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**Factors leading to sustainable consumption (and
barriers to it)**

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Table of Contents

| | | |
|------|--|----|
| 1 | Introduction | 2 |
| 2. | Factors promoting sustainable consumption | 4 |
| 2.1. | Change in consumer awareness and attitude towards the environment and sustainable consumption | 4 |
| 2.2 | Change in companies' attitude towards the environment and in their contributions to sustainable consumption..... | 10 |
| 2.3 | Environmental policies promoting sustainable production and consumption..... | 20 |
| 3 | Barriers to sustainable consumption | 28 |
| 3.1 | Consumerism and the scale effect | 28 |
| 3.2 | Behaviour biases, information problems and the resulting gap between awareness and behaviour | 29 |
| 3.4 | The rebound effect | 33 |
| 3.5 | Weak and unsuitable policies | 34 |
| 3.6 | Limitations to businesses changes due to market forces | 35 |
| 4 | Concluding remarks | 35 |
| | References | 37 |

List of Tables

| | | |
|---------|---|----|
| Table 1 | Revenues from environmentally related taxes 2000–2014, % of GDP | 25 |
|---------|---|----|

List of Figures

| | | |
|----------|--|----|
| Figure 1 | Pro-environmental actions of European citizens in the month previous to the Eurobarometer survey (percent of surveyed people)..... | 6 |
| Figure 2 | Greendex sustainable consumption index | 8 |
| Figure 3 | Sustainable and responsible investment in the United States 1995–2016..... | 19 |
| Figure 4 | Number of PRI signatories and assets under their management | 20 |
| Figure 5 | Energy labelling in the EU | 22 |
| Figure 6 | Trends in global resource extraction, GDP and material intensity 1980–2013 (index: 1980=100) | 29 |
| Figure 7 | Factors discouraging more environmentally friendly behaviour..... | 31 |

Abstract

This paper examines the factors that promote sustainable consumption as well as the limitations and barriers to it. There are some positive trends in consumer awareness and behaviour, technological changes, business models as well as national policies and international frameworks to encourage sustainable consumption. Nevertheless, these improvements have not been able to mitigate the overall environmental impact of consumption, which continues to increase. Besides the difficulty of mitigating environmental impacts associated with the tremendous rise in global consumption levels, other important factors are hampering the transition towards sustainable consumption. Consumers' changes are limited by availability, affordability and lack of trust; the management of supply chains is deficient; proper incentives for firms have not been established and policies lack ambition and coordination, among other problems. This paper explores options on appropriate measures to overcome these obstacles.

1 Introduction

The rise in global consumption levels over the last decades has been accompanied by a persistent increase in resource depletion and pollution, putting serious pressure on the environment, well above its regenerative and assimilative capacities. As a result, both local (e.g. water shortage, health impairing pollution and natural resource scarcity) and global environmental problems (e.g. biodiversity loss and climate change) have emerged or have been seriously aggravated. It is now clear that the Earth cannot bear an increasing scale of present consumption patterns. The picture is even more worrying if we consider the projected trend of world population, which is expected to reach 9 billion by 2050, and its associated consumption, with the global middle class expected to triple by 2030 (WBCSD, 2008). Without a significant change in current consumption and production patterns, the world will face strong environmental and economic costs (such as those caused by projected climate change; see e.g. Stern, 2006). There must therefore be a change in how we satisfy our needs if we want to achieve sustainable development and maintain the Earth's capacity to satisfy the needs of future generations (WCED, 1987).

Analysis on the environmental impacts of consumption and the unsustainability of consumption patterns began decades ago. The publication "Limits to growth" by Meadows et al. (1972) was a turning point, bringing attention to the unsustainability of consumption patterns and the consequences of rising levels of consumption on the environment. According to Jackson (2014), the terminology of sustainable consumption dates back to Agenda 21, the main policy document from the Earth Summit of Rio in 1992 (UNCED, 1992). Chapter 4, "Changing consumption patterns", presents actions that "focus[...] on unsustainable patterns of production and consumption" and "developing national policies and strategies to encourage changes in unsustainable consumption patterns". The document also asserts that new less resource-demanding lifestyles based on new definitions of wealth and prosperity should be encouraged (UNCED, 1992). Two years later, the most widely employed definition of sustainable consumption was established at a symposium on sustainable consumption hosted in Oslo. Accordingly, sustainable consumption was defined as "the use of goods and services that respond to basic needs and bring a better quality of life, while minimising the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not to jeopardise the needs of future generations" (Norwegian Ministry of the Environment, 1994). However, several alternative definitions of sustainable consumption have been provided in the literature (see a review in Jackson, 2014), and the precise meaning and scope of the term is not entirely clear. While some definitions place more emphasis on changes in consumer behaviour

and the need to reduce “consumerism”, others focus on more efficient production of more sustainable products, while still others combine both aspects (Jackson, 2014). Views on whether sustainable consumption necessarily means consuming less or whether it only entails consuming differently without the need to reduce the overall levels of consumption, diverge as well. Consequently, emphasis is either placed on technological changes for improving resource productivity or on behavioural changes, i.e. modifying lifestyles and consumerism. Though these perspectives may be motivated by differing degrees of optimism in the possibilities of technological progress, it seems reasonable to assume that in order to achieve the momentous changes necessary to embark on a path towards sustainable consumption, a combination of both behavioural changes and technological improvements are required. This paper will show that technological changes and efficiency improvements can make a considerable contribution to sustainable consumption, but do not suffice to reverse the present trends of environmental degradation. More profound changes in business and in consumer lifestyles, as well as in the policies that encourage these changes are required to achieve sustainable consumption patterns.

Sustainable consumption has become a central issue on the sustainable development agenda. This was evident during the 2002 World Summit on Sustainable Development in Johannesburg, which stated that “poverty eradication, changing unsustainable and promoting sustainable patterns of consumption and production, and protecting and managing the natural resource base of economic and social development are overarching objectives of and essential requirements for sustainable development” (UN, 2002, p. 2). This statement was incorporated into the final document of the Rio+20 Summit (UN, 2012a, p. 1), which also included the adoption of the “10-Year Framework of Programmes on Sustainable Consumption and Production”, one of the main results of the summit.

This growing concern in the political arena has led to the introduction and reinforcement of different policies promoting sustainable consumption in several countries. In addition, there is also growing environmental awareness among consumers on the social and environmental consequences of their consumption, which, to a limited degree, has also translated into changes in their behaviour and consumption decisions. Finally, the relevance of sustainability issues for businesses has also witnessed an important rise. As a result of all these changes, there is a trend in recent decades to increase the production and consumption of new products which cause less environmental damage than previous alternatives, as well as an increase in pro-environmental practices such as recycling and reusing. Moreover, a trend towards reduction of environmental pressures in terms of level per unit of production or consumption is also visible.

Various factors, such as environmental awareness, policies, behavioural change and technological progress, among others, which have led to an increase in the consumption of more sustainable products as well as to the improvement of production and consumption practices will be explored in Section 2 of this paper. This trend has not, however, been able to curb the absolute levels of environmental pressures and has not prevented serious environmental degradation from occurring or intensifying over time. One of the main reasons for this is the tremendous increase in overall consumption levels recorded over the last decades, which is expected to continue. There are additional factors that impede the transition to more sustainable consumption, such as deficient policies and behavioural biases, among others. These obstacles, as well as the means to overcome them, will be discussed in Section 3 of this paper.

2. Factors promoting sustainable consumption

2.1. Change in consumer awareness and attitude towards the environment and sustainable consumption

Environmental and social issues are a growing concern among consumers. Several studies and surveys show an increase in environmental awareness among consumers in several countries and their willingness to act in favour of the environment. This changing awareness and attitude towards consumption is found and is rising in both high- and low-income countries. Although these changes have a positive impact, they do not always translate into more sustainable consumption.

2.1.1 Change in environmental awareness

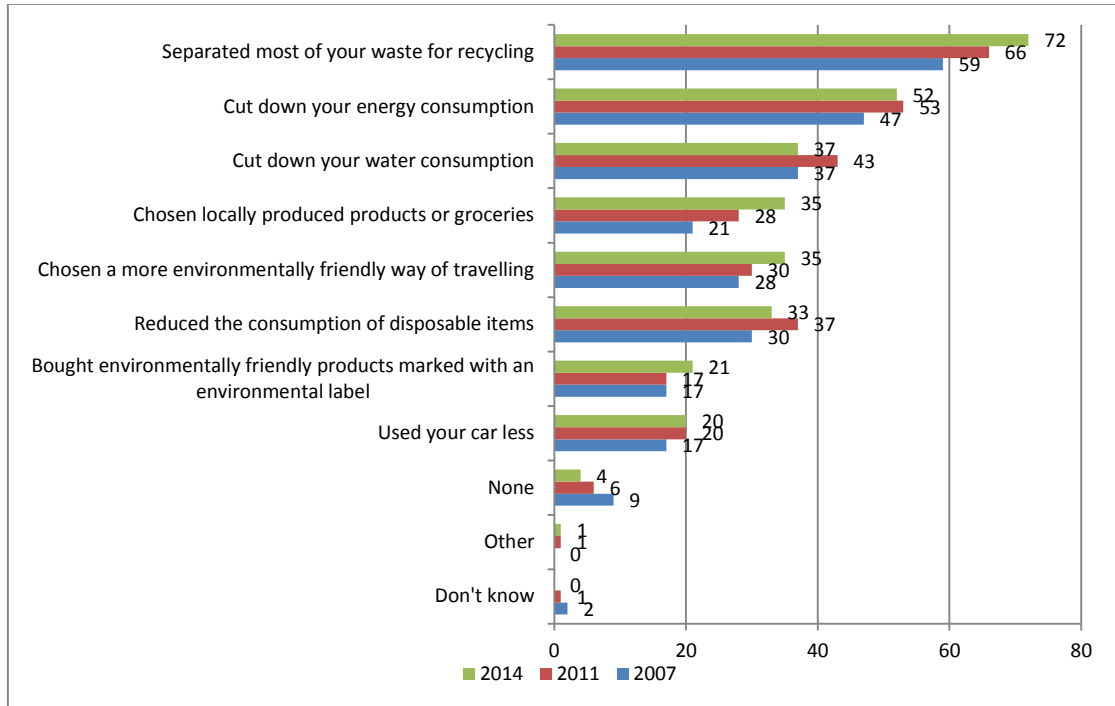
According to the most recent special Eurobarometer on the “attitudes of European citizens towards the environment” (European Commission, 2014), 95 per cent of Europeans surveyed responded that protecting the environment is important for them personally, which is very similar to the figures of previous special Eurobarometers (waves of 2007 and 2011), with 53 per cent considering it to be very important. There is a strong and continuous consensus on the relevance of environmental protection in the European Union. Moreover, the World Value Survey data seem to support that general concern for the environment is evenly distributed worldwide, with a similar percentage of people in developed, transitioning and developing countries stating that global warming is a serious problem (62 per cent, 60 per cent and 61 per cent, respectively), while there is some divergence in the answers to the question whether environmental protection should be prioritized over economic growth (64 per cent, 53 per cent and 48 per cent) (Running, 2012). There are significant differences within each of these groups that do not seem to follow any clear income-motivated pattern.

