction of economic policy measures typically leads to inefficiency in the market and thus to welfare losses.

In a world with **external effects**, however, things look different. We speak of an external effect when economic actions of one party affect the welfare of an uninvolved third party. This chapter focuses on negative external effects, i.e. costs are incurred by a third party without the polluter having to pay compensation. In the literature, such uncompensated costs are referred to as external costs. Such external

M. Fischer et al., *Sustainable Business*, SpringerBriefs in Business,
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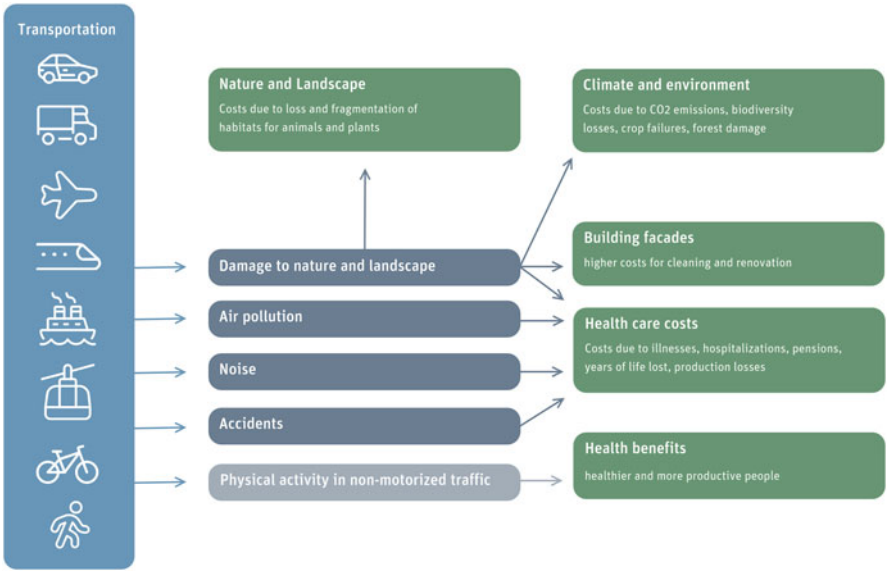

Fig. 6.1 Impact of traffic on the environment and health (source: own representation based on Federal Office for Spatial Development, 2022)

costs can be found in the transport sector, for example. Besides pure environmental costs, transport also causes noise and accidents (see Fig. 6.1).

Real-World Example: External Costs of Transport in Switzerland

In order to calculate the external costs of transport, the first step is to quantify the damage caused by transport. A wide range of scientific disciplines are involved in determining the damage. From medicine and public health, for example, we know how exhaust gases and noise affect human health. From this, we can then estimate the health costs of these health impacts. Environmental science expertise is needed to quantify the negative effects of pollutants or traffic infrastructure on animal and plant species.

The external costs of transport in Switzerland, i.e. the environmental and health costs that are not covered by the polluters, amounted to **CHF 13.7 billion** in 2018. This includes, for example:

- 17,300 years of life lost
- 87,600 tons of lost grain harvest
- 39,000 days with asthma symptoms affecting children
- 26,900 hospital days due to illnesses caused by air pollution and noise

Source: Bundesamt für Raumentwicklung (2021)

