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Real or *Perceived*? When powerlessness hinders climate policy support.

The France of the Yellow Vests: an application.

Submitted by

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Abstract - This research draws a parallel between the recent political backlashes witnessed in the (de)-industrialized world and people's attitudes towards climate policies. In lieu of the rise of populism, subjective feelings induced by individuals' *perceptions* of their condition have increasingly been considered by researchers. In parallel, there is a substantial literature on the determinants of public support for climate policy. Based on the allegation of the Yellow Vests movement in France, and in order to scrutinize the underlying foundations of the contestation, this study sought to re-calibrate perceptive variables as to one's condition in a model of attitudes towards taxation. Using survey data, the analysis relies on linear regressions to comparatively assess the effect of individual income and one's *perceived* position in society, as well as that of the reported feeling of powerlessness towards climate action on willingness to pay higher taxes for climate mitigation. The findings suggest that, beyond economic rationality, perceptive dimensions of one's condition ought to be considered to ensure public support for climate policy in a context of sustainable transition.

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1 Introduction

At the end of 2018, France was shaken up by a severe societal turmoil in response to the announcement of the next fuel tax hikes for 2019. Falling within a governmental effort towards energy transition, taxation has been put forward as prime efficient and cost-effective tool (Goulder, 2013; Nerudová et al., 2018; OECD, 2016a). On the other hand, equity concerns also ought to be considered as to ensure the social acceptability of such measures (Drews & Van den Bergh, 2016; Teixidó & Verde, 2017; Jagers & Hammar, 2009; Brannlund & Persson, 2012). The subsequent contention to the implementation of the carbon tax in France suggests that the dilemma between efficiency and equity of the climate policy has been overlooked. In fact, feelings of inequity and unfairness prevailed in the criticisms against the French application of the carbon tax. Yet, although sparked by the announcement of the rise of gasoline taxes, the recent social uprising should not be mistaken for resistance against climate policies altogether. Instead, the contestation is to be understood as the expression of much deeper scars at the socio-economic level.

In the last recent years, the current socio-economic and political context heavily featured by tension and frustration revealed significant equity concerns. At the bottom of it lies the increasing intolerance for social and spatial inequality, exacerbated by the *perceived* injustice of stagnant living standards among lower-middle income groups. Among the influential works which have sought to highlight the recent trends in inequality levels, Milanovic (2016) now infamous elephant curve and Piketty (2014) controversial book *The capital in the Twenty-First* stand out. The former shows that, over the last 30 years, inequalities across countries have diminished while inequalities within countries have been on the rise, at the expense of low and middle-income groups in developed countries. The latter was the cornerstone of a long series of research on wealth accumulation at the top 10, 1 and 0,001% most notably. Across Europe, it was found that the top 10% share has been rising since the 1980's (Piketty & Saez, 2014), and for France specifically, the share of the top 1% in pre-tax income was estimated to rise from less than 8% in 1983 to 12% in 2013 (Garbinti et al., 2018).

Increasingly, the subsequent perceptive feelings likely to emanate from this economic reality have been scrutinized and identified as critical. For instance, Rodrik (2017) posits that *"what arouses popular opposition is not inequality per se, but perceived unfairness"*. Hence, a parallel has been drawn between the feeling of being "left out" and strong social reactions – such as the rise of populism - in the US, Thailand, the UK, and an increasing list of other European

countries (Rodríguez-Pose, 2018). In France, the symbol of the current protest movement is particularly meaningful: those feeling left out began to wear yellow jackets – also widely understood as a distress signal - to become visible. As such, the "Yellow Vests" insurrection only seems to extend the list of populist reaction to the rising inequality and economic insecurity that have emerged fiercely in the (de)-industrialized world.

As it appeared from the French contestation, the challenge of energy transition and the required effort associated with it is compromised by a society's unhealed wounds. More, it might even exacerbate them. In fact, while already under the impression of not being considered by the political leaders, those located in the declining rural areas and rustbelts felt that the burden they were asked to carry for the energy transition was unbearable. Crushed by the disproportionate cost of heavier and heavier taxes, people were left with a bitter taste of powerlessness and unfairness, which eventually sparked opposition and resistance. This certainly outlines one of the most challenging difficulties of environmental policies: the combination of short-term and micro costs with longer term and globally spread benefits.