In another study which conducted a survey of 6,224 consumers in 6 countries including developed and emerging economies (Germany, United Kingdom, United States, Brazil, China and India), two-thirds of respondents agreed that “as a society, we need to consume a lot less to improve the environment for future generations”, while a similar percentage agreed that they feel “a sense of responsibility to purchase products that are good for the environment and society” (BBMG et al., 2012, p. 6). Moreover, the study showed higher values for emerging economies than for developed ones (76 per cent vs. 55 per cent for the first question, and 82 per cent vs. 49 per cent for the second one). Again, these figures seem to refute the hypothesis that people in wealthier countries tend to care more about the environment. Concerns about the environment have spread across the world, and are similar among people living in low-income as well as in high-income countries, and may even be stronger for people in low-income developing countries for certain issues, as their health and livelihoods are more directly affected by the deterioration of their natural environment (see Box 1).

2.1.2 Change in behaviour and consumption patterns

As regards consumer behaviour, the most recent Eurobarometer indicates that most people (85 per cent) agree that they can play a role in protecting the environment. The majority of respondents declared that they have undertaken certain pro-environmental action, such as separating most of their waste for recycling (72 per cent), cutting down on energy consumption (52 per cent), reducing water consumption (37 per cent), choosing more environmentally friendly ways of traveling (35 per cent), purchasing local products (35 per cent), reduced waste (33 per cent), buying environmentally friendly products marked with an environmental label (21 per cent) or using their car less (20 per cent). Only 4 per cent responded that they did not take any environmental action (European Commission, 2014). Moreover, a positive trend in the attitude of European citizens towards the environment has developed since 2007, despite the economic crisis experienced during that period (see Figure 1).

Figure 1 Pro-environmental actions of European citizens in the month previous to the Eurobarometer survey (percent of surveyed people)



Note: Multiple answers possible, data for EU-27 in 2007 and 2011 and for EU-28 in 2014.

Source: Author's elaboration based on Eurobarometers (waves of 2007, 2011 and 2014) (European Commission, 2008, 2011, and 2014).

According to the survey of BBMG et al. (2012), 51 per cent of respondents in emerging economies covered by this study (Brazil, China and India) declared they had purchased a product because of its environmental or social benefits, while in the developed economies included here (Germany, United Kingdom and the United States), this figure was only 22 per cent. The survey moreover shows that consumers in emerging economies have a greater propensity to change their habits towards sustainable consumption and are more likely to adopt sustainable behaviours than consumers in developed countries: emerging countries' respondents scored better in most pro-environmental attitudes and behaviours included in the survey (BBMG et al., 2012). Consumers in emerging economies can therefore strongly influence the shift towards sustainable consumption, which opens the opportunity to leapfrog challenges and barriers that developed countries have experienced (BBMG et al., 2012), avoiding the replication of their unsustainable consumption patterns. The changes in consumption attitudes are especially relevant for millennial consumers (WEF, 2013, 2014), though the majority tend to prefer companies to lead the change by improving their products before having to change their habits (WEF, 2014).

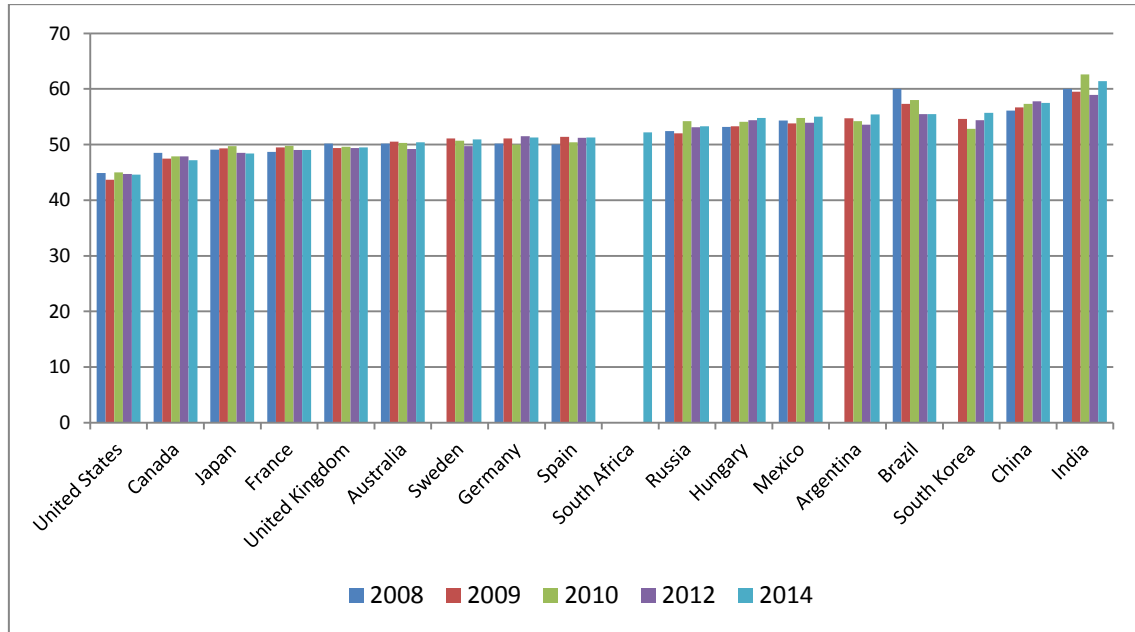
Focusing on the willingness to pay for “green goods”, the Eurobarometer shows that 75 per cent of respondents expressed that they would be willing to buy environmentally friendly products, even if they were priced slightly higher (28 per cent fully agreed with this statement), a percentage that has increased from previous waves of the barometer (European Commission, 2014). The survey of BBMG et al. (2012) indicated that 60 per cent of respondents in developing countries would be “willing to pay more for products with social and environmental benefits”, while the figure was only 26 per cent in the three developed countries covered by the survey. Other studies, such as GMA and Deloitte (2009), show similar results, with 95 per cent of respondents stating that they would buy green, 75 per cent know what a green product is, 63 per cent look for and 47 per cent have seen green products, but only 22 per cent had actually bought green products. In any case, the figures on the willingness to act in favour of the environment when purchasing goods contrast sharply with those on the actual purchasing behaviour of consumers.

Consumers are more actively searching for and demanding information about the environmental and health impacts associated with the goods they consume. In addition, awareness of the importance of sustainable consumption has not decreased despite the economic crisis, but public attitudes and demand for sustainable products prevailed during the recession (WEF, 2010). Rising awareness of the environmental impacts of our everyday actions and the increase in consumers’ positive attitudes towards sustainable consumption across the world are very positive factors that may help promote the shift to more sustainable patterns of consumption. One example of how this changing attitude has led to modifications in consumption is the growing demand for labelled products and, in general, higher interest in the social and environmental impacts caused by the production of goods. In addition to an increased consumption of green goods, other actions contributing to the reduction of the overall impact of consumption mentioned in different surveys include an increase in recycling, greater emphasis on re-using an item instead of replacing it, and an increase in sharing and borrowing to reduce the need to buy new products, among other changes in consumption patterns (European Commission 2014; BBMG et al., 2012).

Other indicators showing consumers’ increasing concern about the environment in different countries is the Greendex index developed by National Geographic and GlobeScan (2014). Greendex is a sustainable consumption index of actual consumer behaviour and material lifestyles based on a study of 18,000 consumers in 18 countries (17 in previous studies carried out in 2009, 2010 and 2012, and 14 in 2008). The study gathers information on energy use and

conservation, food sources, transportation choices, use of green versus conventional products, knowledge of environmental issues and attitudes towards the environment and sustainability.

Figure 2 Greendex sustainable consumption index



Source: National Geographic and GlobeScan (2014).

According to the 2014 Greendex, India, China, Brazil and the Republic of Korea were the countries whose consumers scored better than those of other countries. Brazilian consumers scored better in the first Greendex study in 2008, i.e. a clear deterioration is visible in this case. Consumers in the United States, who have a very large environmental footprint, ranked least sustainable consumers of all countries surveyed across all years. Differences do, however, exist in the various categories surveyed for the index. In the last Greendex, a clear improvement from previous studies with reference to food habits is evident in 11 of the surveyed countries, with a higher number of people purchasing local and organic foods. The Greendex shows that consumers in wealthy countries have a relatively greater impact on the environment than those living in poorer countries and thus have more scope to change their habits (National Geographic and GlobeScan, 2014).

Despite changes in consumer attitudes towards the environmental and social impacts of consumption and their willingness to act accordingly, this is still a far cry from a change in consumption patterns that might lead to sustainable consumption. While people are becoming more aware of sustainable behaviour, consumer behaviour is still primarily dictated by price and quality (GMA and Deloitte, 2009), i.e. there is a clear divergence between awareness and action (WEF, 2010). There are, moreover, a series of barriers to behavioural change, which impede the

transition towards more sustainable patterns of consumption. We will consider these further in Section 3.

Box 1 Do increasing incomes facilitate sustainable consumption?