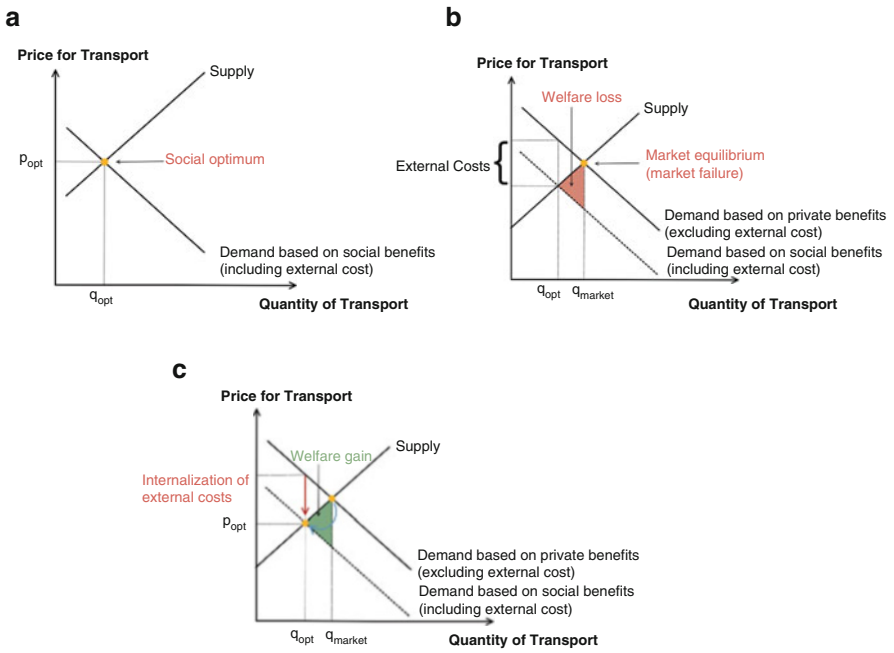

Fig. 6.2 Welfare loss due to external costs. (**a**) Social optimum. (**b**) Market outcome. (**c**) Effect of policy instruments (source: own representation). *Notes*: Panel **a** shows the social optimum, which considers external costs of transport (such as noise, etc.). Panel **b** shows the market outcome which does not consider external costs and thus leads to over-consumption ($q_{\text{market}} > q_{\text{opt}}$) and thus welfare loss. Panel **c** shows the outcome when policy instruments are used. By internalizing external costs (e.g., based on a tax: $p_{\text{demand}} = p_{\text{opt}}$ + TAX) or directly limiting the quantity of transport available on the market, the welfare loss is reduced (i.e., there is a welfare gain)

All these costs have so far been insufficiently or not at all reflected in (transport) prices. Hence, the market price for transport is effectively too low. If individuals (and companies) maximize their personal benefit, the consequence is that—from a macroeconomic perspective—they will travel too much. Some transport activities only occur because the costs are not fully included in the price; if the consumer had to pay for all the costs incurred, they would generally travel less. Consumers therefore travel at the expense of the whole society, so to speak. External effects therefore lead to a **market failure**. In contrast to a situation with perfect competition, where price always guides the market to its equilibrium, external effects prevent the market to find an equilibrium that maximizes overall welfare (see Fig. 6.2).

As discussed in Chap. 3, the external costs to the economy as a whole can be substantial. Now, if **policy instruments** are introduced to reduce this market failure and the associated welfare losses, total welfare should increase accordingly (see Panel c in Fig. 6.2). Thus, in contrast to a situation without market failure, the introduction of policy instruments in a situation with external costs should lead to higher efficiency and a better outcome from an overall economic perspective.

6.1.1 *Instruments for Dealing with External Effects*

In a situation with externalities, it may therefore make sense for the state to intervene and try to remedy the market failure. The state can, for example, try to persuade actors to adopt more sustainable behavior through **information campaigns** and **voluntary agreements**. However, more binding policy instruments are often needed to achieve significant changes (see Table 6.1).

Table 6.1 Overview of the different policy instruments

Policy type	Instruments	Description	Examples
Informational and cooperative instruments	Labeling and certification	Voluntary method of environmental performance certification and labeling	Eco-label (e.g., energy star, Bio Suisse)
	Information disclosure	Measure that provides information about the environmental harm of a particular product or activity	Information provision to recyclers; specific training programs; a specific program for collecting data
	Voluntary agreements	Voluntary agreements or commitments between the state and private actors or among private actors	Voluntary agreement made by a number of industries on a CO_2 reduction
Regulations	Mandatory standards	A legally enforceable numerical standard that usually includes a unit of measurement, e.g. mg/l	Building and energy standards such as Minergie; mandatory CO_2 emission standards for cars
	Prohibition/ban	A total or partial ban/prohibition of certain emissions, activities, products, etc.	Ban on oil heating systems
	Technological prescription	Measure prescribing the use of a particular technology or process	Use of Carbon Capture and Storage (CCS)
Emission rights	Permits	A permit to pollute the environment or to manufacture/import/export/sell environmentally harmful products	Cap and trade schemes
Taxes	Tax/levy	A tax or levy for a polluting product or activity	Carbon tax; water rates; gas taxes; advance disposal fee systems; deposit-refund system
Subsidies	Subsidy/tax reduction	A measure by which the state grants a financial advantage for a particular product or activity	R&D subsidies; renewable energy feed-in tariffs; consumer subsidies for energy-efficient or low-emitting substitutes (e.g., heat pumps, electric cars)