When dealing with such policies, the civil society and consumers play an undeniable role. Not only do consumers' lifestyles have direct consequences on climate issues, their willingness to engage with climate change mitigation and to support policies accordingly is also of critical importance. A good understanding of the factors that facilitate or block the adoption of climate policies might provide useful information for policy makers to design the appropriate policies. Although the literature has identified such determinants quite extensively (Drews & Van den Bergh, 2016; Tobler et al., 2012; Kallbekken & Sælen, 2011), individual perceptions in response to the local socio-economic context have only been partly documented. Yet, if subjective feelings with regards to one's socio-economic condition shape voting behaviors, this more perceptive dimension might also have an essential role in determining one's willingness to accept environmental tax policies. This research thus proposes to include an additional dimension to the analysis of the determinants (barriers) to policy support, that of contemporary feelings of *"relative deprivation"*[1], as proxied by the perceived socio-economic condition and sentiment of powerlessness. The following research question emerges from the discussion: to what extent do feelings of relative deprivation influence one's willingness to pay higher taxes for climate mitigation?

[1] The concept of relative deprivation was coined by Runciman (1993) in an influential study on 20th century England.

In order to assess the impact of perceptive feelings, and confront it with the effect of one's absolute economic position, this study will rely on survey data. Individual data give information about one's "real[2]" economic condition – individual income – and "perceived" socio-economic condition – the reported position on the social ladder. An additional variable allows to assess the perceived degree of powerlessness of the respondents with regards to climate action. Those three proxy variables of real and perceived condition will be tested against the respondents' willingness to pay higher taxes for climate mitigation. A set of other determinants, which have been identified in the literature as having an impact on Willingness to Pay (WTP), will also be controlled for. In resonance with Rodrik's proposition, the baseline hypothesis for this analysis is that one's "perceived" condition matters for explaining the willingness to pay for climate mitigation via taxation policies. Also, one's feeling of powerlessness with regards to climate action might be induced to a greater extent by perceived rather than absolute variants.

The linear analysis conducted in this study supports our hypotheses. Feeling powerless towards environmental mitigation does indeed diminish the propensity to engage with climate change mitigation, and this feeling is mediated by the perceived position on the social ladder, rather than by absolute individual income. Although the distinction may appear trivial, this subtlety may in fact have laid grounds for the present opposition in France. Given that after three weeks of fierce protests, President Emmanuel Macron announced that all fuel tax hikes for 2019 will be scrapped altogether, this context-specific analysis may hold critical implications for understanding social acceptability and implementation of environmental policies. In sum, while the analysis presented in this study comports several limitations, it does offer quantitative insights highlighting the imperative need to give more weight to perceptive sentiments in already fragile developed countries, further pressured by the urgent need for sustainable transitions.

The reminding of this research is organized as follows. The first section offers a background study of the carbon tax, in general and in France, and documents the subsequent social backlash. Section two will introduce an extensive literature review on policy support and its determinants, with a focus on perceptive individual dimensions. After introducing the empirical strategy in section four, section five will introduce the available data and variables derived from the survey. Section six will discuss the findings, which will then be further discussed in section seven, before concluding in section eight.

[2] The terms 'real' and 'absolute' in reference to income and absolute condition are used interchangeably in this paper.

2 Carbon pricing, French application and resistance

Why is France relevant to study energy transition issues? After all, France's share in global energy consumption does not exceed 1,6% and its share of global emissions does not reach 1% (USCUSA, 2018). Also, France's dependence on fossil-fuel energy is much lower than other European counterparts because of a strong reliance on nuclear power as well as the development of renewable energy.

France appeared as a key stakeholder in the ratification of the Paris agreement in 2015 by calling on other European countries to follow its lead (The Guardian, 2016). As such, France is a powerful country in Europe seeking a leadership position in terms of environmental policies. President Emmanuel Macron is a strong defender of multilateralism and, by extension, global action to address climate change. Following this line of inquiry, the inauguration of the One Planet Summit aimed at further accelerating the implementation of the Paris Agreement, by strengthening multilateral collaboration (United Nations, 2018). However, this series of initiatives have failed to formulate clear incentives for domestic and global action on climate change. For this study, France's case is also particularly relevant for that it illustrates the challenge of achieving an energy transition via macro-economic policies such as taxation in a society seized by economic and social inequalities.