There are conflicting views on the general relationship between income, demand for environmental quality and environmental pressures (Roca, 2003). There is some empirical evidence suggesting that an increase in income per capita levels has in some cases been followed by a decrease in some environmental pressures, which are attributable to technological improvements and changes in the economic structure (Grossman and Krueger, 1991). Some theoretical models suggest that changes in preferences for environmental quality as income rises could lead to an inverted-U relationship between income per capita and pollution (Selden and Song, 1995). However, it has not been verified that a change in preferences as income rises could be the explanation for the cases of delinking observed between environmental pressures and income (Roca, 2003). Environmental quality (or abatement policy) is not like a private good that can be bought in the market; it is a public good that depends on political decisions (Roca et al., 2001; Roca and Padilla, 2003). Moreover, a general hypothesis assuming that environmental quality is a luxury good disregards the fact that poor populations are those most directly affected by the quality of environmental resources. In fact, there seems to not be a clear divide on environmental concerns between high- and low-income countries. According to the surveys mentioned above, environmental awareness and the willingness to act in favour of the environment is not lower in emerging economies than in developed ones. Furthermore, empirical evidence does not support the recurrent assertion that environmental quality is a luxury good, the demand of which increases proportionally more than income. Kristom and Riera (1997) estimate that the income elasticity of environmental improvements is less than one for a number of European datasets. Similarly, further studies estimating the income elasticity of the willingness to pay for environmental improvements find this elasticity to also be consistently less than one (Ready et al., 2002; Høkbj and Söderqvist, 2003; Jacobsen and Hanley, 2009; Czajkowski and Ščasný, 2010; Barbier et al., 2017), hence, the empirical evidence seems to reject the argument that environmental quality is a luxury good. The higher price for specific green products may, of course, impede their expansion in low-income countries. Demand for more expensive new green manufactured products and services, such as electric cars, is clearly more important among wealthier individuals and the market for these may tend to widen with a rise in income, together with environmental awareness. Despite the greater relevance in the consumption of certain expensive green niche products, however, the overall environmental impact associated with the levels and patterns of consumption in high-income countries is clearly higher than that in low-income countries (even though they may in some cases have less impact per unit of consumption). Indicators of sustainable consumption, such as the Greendex mentioned above also reveal this.

2.2 Change in companies' attitude towards the environment and in their contributions to sustainable consumption

Companies develop and market the products we consume and thus contribute to the shaping of demand and its associated environmental impacts. Companies promote their products and thereby encourage consumerism. They did not traditionally take the lead on environmental awareness in the past, but usually react to shifting market conditions and tend to adopt mitigation measures in response to regulation and pursue resource efficiency motivated by market forces (Michaelis, 2003). However, over the last decades, the role of sustainability in business has gradually increased and several companies have significantly contributed to the promotion of sustainable consumption. Though companies do not have control over market forces, some, especially very large corporations, can take decisions that contribute to a transition towards sustainable consumption (Michaelis, 2003). There are different reasons why companies change their attitude towards the environment and there are several ways in which they are increasingly contributing to sustainable consumption.

2.2.1 Change in companies' environmental awareness and values

Several companies have incorporated new values, such as environmental concern, into their guiding principles. There is a trend among companies to adapt their values to the changing values of consumers, their customers, investors or governments. In some cases, this has been the result of societal questioning of their behaviour, while in other cases companies intentionally developed a strategy to become leaders in corporate social responsibility (Michaelis, 2003).

Some companies' values have changed as a result of the changing principles of their employees and also seeking the approval of more socially and environmentally concerned communities. Companies have also adapted their guiding principles to more stringent public environmental policies and regulations (or the prospect of such in the near future), modifying their mode of production to limit their environmental impact. Companies have also begun focusing on sustainability because the market for green goods is predicted to increase and companies that move rapidly and take the lead are likely to secure more benefits (WEF, 2009, 2010). Moreover, companies respond to increasing prices (and the scarcity) of raw materials and energy and sustainability has thus become a corporate value because it may reduce the exposure to the risks of the increasing scarcity of resources and the rising and volatile prices for natural resources, and consequently provide stronger resilience against external shocks (WEF, 2010).

Many companies have undertaken efforts to modify their corporate values along with their image (such as e.g. the rebranding of 'British Petroleum' to 'Beyond Petroleum', and adopting a green sunburst logo). Moreover, many companies have found that protecting the environment can improve efficiency, motivate employees and even enrich shareholders (Michaelis, 2003; McKinsey and Company, 2011a).

Even during the recent financial crisis, sustainability concerns remained an important item on companies' agendas. According to a survey of 1,560 business leaders, 60 per cent of respondents stated that their companies had maintained or increased their commitment to sustainability (Berns et al., 2009). The change in principles in parts of the business community is also reflected in the creation of various business organizations with the objective of facilitating the shift of businesses towards more sustainable means of production and consumption. Among these, the World Business Council for Sustainable Development (WBCSD), the World Economic Forum (WEF) or the Consumer Goods Forum (CGF) are worth mentioning. Traditionally, business organizations seeking to promote more sustainable practices in the past, such as the Swedish Natural Step, mostly succeeded with companies that had something to gain from the expansion of green consumer markets (Bradbury, 1998; as cited in Michaelis, 2003). Today, other motivations which have already been mentioned above, such as brand image or public acceptance, are also increasingly influencing businesses' attitudes towards the environment. However, even though environmental protection is increasingly being incorporated into the guiding principles of many leading companies, this is still a far cry from being mainstream among the majority of firms.

2.2.2 Companies' innovation and improvements in eco-efficiency

Innovation is an important driver of sustainable consumption. The traditional business approach to sustainability is through technological improvements leading to a reduced use of resources and of generation of waste per unit of value, thus reducing companies' costs. Considerable progress has been achieved in energy and resource efficiency over the last decades. These improvements often pay for themselves, generating both environmental and economic benefits. Moreover, several businesses are increasingly engaged in developing new and improved products and services as well as business models to deliver maximum value at minimum environmental cost (WBCSD, 2008; WBCSD et al., 2012).

In its report to the Rio Summit of 1992, the World Business Council for Sustainable Development (WBCSD) defined the business concept “eco-efficiency”, with the aim of creating more societal value with less environmental impact. The definition states that “eco-efficiency is achieved by the delivery of competitively priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource use intensity throughout the life cycle to a level at least in line with the Earth’s estimated capacity” (WBCSD, 2008, p. 24). Eco-efficiency allows companies to incorporate environmental awareness into a conventional business model: achieving cost savings, adjusting to regulation and seeking community approbation (Michaelis, 2003).

Innovation measures oriented towards improving eco-efficiency—through changes in technologies or practices—can reduce production costs, and can simultaneously also provide additional value to consumers who assign a positive value to lowering the environmental impact of their consumption (WBCSD, 2008). Eco-efficiency has been improved by companies in a number of ways. One measure, for example, is minimizing packaging and introducing other measures to reduce waste (increasing recycling and reusing), such as the achievements under the banners of 3M “pollution prevention pays” (PPP) and the Dow Chemical Company’s “waste reduction always pays” (WRAPS) (DeSimone et al., 1997; as cited in Michaelis, 2003). Some companies have succeeded in transforming from suppliers of consumer goods to providers of services, renting out equipment (such as Xerox photocopiers) or chemicals (such as the Dow Chemical Company) and thus retaining greater control over their equipment’s use, reuse, recycling and disposal, resulting in significant reductions in environmental impact (Michaelis, 2003). Eco-efficiency gains have also been made by using fuel, water and other materials in manufacturing and distribution more efficiently. Finally, companies have been able to improve eco-efficiency by reducing the fuel used in the transport of resources, products and people including improving logistics, using greener transport or videoconferencing (WBCSD, 2008). A study by ETNO and WWF (2006) concluded that if 20 per cent of business travel in the EU were substituted by virtual meetings, 25 million tons of CO₂ would be avoided annually. One example is the leading Swedish telecom company group, Telia AB, which promoted the use of virtual meetings, with a reduction in the number of air travel by 20 per cent between 1999 and 2000 (Telia, 2001, cited in Arnfalk, 2002)

Innovation is often oriented towards the development of new products and services offering better performance while reducing environmental impacts (WBCSD, 2008), i.e. to provide more efficient and healthier products. This requires analysis of the impacts of products over the entire life cycle (such as energy consumption during use or product disposal). Several firms have

succeeded in providing new higher value, environmentally friendly goods (such as home cleaning products and organic foods) (Michaelis, 2003). One example is the case of Tide Cold Water introduced by Procter & Gamble in 2005, a detergent formulated for cold water conditions, which allows energy savings of around 50 per cent during the washing cycle. Other brands have followed this example and have formulated detergents for cold water conditions, such as Purex by Henkel, Wisk by Sun Products or Biokleen by a company of the same name (Martin and Rosenthal, 2011). However, being green is not enough, and some green products failed to succeed given that they performed worse than existing products or involved higher costs for similar performance (see Section 3 for further details on the barriers to sustainable consumption). Innovation is not only necessary in product design, but new business strategies may also be required in order to succeed and to provide differentiated products that enhance consumer value (and are perceived as such).

Several companies have contributed to eco-efficiency and sustainable consumption through better environmental management of the supply chain. This can be achieved by setting, monitoring and enforcing environmental standards throughout the supply chain (WBCSD, 2008). Companies can significantly contribute to sustainable consumption by changing the incentives they provide to employees and suppliers. They can revise the various supply chain components and make them green: modifying own consumption practices through sustainable procurement and improving office design, the management of resources, transport management, logistics, etc. In several cases, better environmental management of the supply chain can provide significant cost savings while reducing the use of resources and waste. Moreover, incorporating these controls across the entire supply chain influences environmental awareness and may also broaden their employees' consumption patterns (Michaelis, 2003). Collaboration along the value chain facilitates resource and waste-saving innovations. Some improvements in the management of the supply chain are facilitated by new technologies; a trend has emerged in recent years to increase the efficiency of the value chain through data analysis, robotics, sensors and 3D printing (Nayyar, 2016), which has contributed to waste reduction and the achievement of more efficient use of resources. There are a number of examples of leading firms that have promoted sustainable consumption through effective environmental management of the supply chain (e.g. IKEA made considerable efforts in terms of cooperation through the value chain, educated and trained its suppliers and engaged with producers, unions and NGOs; Salzmann et al., 2006).

Concepts related to sustainable production and consumption, such as “circular economy processes”, are gaining recognition in the business communities across the world. Recycling, reusing, reassembling, but also a different conception in the design of goods are gaining ground in several countries and industries, leading to “cradle to cradle” processes as opposed to the previous “cradle to grave” processes in which resources were used and waste was generated without accounting for the natural environment’s limitations. Non-profit organizations, like Cradle to Cradle, provide certification and are helping companies manage resources and address their environmental impact (Nayyar, 2016).