Source: own representation

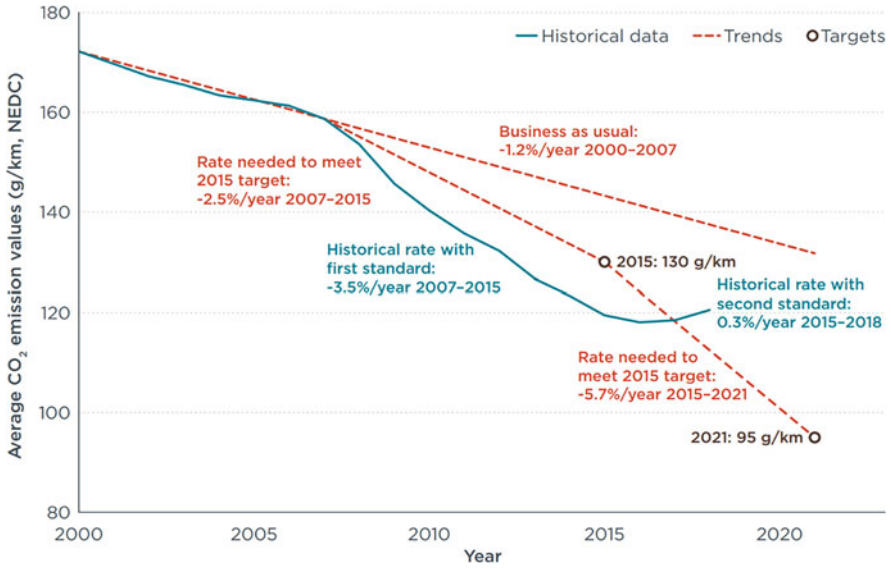

Fig. 6.3 CO_2 emissions from new passenger cars in the EU; historical average CO_2 emission values, targets, and annual reduction rates of new passenger cars in the European Union (source: Tietge, U., Mock, P., & Dornoff, J. (2019). *CO_2 Emissions from New Passenger Cars in the European Union: Car Manufacturers' Performance in 2018*)

In principle, measures can be taken in two areas: Either the state tries to influence the quantity directly or it influences the price, which in turn indirectly affects the quantity consumed/supplied. Both interventions have the objective of getting closer to the macroeconomic optimum and thus increasing overall welfare. In the following, the main policy instruments are discussed in more detail:

- **Regulations**: Binding regulations are used to directly influence the amount of external effects. In the case of negative externalities, this should lead to a reduction in (over-) consumption/production of goods and bring the market outcome closer to the macroeconomic optimum. Examples of such regulatory interventions are standards in the construction sector or car industry. Regulations usually have to be introduced specifically for individual sectors, which is why their implementation is often relatively complex and the monitoring costs are high. However, if we look at the example of passenger cars, regulations can also have a substantial impact on market results (see Fig. 6.3).
- **Allocation of emission rights**: Like regulations, the allocation of emission rights also influences the quantity. In concrete terms, the state controls how many external costs are to be tolerated based on the quantity of rights issued. A specific example is CO_2 certificate trading. Here, the state decides how much CO_2 it actually wants to tolerate and then distributes the corresponding certificates to the companies (usually free of charge). The companies can then trade the certificates on an emission exchange. This is to ensure that the certificates are ultimately used