2.1 Carbon pricing: an inescapable coercive measure to address climate change

In the recent years, the need for a rapid energy transition has been strongly emphasized to respond to many environmental challenges. Many would argue that climate change, loss of biodiversity and resource depletion are the inevitable result of unsustainable patterns of consumption and production.

Although this growing concern has only recently started to penetrate the vast of collective consciousness, hints of caution in response to the challenges emanating during the post WWII phase of modern development can be traced back to the second-half of the 20th century. The new set of dynamics that emerged from the apparent need to break out with the current development paradigm boils down to the concept of *"reflexive modernization"* as coined by Beck et al. (1994). The theory of reflexive modernity posits that in the modernization process, society – as composed by policy makers, citizens groups and individuals – is confronted to the

need to cope with severe unintended externalities induced by former decisions at both the social and environmental levels. Reflexivity thus induces *"the capacity for continuous and self-conscious societal reflection, assessment, and readjustment"* (Meadowcroft, 2009).

Given the strong reliance of production systems, agro-food and transport on fossil fuel energy, many economists have advocated carbon taxation as an economic solution to reflect the social cost of carbon content in the consumer decision making process. In fact, carbon emissions represent a negative externality which, although strongly embedded in human actions, has been ignored hence generating huge carbon dioxide emissions. According to MacKay (2008), *"the principal problem is that carbon pollution is not priced correctly"*. As environmental considerations began to penetrate into the political sphere, taxation devices hence were soon underlined as the most efficient mechanisms on the international front (Goulder, 2013; Nerudová et al., 2018; OECD, 2016a). Carbon taxes are generally argued to be economically effective devices as they can be conveniently attached to already existing systems (OECD, 2016a). Also, the Pigovian nature of the tax allows to correct for market imperfections by internalizing the negative externalities caused by the use of fossil fuels in the prices of the energy sector. In order to mitigate potential impacts of the tax at the macroeconomic level, it is important to preserve its "behavorial" nature. That is, the carbon tax is not to increase budget revenues and thus should be implemented with constant fiscal revenues, by lowering other tax ratios or via the implementation of distributional schemes for instance. In 2015, the ratification of the Paris Agreement sealed the enactment of strong regulation on production and consumption-induced carbon emissions (OECD, 2016a).

Successful examples of carbon tax implementation are found in Sweden and British Columbia. The former, and precursor of the tax with an adoption in 1991, exhibits one of the highest rates in the world with a progressive rise over years from 24 euro/ton of CO2 to 114 e today. This substantial increase was accompanied by a simultaneous decline in the rates of income tax and social contribution. In the Swedish case, the carbon tax is not earmarked and thus generates revenues for the general budget, but general budget funds are then used to address distributional consequences or financing other low-carbon measures (Government Offices of Sweden, 2019). Adopted in 2008, the carbon tax in British Columbia was initially fixed at 5 dollars per ton, reached 35 $ in 2018 and is expected to reach 50 $ in 2021. The tax was designed based on a revenue neutral tax plan. The redistribution of all revenues is done via the diminution of the income tax rate on households and on societies, and a Climate Action Tax Credit available to low- and moderate-income households. Every year, the Ministry of Finance

is required to publish a detailed report of the distributional plan in order to ensure fiscal neutrality (Government of British Columbia, 2019). In both cases, fairness and transparency are accounted for.

2.2 La taxe carbone: The French application

In 2007, French President Nicolas Sarkozy announced at the end of a national conference on the environment: *"We need to profoundly revise all of our taxes and charges. The aim is to tax pollution – notably fossil fuels – more, and tax work less"*. After two failed attempts in 2000 and 2010, a carbon component was added in 2014 to the already existing TICPE domestic excise tax on energy products, which applies to the consumption of energy products in France.