2.2.3 Several companies are increasingly promoting sustainable consumption by influencing consumer purchasing and use behaviour

Businesses have traditionally spent large amounts of money on the marketing and advertising of their products in order to increase their sales, and in doing so, contribute to the promotion of consumerism and unsustainable patterns of consumption. However, in line with the changes in businesses’ values and models mentioned above and in order to take advantage and make gains (either by selling more environmentally friendly goods or by improving brand image) within the context of rising environmental concern among consumers, several businesses have engaged in promoting sustainable consumption by influencing consumer behaviour in different ways.

Firms can furthermore encourage sustainable consumption by influencing purchasing behaviour, promoting demand for sustainable products, by influencing use behaviour and promoting a more sustainable use of the products they sell, including end-of-life treatment (Salzmann et al., 2006). The WBCSD (2008, p. 22) defines “choice influencing” as “the use of marketing communications and awareness-raising campaigns to enable and encourage consumers to choose and use products more efficiently and sustainably”.

In addition to providing sustainable products and services, some businesses have embedded sustainability principles into their business model and have been very active in helping consumers choose and use their goods and services in sustainable ways, in addition to contributing to the promotion of sustainable lifestyles, thereby helping to lessen the overall environmental impact of consumption (WBCSD, 2008). Cultural differences have shown to play a very important role when trying to influence consumer choices. The advertising campaign of Tide Coldwater in the United States, for example, focused on money savings (when using the cold water cycle), while it focused on environmental performance in Europe (Goffman, 2012).

To successfully tackle unsustainable consumption patterns, production must be linked to the way services and products are selected and used. The way certain products are used is as much or even more important for their resulting environmental impact than their method of production. This may be the case in the use of cars, dishwashing detergents, bulbs, electronics or communications, among others (WBCSD, 2008). For example, in the case of vehicles, the distribution of energy consumption and the corresponding CO₂ emissions over the life cycle of an average vehicle was 16 per cent in its production, 3 per cent in the use of parts and 81 per cent in the use of fuel (WWF and SustainAbility, 2007). As for the life cycle of dishwashing detergents, more than 86 per cent of water consumption and 87.5 per cent of energy consumption is generated by the use of the product (WBCSD, 2008). A frequently mentioned example on how a company can promote sustainable use is the case of the Levi Strauss Company which, besides implementing measures to recycle and reduce waste in its production and supply chain, has also undertaken efforts to change customer behaviour. A life cycle assessment determined that most of the water consumption related to one of its most popular jeans occurred when they were being washed at home. Levi Strauss then launched a joint campaign with Procter & Gamble's Tide detergent to increase awareness of the cost savings and the environmental benefits of washing laundry using cold water and only when necessary, with the company pointing out that the best way to preserve the product was to wash them less (Kaye, 2013). Another example was the pledge of the International Association for Soaps, Detergents and Maintenance Products (AISE) to reduce detergent consumption by 10 per cent per capita and/ or energy consumption per wash load by 5 per cent from 1996 to 2001. It launched the "Wash Right Campaign" in 1998 to inform consumers on how to reduce the use of detergent. Within the period 1996–2001, the consumption of detergents was reduced by 8 per cent in Europe (Salzmann et al., 2006).

Not only producers, but retailers as well can promote sustainable consumption by encouraging lower consumption and issuing statements on how to reduce waste, particularly with reference to food waste reduction. For example, major retailers in the UK, including Asda, Sainsbury's, Tesco and Morrisons, signed a voluntary agreement to reduce food and drink waste by 20 per cent by 2025 (The Guardian, 2016). Though discouraging overconsumption may seem at odds with companies' objectives, some companies have grabbed the opportunity to promote empathy with customers and to increase customers' trust in the company. The Positive Change Effie Award created by the World Economic Forum recognizes and rewards brands that promote sustainable consumption in their marketing programmes (WEF, 2014). Promoting sustainable consumption, either by improving information on sustainable choices and discouraging

overconsumption, is often a very effective measure to improve one's reputation and achieve greater engagement with consumers.

2.2.4 More active participation of firms in choice editing in favour of sustainable consumption

Choice editing (or editing out) refers to limiting the scope of consumer choices, removing unnecessarily harmful products and placing sustainable products “on the shelves” in order to mainstream them (Sustainable Development Commission, 2006). Traditionally, choice editing was achieved by applying different environmental policies such as taxes, subsidies and standards, among others, oriented towards removing or disincentivizing the consumption of certain products and encouraging the consumption of others. However, many businesses, including producers and retailers, have assumed an increasingly active role in collaboration with administrations and stakeholders in the removal of unsustainable products and services. Companies can directly remove items from their lists of products if they are identified as having a negative environmental or health impact. In addition, by assessing the impact of a product's entire life cycle, companies can also provide more sustainable products and processes by collaborating with employees, suppliers and retailers along the value chain. Thus, not only products, but unsustainable product components, services, processes and business models as well can be edited out (WBCSD, 2008).

Retailers can require their suppliers to meet environmental criteria if they want their products to be stocked, and can remove products that they, their customers, various organizations or the administration deem to have intolerable social, health or environmental impacts. Editing out unsustainable products helps to directly control the impact of consumption, facilitating the choice of sustainable products. Transparent information on the environmental characteristics of products, such as through the adoption of green labelling controlled by third parties, helps gain consumer trust and encourages the success of the most sustainable products available on the market and the abandonment of products that have a higher environmental impact. The collaboration between producers, retailers, consumers, NGOs and the administration has been growing in the last decades and has been crucial for its relative success (WBCSD et al., 2012). A recent example of retailers removing a product was Carrefour's decision to cease selling Pangas fish in France and Belgium due to the potential environmental impact of its fishing and the lack of health controls in the countries of origin. This decision was later extended to other countries, including Spain—the main European importer of Pangas fish—where there is a growing opposition by parents' associations to its inclusion in school menus, and was later also adopted by other retailers (García, 2017).

2.2.5 Changing role of the influence of some firms on environmental regulation

Businesses traditionally oppose regulations. The measures to mitigate CFCs initially found strong opposition and lobbying by the affected industries. Only when it became clear that cheap technologies were available and that adequate measures to support the affected industries were being taken did their resistance diminish. In far too many cases, however, companies still put up a fight against regulations that affect their short-term net (private) benefits.

This has also been the case for climate change mitigation policies. Lobbying from industries affected by climate policy measures has resulted in limitations to environmental policies such as carbon taxes (Baranzini and Carattini 2014; Rocchi et al., 2014) and to the application of important exemptions to energy-intensive industries, which reduced their environmental effectiveness (Ekins and Speck, 1999). Resource and pollution-intensive industries continue to lobby against certain environmental measures. However, the picture is slowly changing with new rival lobbies forming and confronting each other (Baranzini et al., 2017). Not only do green organizations have a stronger lobbying capacity, several companies seem to have recently changed their attitude in favour of certain environmental measures, such as carbon pricing (Baranzini et al., 2017). 150 companies reported to the Carbon Disclosure Project (CDP, 2014) being using internal carbon pricing as a tool to reduce their CO₂ emissions. Moreover, a survey among executives of large companies revealed a fair amount of support for carbon pricing, with nearly half of the respondents in favour of it (EY, 2015). The reason may be that an important share of the executives expected some form of implementation of carbon pricing and were prepared for this change, which facilitates its implementation (Baranzini et al., 2017). If firms expect that a more stringent environmental policy will be applied in any case, their best option is to accept and not be laggards in the adoption of change. Moreover, it is prudent for firms to lobby for instruments that increase flexibility and cost less, as is the case for taxes (or other economic incentives). This might explain the abovementioned increasing acceptance of carbon pricing, given its advantages with respect to more restrictive and expensive alternatives. As sustainability principles are incorporated into regulation, firms have more to gain by actively participating in its design (WEF, 2010).

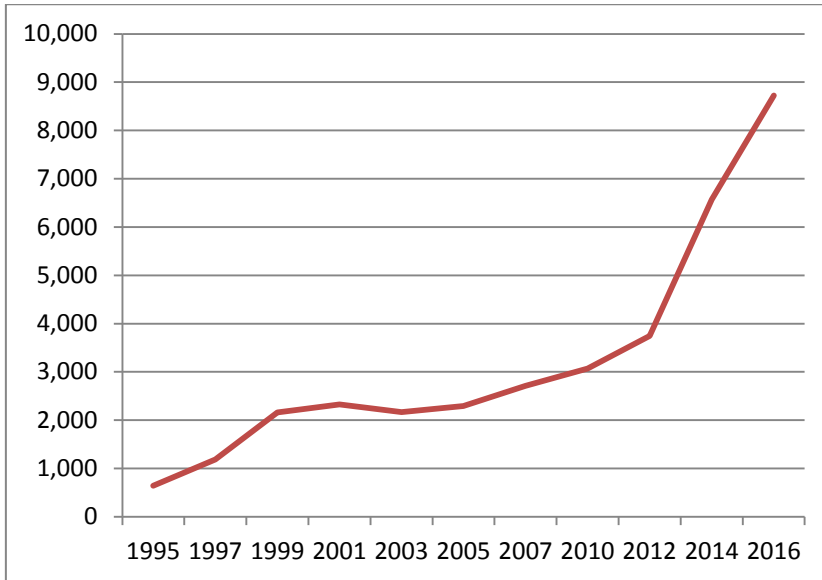
In some cases, firms have begun lobbying for clear and fair regulations, taking a position on leading environmental improvements and promoting sustainable consumption. These firms have much to benefit from legislation that reduces the capacity of free-riders from gaining a competitive advantage by harming the environment (Goffman, 2012).

2.2.6 Ethical finance and sustainability investments

In line with changes in government, consumer and business attitudes, sustainability criteria are increasingly becoming the hallmark of investment patterns as well (WEF, 2010), and a substantial rise in sustainable and socially responsible investments is evident. Ethical funds and investment policies have gained relevance in recent decades, encouraging businesses to report and improve their social and environmental performance (Michaelis, 2003). This involves a source of funding for sustainability projects and for the establishment of sustainable businesses. It may thus be an additional driver for sustainable production and consumption. Such sustainability funding may become enablers of sustainable investments resulting in significant changes in firms' consumption and production practices in order to qualify for such funding. Publicly controlled funds, such as pension funds, often apply some ethical criteria or are subject to civil society pressure to adopt ethical criteria to reinforce ethical behaviour of corporations. The relevance of socially responsible mutual funds has also increased.