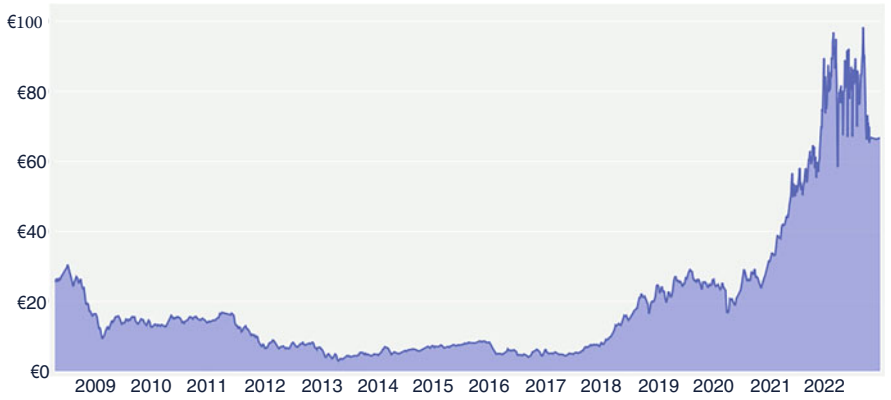

Fig. 6.4 Price development of EU emission certificates in euros per ton of CO_2 (source: https://sandbag.be, accessed November 7, 2022)

as efficiently as possible, i.e. that CO_2 is first saved where it is cheapest. Compared to regulation, where all actors in a given industry are affected equally regardless of the costs of reducing externalities, the allocation of emission rights is likely to increase the efficiency of internalizing external costs. Moreover, the implementation and control costs are also lower when emission rights are allocated, since the market ultimately regulates alone which company owns how many certificates. A central challenge with emission rights, however, is the determination of the quantity of emission rights to be issued. If too many rights are allocated, the price on the market will ultimately be so low that hardly any environmental impact is achieved. If the quantity is too small, the interventions will be too restrictive and the costs for the economy will be too high. The allocation of emission rights is therefore a tightrope walk, whereby the system usually has to be adjusted over time in order to achieve an efficient balance in the end. This is also the case with EU emissions trading. For years, the price of emission certificates in the EU was so low that hardly anyone wanted to invest in climate protection. The EU has therefore decided to reduce the number of certificates, which is why the price has risen again significantly since the end of 2017 (see Fig. 6.4).

- **Taxes**: In contrast to emission rights, taxes do not directly influence quantity of emissions but the price of the polluting product. In concrete terms, the state defines a price for causing external effects, which is then added to the market price via taxes. The external costs thus become internal costs, i.e. they are **internalized**. Such taxes are introduced, for example, on individual goods such as specific fuels or ideally as a general CO_2 tax. In Switzerland, taxes on fossil fuels such as heating oil and natural gas have been in place since 2008, but so far there have been practically no taxes on fuels (petrol, diesel).

  In the case of taxes, the fundamental question is whether they should primarily relate to consumption or production. To optimize the efficiency of taxes, taxes

should in principle be levied where the externalities arise. Since consumption ultimately best reflects our ecological footprint, the tax should be levied on consumption and not on production of the respective goods.

The central goal of a CO_2 tax is to avoid market failures and not to generate government revenue. Similar to the free allocation of emission rights, the revenues generated by a CO_2 tax should therefore be refunded. Such refunds should also be used to reduce differences in the extent to which people are affected by the tax. For example, one study finds that the rural population in Switzerland is probably more affected by a tax on fuel than the urban population, which has access to a greater range of public transport (Filippini & Heimsch, 2016). In order to reduce such inequalities, the rural population should therefore be compensated more when it comes to reimbursement.

The introduction of a CO_2 tax is often preferred by economists compared to the allocation of emission rights. Whereas a CO_2 tax directly sets the prices for negative externalities, certificates determine the emission quantity in a first step, but the prices are only indirectly derived on the market. Experience from the EU certificate market has shown that prices on such markets are very volatile and can be influenced by individual market participants. This makes it very risky for companies to make long-term investments in climate protection.