After the introduction of the carbon component, the new rate of the TICPE was divided between an "energy" and a "carbon" part based on the standardized carbon content of the energy goods. The carbon component was introduced at 7 euro per ton of CO2, and rose to 14,50 € in 2015, 22 € in 2016, 30,5 € in 2017 and reached 39 € in 2018. The objective for 2019 was fixed at 47,50 €, then 56 € in 2020 and 100 € in 2030. In 2016, the associated tax revenues contributed to a Tax Credit for Competitiveness and Employment. Since 2017, part of the revenue is dedicated to special funds for the development of renewable energies. The website of the Ministry of Ecological and Solidary Transition (2017a) stipulates that:

"This greening of the fiscality of the energy sector should positively impact growth and employment, contribute to reducing dependency on fossil-fuels and improve the trade balance. It will promote the growth of sectors related to the energy transition and help households and enterprises reducing spending by creating incentives to improve energy efficiency".

Following the general infatuation for carbon pricing to reach greenhouse gas emissions reduction targets, and in response to the growing concern for the country's failure to meet them given the reliance on fuel and diesel consumption (OECD, 2016b), taxing diesel became an obvious and almost inescapable channel for the successive governments. In line with President Emmanuel Macron objective to honor the COP 21 targets and totally exclude diesel consumption by 2040 (Ministry of Ecological and Solidary Transition, 2017b), the government also planned a € 6.5 cents increase of the TICPE on diesel prices for 2019 (Journal Officiel de la République, 2018).

The French application of the tax somewhat differs from the two cases presented further above. In fact, as opposed to Sweden and British Columbia, no income tax and social contribution reduction or direct distributional scheme is mentioned under the carbon fiscal plan in France. Although the taxation rate is also gradual in the French scenario, the yearly increase is much more important than in the two other cases. Although not a French peculiarity, carbon pricing in France has lost its sole behavorial function, as it also stands as a key revenue in the public finances, the 4th most important one (Connaissances des energies, 2019).

2.3 From social acceptability to social uprising: when public support crumbles

November 17th 2018 marked the first and biggest day of road blockades across France that initiated the Yellow Vests movement. Initially motivated by rising fuel prices in lieu of the fuel tax hikes for January 2019, the protests quickly revealed much more profound scars at the socio-economic level and a deeper dissent against the government and the overall tax system. Several concomitant features of a tense economic and political context may have set the ground for contention.

First, studies have shown that trust in the government has dramatically eroded over the last decade in France. A recent study conducted by the Policy Research Center of Sciences Po over the period 2009-2019 shows that negative feelings such as distrust, disgust and tiredness towards politics largely surpass positive feelings such as enthusiasm or respect. Also, 85% of survey respondents consider that politicians do not care for their interests, 74% think that they are corrupted and 61% do not trust either left or right wing parties (Cheurfa, 2017). In May 2017, the French elected Emmanuel Macron, a young figure in politics at the head of a new independent political party, liberal and progressive, somehow breaking free from the old paradigm of traditional left or right wing parties. While the President's approval ratings scored rather high during the first year of his electoral mandate, the trend quickly reversed in 2018 (Elabe, 2018). The simultaneous rise of social contributions, the sudden resignation of the public figure Environment Minister Nicolas Hulot and, most importantly, the ending of the wealth tax on high earners triggered the gradual decline in confidence in the President. While Macron contributed to brightening the French image on the international front, French citizens among the working and middle class felt their interests were left out in favor of broader global macroeconomic policies. Soon referred to as "The President of the rich", Macron and his government became subject to strong criticism and fierce rejection for being too elitist and not considering the broader French interests.

The fact that the projected fuel tax hikes concerned diesel fuel further reinforced that feeling. Although this rise was legitimate because aligned with a fuel taxation policy initiated in the 2015 Energy Transition for Green Growth Act (Legifrance, 2015), it still was announced following a 26,8% price increase the previous year (Connaissances des énergies, 2019). Also, for the longest time, diesel cars were seen as an advantage over petrol cars for their performance and cheaper cost, and therefore, now constituting 69,75% of the French fleet (Connaissances des énergies, 2019), are much more driven than petrol cars. Over this process of fleet diezelization, diesel cars found their way into the low-income strata and now exhibit a higher share of ownership than petrol cars in rural areas, small towns and peri-urban areas, all very dependent on cars for daily commute (Hivert, 2013). As a result, the perceived cost of the policy increased dramatically for the working and middle class. Against this background, the actors of the resistance movement expressed a strong dissent against perceived distributional unfairness, claiming that a disproportionate burden had to be carried by the working class and low-income groups, especially in rural and periphery areas.