According to U.S. SIF Foundation (2016) data, an increasing trend in investments based on environmental, social and governance criteria is evident in the United States. While in 1995, the first year of the U.S. SIF Foundation's reporting, US\$ 639 billion of a total of US\$ 7 trillion (U.S. SIF, 2010) was reserved for some form of sustainable investment. In 2016, approximately one-fifth of investment assets under professional management in the United States—US\$ 8.72 trillion of a total of US\$ 40.3 trillion—was reserved for some form of sustainable investment. That is a 1265 per cent increase over the period 1995–2016. This growth in recent years is remarkable, and the figure even increased in the years of the financial crisis. As for the last two years of the period, while professionally managed assets rose by 9.5 per cent, the increase in sustainable and responsible investment amounted to 33 per cent. Figure 3 illustrates the trend of investments built on socially responsible investment strategies in the U.S.

Figure 3 Sustainable and responsible investment in the United States 1995–2016

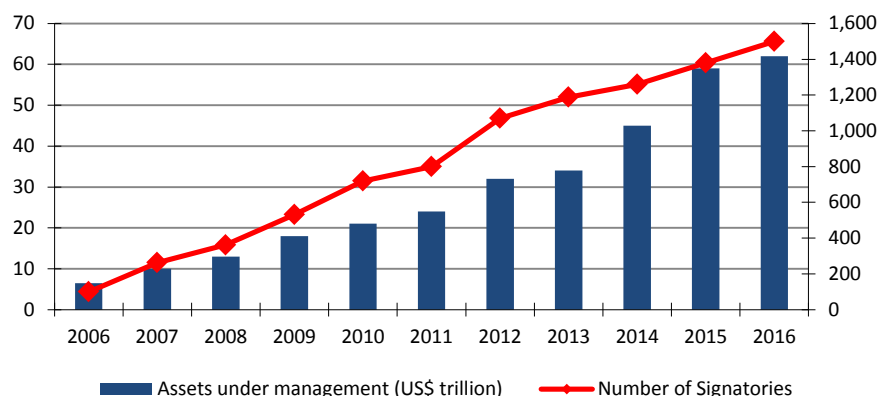


Source: U.S. SIF Foundation (2016).

There is also growing institutional support to facilitate both the control and monitoring of investments and the transition to sustainable practices. For example, the non-profit organization Global Impact Investing Network shares information and consults governments on producing regulations that facilitate sustainable investment (WEF, 2010). The Principles for Responsible Investment initiative established in 2005 by the UNEP Finance Initiative and UN Global Compact provide a framework to improve the analysis of ethical investment and helps companies improve their practices. On 6 February 2017, there were 1,669 signatories from across the world, including 340 asset owners, 1,111 investment managers and 218 service providers (PRI, 2017). The base of PRI signatories represents US\$ 60 trillion in assets under their management as of April 2016, over half of the world’s institutional assets (Figure 4).

As regards the performance of sustainable and responsible investment, empirical evidence suggests that there is no trade-off between environmental, social and governance (ESG) criteria and corporate financial performance (CFP). For example, the meta-analysis carried out by Friede et al. (2015), who present the most comprehensive review of the research on this issue, found that “roughly 90% of studies find a nonnegative ESG–CFP relation. More importantly, the large majority of studies reports positive findings” (p. 2010).

Figure 4 Number of PRI signatories and assets under their management



Note: Annual data correspond to the month of April.
Source: PRI (2017).

2.3 Environmental policies promoting sustainable production and consumption

In line with changes in societal values, governments are increasingly questioning the suitability of production throughput (measured as GDP or other national accounting measures) as the paramount measure of societal progress and are moving towards a battery of indicators, including sustainability measures. This trend to change priorities has been accompanied by an increasing adoption of policies oriented towards promoting sustainable development. Several policies have been implemented to mitigate a number of environmental pressures and to adapt to impacts at the local, national and global level. At the global level, sustainability is included in agreements on climate change and biodiversity. In addition, sustainable consumption has been identified by governments and international institutions as being key for the achievement of sustainable development.

A crucial enabler of the transition towards sustainable consumption is a well-defined policy framework at the national, regional and global level. Several policy measures have been implemented to encourage the reduction of the environmental impacts of production and consumption, leading to cleaner manufactured goods (with less impact per unit of product) and to more sustainable lifestyles. Among these, we can highlight environmental standards, mandatory labels, environmental taxes, subsidies and other measures that—in different policy mixes—facilitate the transition towards sustainable consumption in many countries. The development of international policy frameworks and cooperation to promote sustainable consumption has also played an important role.

2.3.1 *Environmental standards and the ban of dirty products*

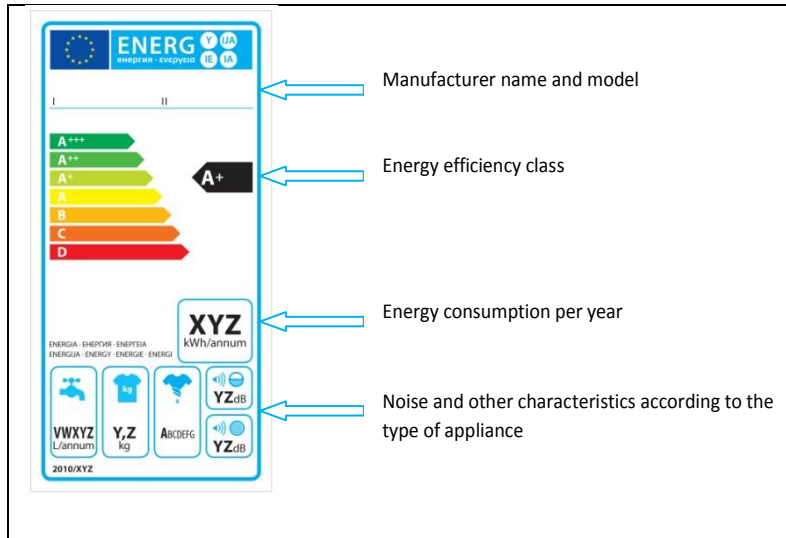
Many governments edit out unsustainable products and promote sustainable ones by imposing environmental standards. Such standards are applied widely to promote energy efficiency and reduce energy use, such as in the case of household appliances (refrigerators, washing machines, air conditioning, etc.). This is the case in the European Union's Directive (2009/125/EC), which establishes a framework for ecodesign requirements of energy-related products (European Council, 2009), but also of similar measures applied across the world. Several governments have also phased out or initiated programmes to phase out traditional incandescent light bulbs for general lighting in favour of more efficient alternatives. Such programmes have been applied in countries such as Argentina, Australia, Brazil, Canada, Malaysia, Mexico, the European Union, the United States and Venezuela, among others. More recently, since September 2016, the European Union has banned halogen spotlights, while halogen bulbs will be completely phased out by 2018 (the energy consumption of these bulbs is about five times that of their LED equivalent).

These measures are very effective in promoting sustainable consumption, especially when affordable cleaner alternatives are actually available. One negative aspect of such measures is their coercive character and that they can end up being more costly than market incentives (such as taxes), especially when there are no easy substitutes for dirty goods.

2.3.2 *Mandatory labels (and surveillance of voluntary labelling and green advertising)*

Another way several countries have promoted the availability of more sustainable products in addition to better information is through mandatory labels. These have become very common for specifying the energy efficiency of household appliances. In this case, the promotion of more efficient consumption does not include a higher price for a given product. Labels simply help consumers choose energy efficient products. In the case of the European Union, the requirements or product groups are created under the corresponding energy labelling directive (Directive 2010/30/EU, European Council, 2010), which replaced the previous directive on the issue (Directive 92/75/EC, European Council, 1992). The establishment of these schemes is usually accompanied by educational and information campaigns to promote sustainable consumption. Several other countries have also introduced similar energy-efficiency labelling schemes, including Australia, Canada, Switzerland and the United States, which, according to the existing evidence, have proven effective in encouraging the development and sale of energy efficient products, as well as improving the effectiveness of other instruments such as procurement, financial incentives, information or R&D (IEA, 2000).

Figure 5 Energy labelling in the EU



Source: Author's elaboration.

Labels are also often required for products to adequately inform consumers whether and how the product (or its different parts) can be recycled, and to promote consumers' recycling behaviour. Other mandatory labels that are increasingly being adopted across the world require the reporting of nutritional information (for food products), indications of noxious health effects (cigarettes), or the presence of genetically modified content. The authorities in many cases also issue labelling rules for organic food and other goods that claim environmental, health or social benefits.

Voluntary labelling has also spread in the last two decades. Such labels are particularly useful when they provide transparency and express complex information in a simple way, thereby enabling informed consumer choices (OECD, 2008). Though there are companies whose development and experience allows them to provide their own labels, labels are usually more reliable when a trusted third party, such as the government or a reputed non-profit organization, verifies the company's environmental and social claims. Labels can refer to a series of environmental and social problems or to specific impacts. The proliferation of different types of labels may also be deemed problematic for consumers who have limited capacity and time to process and verify all the information. Some governments have developed their own labelling systems and have elaborated appropriate legislation to avoid bad practices, simplify the information provided and avoid confusion and mistrust by consumers.

Several firms promote their goods by advertising their products' sustainability. Governments protect consumer interest with the help of regulations to ensure truth in advertising. Such regulations are usually found in trade legislation and controlled by consumer protection

agencies which have to assess the company's claims of environmental (and other) attributes of their products and services (OECD, 2008). Governments in several countries have developed new legislation and increased their control to prevent false environmental marketing claims. Several governments are playing an increasingly active role in preventing misinformation campaigns that can generate mistrust of consumers towards environmentally friendly goods.

2.3.3 Information campaigns and education

Many countries have put communications campaigns into place to raise environmental awareness. They are usually directed at promoting more sustainable consumption lifestyles, such as reducing waste and increasing recycling. Some campaigns, for example, have specifically focused on the problem of climate change and inform how personal emissions can be reduced through changes in lifestyle, or on the reduction of water use, informing on ways to save water at home.