- **Subsidies**: Subsidies are de facto the opposite of a tax; instead of taxing the creation of negative externalities, the avoidance of negative externalities is financially supported. Subsidies are used, for example, to spread the use of electric cars. Norway first introduced tax incentives in the 1990s to stimulate the market for electric cars. In Norway, taxes on the purchase of new vehicles are usually so high that the purchase price of a car with high pollutant emissions is doubled. These and other taxes are waived for electric cars. Drivers of zero-emission vehicles also do not have to pay expensive road tolls, cross fjords for free by ferry, park in cities without paying, and use bus lanes to overtake other commuters. The next step is to complete a network of charging stations (The Economist, 2017).

  Subsidies are often viewed critically because they create a certain dependency, which makes it difficult to reduce them at a later date. Furthermore, subsidies—in contrast to CO_2 taxes—do not lead to a price that reflects the actual costs of a good. As a result, those market actors who cause external costs still do not pay for the damage caused. However, subsidies are an important instrument, especially for the specific promotion of research and innovation activities.

From an economic point of view, emissions trading and in particular the introduction of a CO_2 tax are the preferred economic policy instruments to address market failures caused by external costs. Compared to the other instruments, taxes and emissions trading make use of market forces and should therefore generally lead to more efficient outcomes. In the literature, these instruments are also referred to as "**market-based instruments**." Both taxes and the allocation of emission rights work by imposing costs on the environmental impacts of a particular action (such as transport), which then provides an incentive for the polluter to reduce its

environmental impact. For comparison: in the case of subsidies and regulations, it is the state and not the market that defines which technologies to invest in or how restrictive regulation should be. This presupposes that the state is well informed to make such decisions efficiently. This is often not the case.

Real-World Example: Switzerland Rejects Extended CO_2 Law
On June 13, 2021, Switzerland voted on extending CO_2 laws, which would have included CO_2 taxes on fuel, for example. The CO_2 law was narrowly rejected with 51.6% of the vote. This means that Switzerland will most likely not be able to meet its Paris commitment to halve greenhouse gas emissions by 2030 compared to 1990.

The urban–rural divide was striking. The two agricultural initiatives, which were voted on at the same time, mobilized strongly in rural areas. Municipalities with a high percentage of "no" votes to the CO_2 law had an above-average turnout. Representative figures from the canton of Lucerne: In the city of Lucerne, the law was accepted with 67% (with a voter turnout of 59%), in the municipality of Hasle in the rural Entlebuch, the law was rejected with 72% (with a voter turnout of over 80%). The Republic shows that the CO_2 law was mainly rejected where the proportion of home ownership and passenger cars is high. According to a post-election survey by Tamedia, no age group had rejected the CO_2 law more clearly than those under 35.

The outcome of the vote suggests that the higher the personal costs appear, the lower the acceptance of climate measures. In general, incentive taxes have a difficult time in public votes. All the more so if only a portion is refunded to the population.

Source: Kollmuss & Schenk (2021)

However, implementing an effective CO_2 tax or emissions trading system is not easy in practice either. As soon as a state changes the prices of certain goods in its own economy more than it is done abroad, competition can be distorted. If taxes are set on the consumption of goods, as discussed above, domestic producers may have higher costs than foreign producers due to an increase in the cost of "consuming" production inputs. This could have a negative impact on exports of these goods and could lead to the relocation of the corresponding production abroad. This is neither attractive for the business location nor does it make sense from an ecological point of view, because in the end climate change is a global problem and it hardly matters where the negative externalities ultimately arise. To avoid such distortions, a **border tax adjustment** is needed, which can take the form of a tax or duty on imports and/or rebates on exports. By offsetting the differences in the stringency of climate policy between different jurisdictions, such border tax adjustments help to ensure that the production of goods and its CO_2 emissions are not simply shifted to locations where the production of CO_2 is cheaper. Such tax adjustments, however, involve a certain

administrative effort and can hardly be implemented unilaterally by individual countries, which is why international cooperation is necessary.