The now popular statement "*Make ends meet vs End of the world*" - first coined by a Yellow Vests participant before being taken over by the media and politicians - represents the overarching challenge of this conflict. This statement is highly suggestive of a deeply fractured society, where the division between local and global has become a major impediment to the energy transition process. In lieu of the effort that was imposed upon them, this cleavage further reinforced the feeling of powerlessness and unfairness felt by parts of the population.

3 Literature review

As said, carbon pricing and fuel taxes epitomize the governmental effort to engage the civil society with climate change mitigation. Pigovian types of taxation are generally assumed to be rather progressive than regressive, and thus prevent disproportionate impacts on low- and middle-income groups (Poterba, 1991; Sterner, 2012). However, given their actual materialization in terms of targeted products and goods, fuel taxes may in fact induce important distributional imbalances (OECD, 2016a; Teixidó & Verde, 2017). Specific channels such as diesel fuel in France may hold considerable socio-economic and geographical implications, and consequently convey important regressive incidences. Hence, it was acknowledged that, besides economic efficiency, other social goals such as equity and ideological preferences must be considered by policy makers to validate the public acceptability of the policy (Brannlund & Persson, 2012).

3.1 Public support in the literature

Undeniably, the challenge of transition is daunting. Not to mention the manifestly complex nature of a world dominated by global finance, commodities flows and hegemonic ideologies of capitalism (Shove & Walker, 2007), the variety and heterogeneity of the actors involved in the process - directly or indirectly - is overwhelming. This, in turn, poses a major impediment to the governance of sustainable policy. Ideally, such governance results from an interactive process between those direct and indirect actors towards the *"collective discovery"* of favored development pathways (Meadowcroft, 2007). In practice, however, the process is likely to unfold very differently, as it tends to be dependent on the *"selective pressures"* emerging from the conscious and direct intervention of active actors who have clear ideas about the direction they want (or do not want) the transition to go (Meadowcroft, 2007).

Yet, acute attention must be given to all *"the winners and losers"*, that is not simply the active actors within the regime but also *"the many social actors and bystanders whose lives and interests are wrapped up in processes of transition-managed sociotechnical change"* (Shove & Walker, 2008). In other terms, societal actors that do not take a direct or active role in transitions do need to be considered, as they still are engaged in transition activities and, therefore, are bound to be concerned with their own position in future arrangements. Ultimately then, *"acute social and political struggles about the character of these transitions seem inevitable"*(Meadowcroft, 2009).

Against this background, maintaining public support for the transition scheme may pose a prominent challenge that transition managers must consider (Rotmans et al., 2001). Although some have argued that policies are sometimes implemented in the absence of public support (King et al., 2007), factual events have shown that it is politically risky to advance unpopular policies. The recent events in France corroborate Gaunt et al. (2007) findings on the case of road pricing in Edinburgh, which identified public acceptability as *"the greatest impediment to policy"*.

3.2 Several determinants of public support for environmental policies

A wide array of determinant of public support and WTP have been documented (Drews & Van den Bergh, 2016). Attitudinal factors such as people's perception on climate change was found to influence their level of concern and, in turn, impact their propensity to support environmental

policies (Swim et al., 2009; Sibley & Kurz, 2013). Case studies on countries such as China, the US and the UK have shown that the certainty that climate change is happening acts positively on people's WTP for climate policy (Carlsson et al., 2012; Kotchen et al., 2013; Lorenzoni et al., 2007). Naturally, risk perception of climate change as well as the conviction that it is linked to human responsibility come out as even stronger explanatory variables to explaining public support (Zahran et al., 2006; O'Connor et al., 1999) and WTP (Viscusi & Zeckhauser, 2006). By contrast, uncertainty and skepticism about the cause and characteristics of climate change act as a strong barrier to engaging in climate action (Swim et al., 2009.)