Education is a fundamental instrument for providing citizens with the appropriate skills and knowledge to shift towards sustainable consumption. Several countries have introduced the issues of sustainability and sustainable consumption into school curricula (some examples include Austria, Ireland and the Republic of Korea) (OECD, 2008). Many have also introduced education schemes in their programmes on sustainable consumption (such as Czechia, Finland, the United Kingdom and Sweden), while others have promoted the development of "sustainable schools" (including Italy and the United Kingdom), sponsored environmental education (such as Germany) or introduced sustainable consumption as part of more general consumer education (such as Sweden, Japan, Portugal and the Slovak Republic) (OECD, 2008). To become a society of sustainable consumers, a majority must internalize the consequences of their behaviour and act accordingly to mainstream sustainable consumption. Recent empirical evidence indicates that consumers' intrinsic motivation, which is formed with environmental education, also improves the effectiveness of external conditions such as monetary incentives and green infrastructure (Silvi and Padilla, 2017). Moreover, education not only helps reinforce pro-environment behaviours, it also leads to broader acceptance of environmental policies.

2.3.4 Environmental taxation, charges and tradable permits

Pricing instruments are increasingly being applied in several countries. These tools have a range of desirable properties with respect to other instruments (see Baranzini et al., 2017, on the case of carbon pricing), which explain their increasing acceptance and application. Both taxes and tradable permits translate into an increase in the relative price of polluting products and a corresponding change in consumer behaviour, if the change in relative price is high enough and

alternative cleaner products are available and affordable. If the taxation on products has a good design, the impact on the different prices will be proportional to the environmental impact of the products' production and consumption. Another advantage of pricing is that the banning of items can be avoided, resulting in the polluter and consumer making free choices, but under different conditions. The best known advantage of pricing is that it is more cost-effective than other alternatives; as is the case with taxes (or permits), pollution reduction occurs when it is cheaper, since the marginal costs of mitigation of different companies tend to match the tax (or permit price). Moreover, in several cases such as in carbon mitigation, taxes can achieve far more effectiveness (at a reasonable cost) than alternative policies, such as standards (Baranzini et al., 2017).

Taxes are increasingly being applied by governments to a wide variety of issues, including fuel, electricity, CO₂ (e.g. in many European countries and Japan), other atmospheric pollutions (e.g. NO_x and SO₂), vehicles (according to their energy efficiency), water use, household waste, batteries and plastic bags, among others (see the total revenues from environmentally-related taxes in Table 1). Tradable permit systems have also been used to mitigate CO₂ emissions (such as in the case of the European Union and in some states of the United States like California) and other gases (such as SO₂ in the United States). Some big cities have successfully imposed congestion charges to reduce private transport and pollution in cities (e.g. London or Stockholm). Several countries also have deposit refund schemes, especially for beverage containers, an economic incentive that can be very effective for reducing waste disposal. Empirical evidence supports the effectiveness of environmental taxation and indicates that it may also produce a double dividend helping the environment without hurting the economy (Baranzini et al., 2000; Bosquet, 2000). Some studies emphasize the effectiveness of environmentally related taxes. For example, Deyle and Bretschneider (1995) found that higher taxes on waste reduce the amount of waste sent to landfills more than other types of waste management. Convery et al. (2007) showed the effectiveness of tax on plastic bags in Ireland, the use of which dropped by more than 90 per cent. Lin and Li (2011) analysed the effectiveness of CO₂ taxation in some of the countries that were first to apply it using a difference-in-difference approach. They found a significant impact of carbon taxation on the reduction of per capita emissions in the case of Finland. In Denmark, Sweden and the Netherlands, however, the results revealed an expected negative sign, albeit not significant, with exemptions for energy intensive industries in these countries weakening the mitigation effects of the tax. One exception is Norway, for which the coefficient was not significant but positive; in this case, the carbon tax was not able to curb emissions due to the rapid growth of energy products exports.

While a trend to increase the relevance of economic incentives in environmental policy is evident, advancements achieved across the world are uneven. In several countries, the only relevant environmental pricing policy is taxation on transport fuel (and for revenue-raising objectives only). There is still much to be done to achieve adequate pricing of resources and waste management—considering their environmental consequences—that gives the consumers proper signals to act accordingly.

Table 1 Revenues from environmentally related taxes 2000–2014, % of GDP

| COUNTRY | 2000 | 2014 | COUNTRY | 2000 | 2014 |
|------------------------|-------------|-------------|---------------------------|-------------|-------------|
| Denmark | 4.98 | 4.11 | Poland | 1.96 | 1.93 |
| Netherlands | 3.55 | 1.19 | Switzerland | 1.89 | 1.77 |
| Finland | 3.1 | 2.88 | Honduras | 1.84 | 2.17 |
| Slovenia | 3.04 | 3.86 | OECD | 1.83 | 1.56 |
| Iceland | 3 | 2 | South Africa | 1.8 | 2.29 |
| Hungary | 2.96 | 2.59 | Japan | 1.73 | 1.5 |
| Austria | 2.93 | 2.89 | Tunisia | 1.72 | 1.15 |
| Italy | 2.89 | 3.85 | New Zealand | 1.67 | 1.35 |
| Norway | 2.84 | 2.12 | Rwanda | 1.63 | 1.19 |
| United Kingdom | 2.84 | 2.31 | Estonia | 1.59 | 2.56 |
| Turkey | 2.77 | 3.83 | Chile | 1.57 | 1.21 |
| Ireland | 2.75 | 2.23 | Argentina | 1.56 | 1.3 |
| Sweden | 2.67 | 2.21 | Canada | 1.34 | 1.15 |
| Israel | 2.65 | 2.97 | Mexico | 1.31 | 0.06 |
| Rep. of Korea | 2.65 | 2.25 | Senegal | 1.29 | 1.63 |
| Luxembourg | 2.64 | 2 | Peru | 1.25 | 0.45 |
| Uruguay | 2.64 | 1.69 | Dominican Republic | 1.09 | 2.02 |
| Portugal | 2.61 | 2.2 | Guatemala | 1.05 | 0.83 |
| Belgium | 2.48 | 2.02 | United States | 0.96 | 0.72 |
| Czech Republic | 2.44 | 2.65 | Philippines | 0.9 | 0.21 |
| Australia | 2.41 | 1.91 | Cameroon | 0.88 | 0.81 |
| Germany | 2.29 | 1.95 | Colombia | 0.87 | 0.4 |
| Slovak Republic | 2.26 | 1.73 | Brazil | 0.61 | 0.6 |
| Greece | 2.25 | 2.79 | Malaysia | 0.54 | 0.24 |
| France | 2.24 | 1.97 | Costa Rica | 0.42 | 2.21 |
| Mauritius | 2.2 | 2.68 | China | 0.38 | 1.33 |
| Spain | 2.19 | 1.89 | India | 0.3 | 0.95 |
| Nicaragua | 2.1 | 1.28 | Côte d'Ivoire | 0.06 | 0.09 |

Source: Author's elaboration based on the OECD database Policy Instruments for the Environment (OECD, 2016).

2.3.5 Subsidies

Other economic incentives increasingly being used by governments to promote sustainable consumption are subsidies and incentives to encourage people to consume more sustainably. As occur with taxes, these incentives modify relative prices and thus change consumers' decisions towards sustainable choices, which become less expensive. In order to be effective, these have to sufficiently reduce the difference between the unsustainable and the sustainable alternative. Several countries have imposed schemes promoting the purchase of more energy-efficient vehicles (e.g. in France, Japan, Denmark, Norway, the Netherlands, Sweden, the United Kingdom and Canada) (OECD, 2008). Other ways of promoting sustainable transport is the provision of bicycles to commuters in big cities. Subsidies (and fiscal incentives) have also been applied to increase home energy efficiency.

Sustainable goods are closely related to innovation, where knowledge externalities result in underinvestment. Hence, policies promoting innovation are justified. While proper pricing (through taxes, e.g.) may account for the environmental degradation associated with the production and consumption of different goods, and indeed facilitates a better orientation of investments towards cleaner technologies, it may be more appropriate to promote the positive externalities associated with innovation with innovation subsidies that reward them. Innovation subsidies are widely applied in many countries and are in some cases even linked to green industrial policy strategies.

2.3.6 Increase in green public procurement

In many countries, the public sector is the largest consumer of goods and services. In the case of the EU, public expenditure on works, goods and services represents around 13 per cent of GDP, accounting for roughly € 1.8 trillion annually (excluding expending by utility companies) (European Commission, 2016a). Given the amount of their purchases, governments have a strong capacity to influence markets. By choosing works, goods and services with reduced environmental impacts, governments can make an important contribution towards local, national and international sustainability goals (European Commission, 2016b). Sustainability criteria are increasingly being taken into consideration in the allocation of government contracts and in the purchasing rules of many governments (WEF, 2010). Governments are increasingly taking sustainability criteria into account with regard to investments. The fiscal stimulus packages launched during the recent financial crisis assigned a relevant role to green growth (this was the case in e.g., the United States, Europe, Brazil, India and China) (WEF, 2010). The coverage and extent of green procurement varies considerably among countries. One of the Tasks Forces of the Marrakech Process on Sustainable Consumption was on Sustainable Public

Procurement, which developed a programme to provide information and capacity-building activities on sustainable purchases (UNEP, 2011).

2.3.7 International institutional framework promoting sustainable consumption

Sustainable consumption and production have been recognized by international institutions as key objectives for achieving sustainable development. The text of Agenda 21, adopted at the Earth Summit of Rio in 1992, states that “the major cause of the continued deterioration of the global environment are the unsustainable patterns of consumption and production” (UNCED, 1992, p. 18). The document planned actions “focusing on unsustainable patterns of production and consumption” and “developing national policies and strategies to encourage changes in unsustainable consumption patterns” (UNCED, 1992, p. 18). The document furthermore calls for encouraging more sustainable lifestyles based on new definitions of wealth and prosperity.