Switzerland shows how difficult it is in practice to implement a broad-based CO_2 tax (see Real-World Example). Without such border tax adjustments, the room for action on taxes is very limited and other instruments will have to be used. This applies all the more if existing environmental goals are to be achieved effectively. If, for example, we want to achieve net-zero emissions by 2050, this will hardly be possible with a CO_2 tax alone. Restrictive regulations of particularly CO_2-intensive sectors such as the construction and cement industries are likely to become necessary. Bans may also be necessary in certain sectors, for example, to reduce the use of gas and oil heating. At the same time, massive financial support may also be needed to accelerate necessary technological developments. Hence, to achieve defined environmental goals, a broad mix of different policy instruments will ultimately be needed.

6.1.2 International Comparison of the Measures Implemented

To compare the effectiveness of existing policies over time and between countries, an indicator is needed that measures the commitment and stringency of each country's environmental and energy policies. Such an indicator has been developed by the Organization for Economic Co-operation and Development (OECD). The indicator of Environmental Policy Stringency developed and recently revised by the OECD (see Kruse et al., 2022) consists of three equally-weighted sub-indices, which group market-oriented (e.g., taxes, permits, and allowances), non-market-oriented (e.g., performance standards), and technology support measures (upstream (R&D support) and downstream (feed-in tariffs, auctions) measures.

The indicator shows that the stringency of policy measures in all OECD countries has increased over time (see Fig. 6.5). Particularly stringent environmental policies are observed in France and Switzerland. Luxembourg, Finland, and Norway follow closely behind, together with Finland and Norway. New Zealand, Brazil, and South Africa are the least stringent among OECD countries.

6.2 Financial System

The financial sector allocates funding to its most productive use by managing the supply of loans, equity finance, insurance, and other financial products. Therefore, by increasing the share of sustainable investments and lending, the financial system can directly contribute to the efficient distribution of wealth and the promotion of sustainable development. Sustainable or responsible investing refers to any

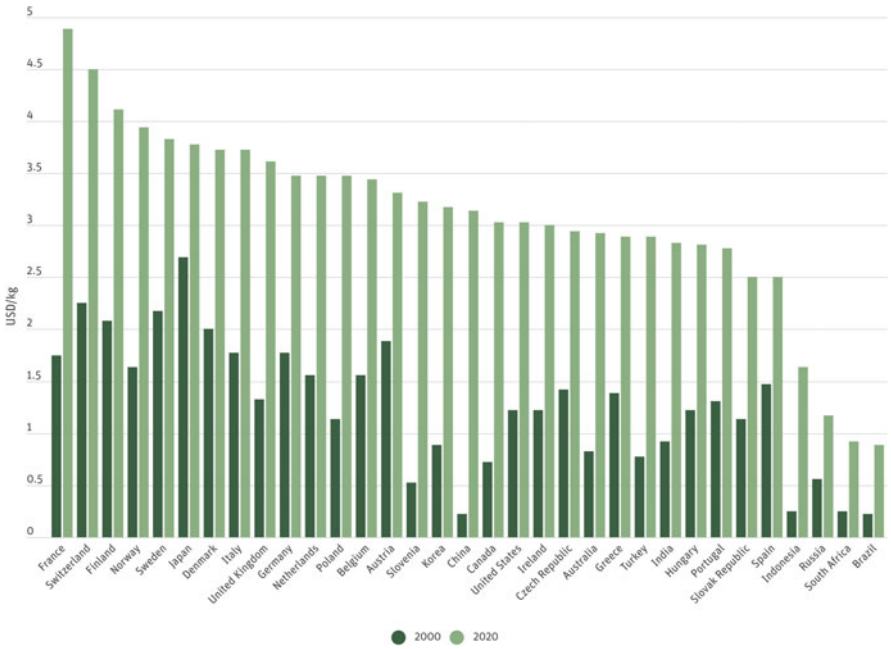

Fig. 6.5 Environmental policy stringency by country in 2020 and 2000 (source: own representation based on OECD, 2022)

investment approach that incorporates **environmental, social, and governance** (ESG) factors into the selection and management of investments.