The World Summit on Sustainable Development in Johannesburg in 2002 emphasized “promoting sustainable patterns of consumption and production” as an overarching objective of sustainable development (UN, 2002, p. 2). The Johannesburg Plan on Implementation sought to develop a 10-year framework programme to accelerate “delinking economic growth and environmental degradation”, which led to the Marrakech Process on Sustainable Consumption and Production (UNEP, 2011, p. 7). This Process was designed to make available framework of programmes in support of regional and national measures to accelerate change towards sustainable consumption and production. It identified regional needs and priorities, supported the implementation of demonstration projects and the elaboration of sustainable consumption national action plans and provided policy recommendations on sustainable procurement, tourism, buildings and construction, products, education and lifestyle, among others (UNEP, 2011). The Rio+20 Summit (UN, 2012a) included the adoption of the “10 Year Framework of Programmes on Sustainable Consumption and Production”, built upon the experiences of the Marrakech Process. This framework provides a tool to improve international cooperation to promote the transition towards sustainable consumption in both developed and developing countries. The framework not only involves governments and UN agencies, but also the private sector, civil society, researchers, etc. The framework’s objectives include: supporting regional and national policies to accelerate the shift towards sustainable consumption and production; contributing to resource efficiency; mainstreaming sustainable consumption and production into sustainable development policies; supporting capacity building and access to financial and technical assistance of developing countries; and enabling stakeholders to share knowledge and information (UN, 2012b). This international framework, which supports the shift towards sustainable consumption policies and initiatives, is of particular relevance for low-income

countries, which often lack the capacity, financial resources and institutional quality to put the appropriate policies into place.

3 Barriers to sustainable consumption

Despite the increasing environmental awareness of consumers, governments and companies, several factors limit the transition to sustainable consumption and explain why we are still far from achieving this goal.

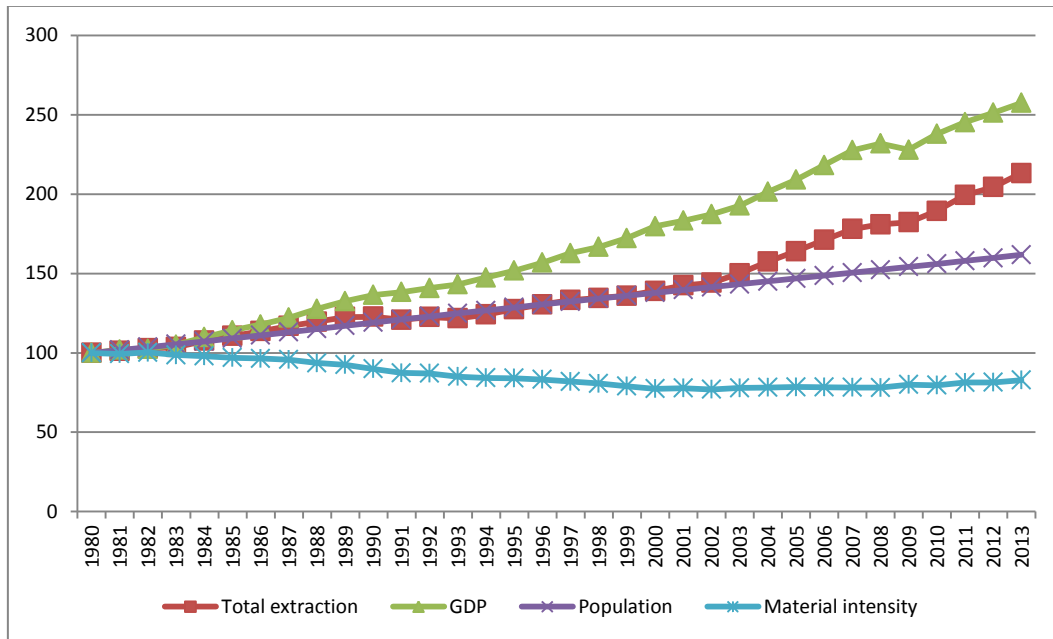
3.1 Consumerism and the scale effect

Even though production processes have become cleaner and greener in many countries, and demand for sustainable products has been increasing, global consumption levels have increased significantly, especially in emerging economies, which will hamper the reduction in the absolute environmental impact of consumption in future decades.

The overall trends of environmental efficiency of production and of environmental pressures can be determined by evaluating the changes in an economy's material flows (this, of course, is just an environmental indicator that can be complemented with other measures of environmental pressure). Material intensity has decreased at the world level (see Figure 6), a result driven by the decrease in material intensity in high-income regions and in Asia, though the trend in Asia has changed in the last years of the study period. The overall trend in materials extraction, however, indicates that this greater efficiency has not interrupted the continuous increase in total resource extraction, which has been driven by a significant rise in the levels of overall consumption of goods and services.

Other ecological indicators paint a similar picture. The measurement of the ecological footprint shows that since the early 1970s, world population has been consuming more environmental resources and generating more waste than nature can regenerate due to overfishing, deforestation and the combustion of fossil fuels (Global Footprint Network, 2017). Current consumption patterns require the equivalent of 1.6 Earths to provide the resources we consume and to absorb our waste; moreover, over 80 per cent of the world's population live in countries that consume resources beyond their ecosystem's capacity to renew them (Global Footprint Network, 2017).

Figure 6 Trends in global resource extraction, GDP and material intensity 1980–2013 (index: 1980=100)



Source: Author’s elaboration based on the Global Material Flow database (WU, 2015) and World Development Indicators (World Bank, 2016).

Hence, although cleaner production processes—which reduce resource and waste intensity of production and consumption—play an important role, it seems clear that in order to achieve an overall level of consumption that can be maintained within environmental limits, profound changes in lifestyles need to be realized. It does not seem possible that a permanent increase in the throughput of resources consumed in developed countries can be maintained, and resource consumption and waste levels should thus decline. In the case of developing countries, however, which are expected to experience a greater increase in consumption levels in the near future, consumption patterns should not follow the same pattern as in developed countries and should skip the phase of high-resource and high-waste goods and services in order to avoid greater environmental impacts, but also to avoid lock-in into unsustainable consumption and thus higher transaction costs when transitioning towards sustainable consumption (Padilla, 2017).

3.2 Behaviour biases, information problems and the resulting gap between awareness and behaviour

Even though there is increasing environmental awareness and concern about environmental (and social) impacts of consumption, some behaviour biases limit the shift to sustainable consumption. Several factors such as social norms, habits and emotions, the perceived characteristics of sustainable products, the impression that individual actions are not relevant, the lack of trust or of proper information (or the incapacity or time to process it), hampers the

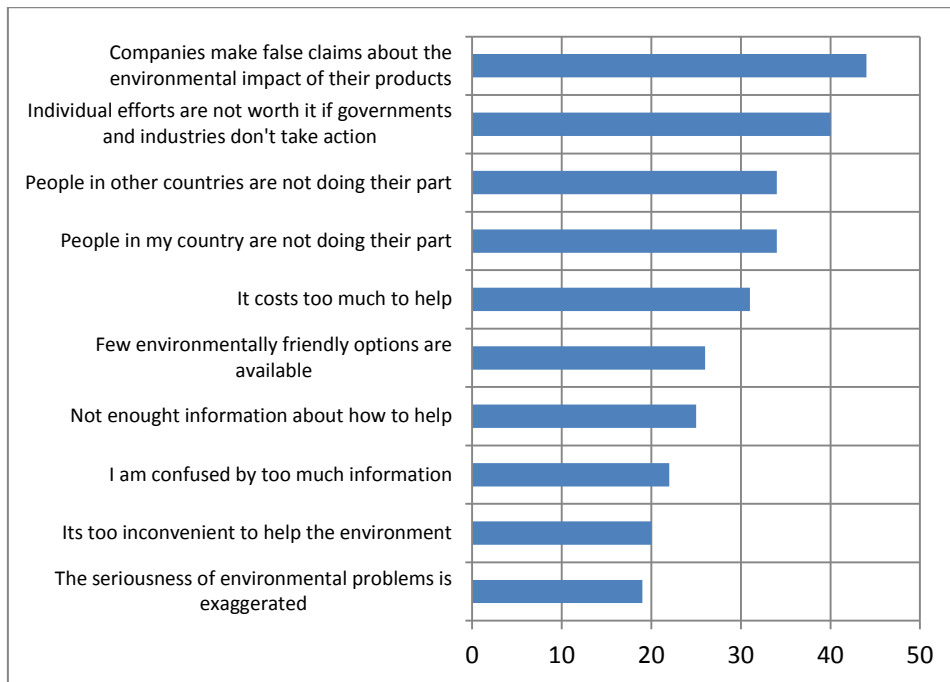
translation of environmental awareness into pro-environmental behaviour. Therefore, despite the willingness to act in favour of the environment, all of these barriers result in a gap between awareness and actual behaviour, i.e. sustainable consumption is far from being mainstreamed.

3.2.1 Lack of trust and information problems

Despite the fact that an increasing share of population is concerned about the impact of their consumption, it is difficult for them to precisely know what the specific impacts of the consumption of different goods are and to what extent they should consume (or not consume) these goods to meet their personal environmental concerns. People ignore or are uninformed about the multiple effects of the different products on the environment. Increasing knowledge on products' various attributes may require more time than what is usually devoted to purchasing activities. Moreover, some impacts are complex and difficult for consumers to understand. In some cases, the short lifecycles of products (such as modern devices) quickly make information obsolete (Salzmann, 2006).

Among the sources informing whether a product is environmentally and socially responsible, labels seem one of the most reliable means (they were the most trusted source for consumers according to the survey of BBMG et al., 2012). Environmental labels increase transparency, provide information on the environmental (and social) consequences of consuming different goods. Individuals tend to trust the labelling systems controlled by government or other third parties, such as NGOs, more while their level of trust in companies and retailers seems much lower (BBMG et al., 2012; PWC, 2008). However, the proliferation of differing and sometimes overlapping and confusing labelling schemes, in addition to the abundant marketing strategies of firms highlighting their products' environmental attributes, reduce trust and hamper and discourage sustainable consumption. Lack of trust in companies' environmental claims was found to be the most important factor in discouraging more environmentally friendly consumer behaviour according to a survey that included 17 countries in a Greendex study of 2010 (National Geographic and GlobeScan, 2010, see Figure 7). As stated in the previous section, proper legislation should regulate (voluntary and compulsory) labelling, systematize and simplify it and appropriate legislation against false environmental attributions of marketing and advertising should be developed. Transparency is necessary to alter public perception of green claims (Nayyar, 2016).

Figure 7 Factors discouraging more environmentally friendly behaviour



Note: The bars indicate the percentage of people choosing 4 or 5 on a scale of 1 to 5, where 1 means “Does not discourage you at all” and 5 means “Discourages you a great deal”.