Classical finance theory, developed in the previous century, looks to optimize economic activities with the two production factors labor and capital, whereas nature and environment usage were considered to be freely available. Shareholder maximization was at the center of the theory, as most prominently described by the Nobel-prize winning economist Milton Friedman, in his 1970 essay in the New York Times, "A Friedman Doctrine: The Social Responsibility of Business Is to Increase Its Profits," one of the most cited economics articles ever.

However, with the recognition of population increase, the depletion of natural resources, and the generation of pollution, the finance paradigm shifted from shareholder value to stakeholder value, from avoiding risks to recognizing opportunities in the context of ESG factors. The role of sustainable finance is to combine both points of view. It can help make strategic decisions on capital allocation, educate long-term investors on how to exercise their influence on companies, and help deal with inherent uncertainties by providing powerful tools to find prices for risky assets and investments.

Sustainable Finance has evolved over several stages. Investors started by avoiding risks related to ESG investments and lending. In doing so they incorporated negative social and environmental externalities into decision-making to become sustainable long-term decision-makers and contributing to sustainable development.

Therefore, financial theory has evolved from short-term profit maximization to long-term value creation over the last 50 years.

Five major areas for sustainable impact can be identified:

- Adjust **decision-making** to focus on long-term value creation, by taking environmental, social, and governance factors into account, in addition to the traditional production factors labor and capital
- For **equity investing**, move to an active investor model with an ownership stake and contribution to the company's ESG strategy
- Comprehensive **bond investing** strategies by including ESG factors in the calculation of credit and default risk as well as issuing Green and Social bonds
- Improved **bank lending** approaches: Move towards a risk and value-based lending approach by including ESG factors in the credit risk calculations and ESG-related non-monetary reasons
- Managing **long-term risks** via approaches that deal with the uncertainty of ESG-related issues on the pricing of insurance products

The literature distinguishes three different types of investments channels: (a) **investment funds**, (b) **mandates**, and (c) **asset owners** (see SSF, 2022). Funds are collective investments, where money from different investors is pooled together and spread across a wide range of underlying investments, thereby spreading individual risk. Mandates are agreements with an investment manager that set out how the money is to be invested. Asset owners include pension plans, insurance companies, official institutions, banks, foundations, endowments, family offices, and individual investors located worldwide, with pension funds typically controlling more than 50% of the assets.

6.2.1 Sustainable Finance Is Becoming More Important

Although difficult to quantify, the data indicate that recently, sustainable investing has increased sharply in some countries. The UN reports that 84% of asset owners say they pursue or actively consider sustainable investing (UN, 2019). In 2020, global sustainable investment reached $35.3 trillion, an increase of 15% in 2 years (see Fig. 6.6).

In Switzerland in particular, the role of the financial sector is central to more sustainable development. Given the scale of assets managed by the Swiss financial sector, it could play an important role in achieving sustainability within Switzerland and globally. Around 220 individual Swiss companies and organizations (asset managers, pension funds, banks, financial research institutes, insurance companies, universities, think tanks, philanthropic foundations, government organizations) are involved in sustainable finance activities, making Switzerland a major hub of sustainable finance specialists, and thus creating a favorable environment for the introduction of innovative sustainable finance products (FOEN, 2015).

Region	2016	2018	2020
Europe	$ 12'040	$ 14'075	$ 12'017
United States	$ 8'723	$ 11'995	$ 17'081
Canada	$ 1'086	$ 1'699	$ 2'423
Australasia	$ 516	$ 734	$ 906
Japan	$ 474	$ 2'180	$ 2'874
Total	**$ 22'838**	**$ 30'683**	**$ 35'301**

Fig. 6.6 Distribution of global sustainable investing assets among regions (source: own representation based on GSIR, 2021). Notes: Asset values are expressed in billions of US dollars. Assets for 2016 were reported as of 31/12/2015 for all regions except Japan as of 31/03/2016. Assets for 2018 were reported as of 31/12/2017 for all regions except Japan, which reported as of 31/03/2018. Assets for 2020 were reported as of 31/12/2019 for all regions except Japan, which reported as of 31/03/2020. Conversions from local currencies to US dollars were at the exchange rates prevailing at the date of reporting. In 2020, Europe includes Austria, Belgium, Bulgaria, Denmark, France, Germany, Greece, Italy, Spain, Netherlands, Poland, Portugal, Slovenia, Sweden, the UK, Norway, Switzerland, Liechtenstein. *Europe and Australasia have enacted significant changes in the way sustainable investment is defined in these regions, so direct comparisons between regions and with previous versions of this report are not easily made