Source: National Geographic and GlobeScan (2010).

3.2.2 Perception of product characteristics and high prices

The perception of a product’s characteristics does not always match reality. In some cases, consumers have the false perception that green (and especially recycled) products are of lower quality or functionality (Salzmann, 2006). Another perception problem is the failure of consumers to consider the product’s entire lifecycle. Consumers tend to base their purchasing decisions on prices, and thus fail to take account of the fact that some products may be more costly when taking the entire lifecycle into account, due to the given product’s lower efficiency, quality or recyclability, which may lead to higher energy, maintenance and disposal costs (Salzmann, 2006). In addition, lifecycle costs can also be determined by factors other than the given manufacturing company, such as policies, infrastructure or product use by the consumer.

Although consumers may be motivated to consume sustainably, they usually do not want to pay an excessive premium, nor do they want to forgo performance characteristics or drastically change their habits. Certain types of consumptions can be more easily modified, as is the case for devices for which functionality is very important and an increase in efficiency with environmental benefits may rapidly be seen as an improvement. Other types of consumption, like buying and using cars, are more closely linked to specific lifestyles and it is therefore more difficult to encourage sustainable choices simply by highlighting the products’ environmental

attributes (Salzmann et al., 2006). In some cases, the poor perception of sustainable goods arose because there was a lack of sustainable products incorporating characteristics that were more compelling to consumers, including emotiveness and convenience (Salzmann et al., 2006).

Despite consumers demonstrating environmental awareness in their consumption behaviour, product performance and price are still the main motivators for switching brands (much more so than environmental and health impacts) (BBMG et al., 2012). The perceptions of price, performance and credibility play a very important role in driving sustainable consumption. According to a survey carried out by BBMG et al. (2012), the majority of consumers agree that they would “purchase more products that are environmentally and socially responsible” if they “performed as well as, or better than, products they usually buy” (75 per cent), “it didn’t cost more” (70 per cent) and “companies’ health and environmental claims were more believable” (64 per cent). In other words, perceptions of high prices, low performance and scepticism about firms’ claims seem to be the main factors undermining the shift of consumers towards sustainable consumption. According to a survey involving 2,000 UK consumers, 48 per cent of respondents stated that they did not buy more sustainable products because they were unwilling or unable to pay the premium associated with them, while confusion and lack of trust was mentioned by 20 per cent and lack of sustainable alternatives by 20 per cent (PWC, 2008).

In general, consumers have environmental awareness, but the majority reject trade-offs and are unwilling to forgo performance or pay premiums for more sustainable products. Firms that manage to fulfil this demand and communicate the improved characteristics of their products transparently and in an appealing way will reap most benefits from this potentially very large market.

3.2.3 *Social norms and habits*

Some consumer habits are linked to social norms and are difficult to change when they are deeply embedded in society (Salzmann et al., 2006; Gazheli et al., 2015). Consumers also tend to behave in accordance with social context. There are some forms of consumption that are related to display of social status. When buying a car, for example, many used to prioritize status and image over environmental issues (Johansson-Stenman and Martinsson, 2006). If driving a car and the type of car purchased responds to social norms and is a way of displaying social status, it becomes difficult to change this purchasing behaviour by emphasizing efficiency or environmental benefits of transport alternatives. Some changes require more profound changes in social values and the promotion of alternative lifestyles to achieve alternative forms of consumption.

To achieve sustainable consumption, major changes in the lifestyles and consumption habits of consumers are necessary, not only an expansion of the number of green consumers or the quantity of green goods purchased.

3.2.4 Perception that individual actions do not matter

The impression that individual actions have no impact on global environmental pressure also tends to discourage individual actions. There may be a sense of hopelessness or of lack of empowerment due to the fact that individual actions make no difference in the grand scheme. Yet, environmental impacts accrue due to the accumulation of individual decisions which, taken on their own, do not have a considerable impact on the environment, usually referred to as the “tyranny of small decisions” (Kahn, 1966; Odum, 1982). That is, individuals do not actually see that changing their consumption decisions makes a difference, which discourages pro-environmental behaviour. However, the sum of many individual decisions has a major impact on the environment. Moreover, even if people would like to contribute to more responsible consumption, their motivation may be limited if the individual perceives that others will not do the same (Nyborg et al., 2006; Ostrom, 2009).

3.4 The rebound effect

Efficiency improvements in the provision of goods and services (or in their use) can lead to a reduction in the consumption of resources and the disposal of waste. Nevertheless, the potential reduction in environmental pressures can be offset by the “rebound effect”. The rebound effect refers to the mechanisms through which efficiency improvements reduce the costs of services obtained with the improved goods (such as, e.g. cheaper travel with low energy consumption cars), and this leads to an increase in their use to (partially or even fully) off-set the reduction in resource use initially achieved by efficiency improvement (Sorrell, 2007; Freire-González, 2011). Taking the rebound effect into account, the positive impact of the availability of improved products on the environment is not proportional to their efficiency improvement, but depends on the changes in behaviour it causes. There is even the possibility—reflected in “Jevon’s paradox” (Jevons, 1865)—that the total consumption of a natural resource following efficiency improvements is greater than before these were introduced (Brookes, 1978; Khazzoom, 1980), which is also known as “backfire”.

Environmental policies have tended to ignore the rebound effect and have therefore been too optimistic on the energy or resource savings of technical improvements (Freire-González and Puig-Ventosa, 2015). Policy measures can be applied to limit the rebound effect, such as environmental taxes or other pricing instruments, which may cancel (totally or partially) the

price reductions generated by energy or resource use efficiency improvements. However, these measures to limit the rebound effect have thus far not been widely used. What is more, many policy designs continue to ignore the rebound effect and are too optimistic about the resource savings and waste reductions that can be obtained through efficiency improvements.

3.5 Weak and unsuitable policies

Policies that encourage unsustainable (consumption) lifestyles and, more generally, policy frameworks that do not take properly into account the social advantages of encouraging sustainable consumption, are still in place. Unsuitable and weak policies are a barrier, hampering a quicker adoption of sustainable consumption patterns.

If the institutional framework is weak, which is the case in many low-income countries, the adoption of adequate policies is hampered. In addition, low trust in institutions also impedes behavioural changes that are necessary to achieve a shift towards sustainable consumption patterns.

Despite the efforts being made at national and international level (especially the Marrakech Process and the 10-Year Framework Programmes), current public policy frameworks are not ambitious enough to facilitate the transition to sustainable consumption. Though resource and waste pricing and other environmental policies are increasingly being implemented in many countries and settings, we still have a long way to go to achieve suitable pricing of resources in most countries.

Not only are the policies to promote sustainable consumption insufficient, governments are often to blame for putting the wrong incentives in place and encouraging unsustainable consumption. In many countries, there are still incentives to consume goods that have a negative environmental impact. That is, instead of correcting prices to account for the external costs and discouraging the consumption of such goods, many subsidies actually incentivize the consumption of polluting goods even further. This applies in many developing countries, but also in some developed ones. There are subsidies that encourage electricity and fossil fuel consumption and unsustainable fishing, water irrigation and agriculture. McKinsey and Company (2011b) and the World Bank (2012) estimated the overall economic support for the overuse of natural resources to lie between US\$ 1 trillion and US\$ 1.2 trillion per year.

In addition, although the attitude of businesses towards environmental regulation has changed to some extent, lobbying against regulation continues in many countries and is especially influential in countries with weak public institutions and corruption. In some cases, such as with

environmental taxes, this resistance and pressure has led to a reduction in the application of regulations or to the presence of exemptions and reductions for resource-intensive industries, which have considerably decreased the effectiveness and efficiency of these policies (Ekins and Speck, 1999; Baranzini et al., 2017).

3.6 Limitations to businesses changes due to market forces

Some firms have modified their business models in response to changes in consumers' values, and are adapting to new environmental norms. However, these changes are often limited to improvements in efficiency, reporting a rapid payback or to promote their sales in the growing niche of green products. Though there are several examples of good practices and of businesses that have extensively incorporated sustainability criteria and have managed to increase the effectiveness of their entire value chain, these practices are still far from being mainstream. The management of supply chains can be particularly complicated, especially when there is vertical disintegration (Salzmann et al., 2006). In some cases, companies justify their behaviour by claiming that their customers do not demand sustainable products (Steger, 2007; as cited in Salzmann et al., 2006). To mainstream the implementation of sustainable practices and to achieve a more profound change in business values, firms' survival must depend on it. Firms should not be penalized in the market if they implement environmentally friendly practices. A more general change in social values and of government policies, including environmental taxation and regulations on competition, investment and reporting, should be in place to reward corporate behaviour that promotes sustainability and environmental protection (Michaelis, 2003).

In addition, despite the increasing relevance of ethical investments, most investors still choose investments that maximize financial returns, regardless of their environmental impacts (Michaelis, 2003). For sustainable investment to become an important enabler of sustainable consumption, the appropriate regulatory framework for businesses to invest in sustainable infrastructure, products and innovation must be implemented by governments (WEF, 2010).

4 Concluding remarks

Some positive trends towards sustainable consumption are perceptible. Consumers' awareness and behaviours are changing, technological progress is improving product efficiency, business models are changing and national policies and international frameworks to support sustainable consumption are increasingly being established. However, those positive changes have not been sufficient to reduce or even retain the overall environmental impact of consumption, which continues to grow. More fundamental changes in production and consumption are necessary.

Consumer behavioural changes are limited due to availability, affordability and lack of trust. Moreover, the management of supply chains is poor, proper incentives for companies are not in place and policies lack ambition and coordination. Profound lifestyle changes are necessary (not just more environmentally-friendly consumption), companies should properly manage their value chains and focus on value creation more than on throughput (which goes beyond efficiency improvements), while governments have to put in place appropriate regulations (WEF, 2010).

Unless such fundamental changes take place, the world will face environmental and economic problems that will strongly affect the prosperity of future generations. The challenge is especially relevant for poorer countries, which have greater potential for consumption growth, to adopt consumption patterns that are consistent with sustainability. In these countries, unsustainable consumption should be avoided by leapfrogging the phase of high-resource and high waste consumption of the developed world (WEF, 2010), thereby avoiding both the associated environmental costs and the larger costs of a latter shift to sustainable consumption.

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