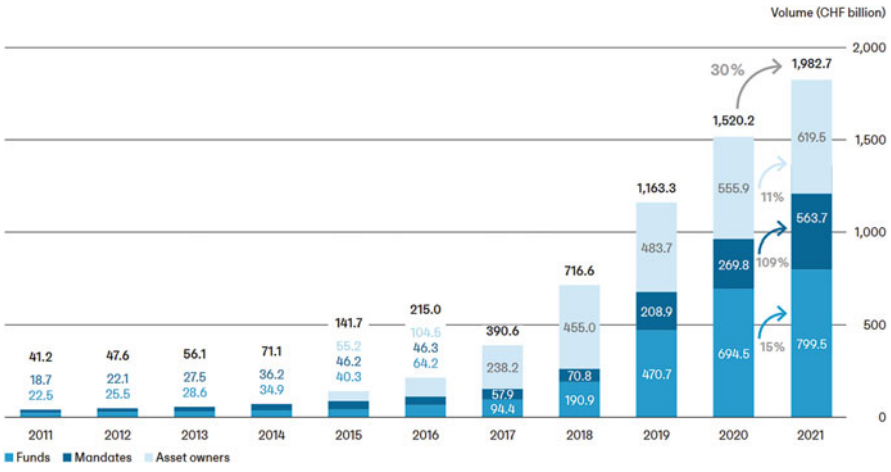

Fig. 6.7 Development of sustainable investments in Switzerland (in CHF billion) (source: SSF, 2022)

Based on responses to an annual market survey performed by Swiss Sustainable Finance (SSF), In 2021, Swiss sustainable investments total CHF 1982.7 billion (see Fig. 6.7)—this represents a 30% increase on the previous year. 70% of the 2021 investments comes from institutional investors, compared to around 30% from private investors (SSF, 2022).

6.2.2 *Accelerating the Impact of the Financial System*

To have a significant impact on sustainability, further growth is needed in the future. To achieve this, various barriers have to be reduced. First, the attractiveness of sustainable investments must be further strengthened; currently, the fees for sustainable products are often significantly higher. Second, the financial industry must improve its communication and actively advise customers to channel more funds into sustainable projects. Ultimately, however, it is also clear that sustainable investments are only possible if many sustainable projects are available for financing in the real economy. Currently, the main barrier to growth is not a lack of potential investors but often a lack of sustainable projects that offer an attractive risk-adjusted return (FOEN, 2015). Here, once again, the system dynamics come to the fore: Such sustainable projects can only be developed if there are corresponding financial resources to finance the projects and a market to sell the products, which heavily depends on the political framework conditions (see Sect. 4.3.4). Finally, we need more transparency. ESG ratings, while widely used, have serious shortcomings, failing to capture the real-world sustainability impact of investments (Popescu et al., 2021).

Real-World Example: Shareholders Put Pressure on Oil Companies
Climate change is a big issue for Shell, BP, and Total, with investors at all three energy giants calling for greater action. Shareholder resolutions to cut carbon emissions will dominate shareholder meetings this month, even as the companies put forward their own, competing proposals. An activist group is putting forward a motion at BP on May 12 and at Shell 6 days later calling on the companies to set emissions targets consistent with the Paris Agreement.

Because the votes are non-binding, they will have limited impact on strategy, but they will increase pressure on companies that still rely on fossil fuels to fund the shift to clean energy. Shell agreed in February to put its conversion plans to a vote, while Total pledged to do the same in March.

Source: Bloomberg. (2021). https://www.bloomberg.com/news/articles/2021-05-07/big-oil-braces-for-climate-votes-with-investor-pressure-mounting

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