General orientation towards life and wider political aspects were reported as impacting factors. A relationship was found between political affiliations and pro-environmental behaviors: left and green political ideology are in stronger support to environmental policies (Tobler et al., 2012; Jagers & Hammar, 2009) and WTP is higher for Democrats than Republicans (Kotchen et al., 2013). Also, a lack of trust in decision makers goes hand in hand with low public support (Kallbekken & Sælen, 2011; Zahran et al., 2006; Hammar & Jagers, 2006) while the involvement of the civil society in the making of global climate policy tends to strengthen public support (Bernauer & Gampfer, 2013).

3.3 Public opposition of fuel taxes under scrutiny

Beyond the more general factors introduced above, several determinants define the acceptability or opposition towards carbon taxes specifically. First, it seems fair to affirm that people generally dislike taxes, although the feeling may be stronger in some countries than others. The general trend against coercive measures, such as taxation and regulation, is well documented in the literature (Tobler et al., 2012; Peters & Pierre, 2006). Besides the associated financial pressure, the perceived loss of freedom they induce also act as a strong negative factor (Cherry et al., 2012). In settings wherein the general tax level is already quite high, such as in France, the reaction to environmental taxes can be two ways. On the one hand, the tax acceptance might be relatively high, so that people are more inclined to accept an additional tax. On the other hand, exactly because the tax level is already high, rising taxes even further might be tricky, as it is more likely to exceed the threshold of acceptance (Jagers & Hammar, 2009).

Evidence from different countries suggest that climate policy is received more positively when it implies less direct monetary cost (De Groot & Schuitema, 2012; Diekmann & Preisendörfer, 2003). Since fuel taxes have a direct negative impact on people's budget, this automatically intensifies the perceived cost of the policy. However, it was suggested that people

tend to overestimate the direct cost associated with a tax and underestimate the hidden cost of non-coercive measures (Jagers & Hammar, 2009). Beyond the *perceived* financial constraint, the perceived effectiveness of climate policies was found to be most decisive for the public acceptance of a congestion charge in Stockholm (Eliasson & Jonsson, 2011) or of a fuel tax in Norway (Kallbekken & Sælen, 2011). It must be noted that the perceived effectiveness of a policy is obviously subjective and might be biased by personal interests. Since an effective policy may also entail higher financial or behavioral cost, this, in turn, might change the individual's perception of the policy's effectiveness (Rosentrater et al., 2013). This might also explain why push (or coercive) measures are usually perceived as ineffective while pull (non-coercive) measures receive higher support, regardless of the objective benefits of either measure (Eriksson et al., 2008).

The perceived fairness of the policy contributes to modeling public support. For instance, a policy is more likely to receive support when richer members of society pay a larger share and when potential revenues are redistributed to more vulnerable members (Brannlund & Persson, 2012; Dreyer & Walker, 2013). Also, WTP might decrease when the effort for climate change mitigation must be carried by general taxpayers, while it is likely to increase when greater responsibility is assigned to industry and energy producers (Cai et al., 2010; Dresner et al., 2006; Thalmann, 2004; Schuitema & Steg, 2008; Bristow et al., 2010; De Groot & Schuitema, 2012), even more so when tax revenues are *"recycled"* and proceeded back to taxpayers, or dedicated to environmental purposes such as financing research or subsidies (Hsu et al., 2008).

3.4 Legitimize individual perceptions of one's condition

Individuals perception of the policy design emerge from all of the above findings. Whether it is in terms of cost, effectiveness or fairness, it appears that what people think of a policy determines their propensity to accept or reject it. Since the perceived unfairness or cost of a policy might impede its acceptability, the underlying mechanisms forging such perceptions are to be considered.

In fact, though observing lower acceptance for coercive measures that target a high cost behaviour such as driving is no surprise (De Groot & Schuitema, 2012), the resistance of the 'Yellow Vests' actually stem from more subtle vulnerabilities at the socio-economic and political level. Featured by the predominance of Paris megalopole and the lagging behind of the regional rest, France appears to present similar disparities in terms of economic geography and the subsequent 'geography of discontent' found in the United Kingdom (Los et al., 2017; McCann,

2016). The feeling of being "left out" in favor of the big metropolitan urban areas emanating from the Brexit "Leave" voters also resonated within the French borders during the recent social uprising.

Even more so than economic rationality, these popular feelings reflect the growth of *"relative deprivation"* induced by globalization, in terms of the actual loss relative to other segments of society, but also the increased awareness of that loss. Rodríguez-Pose (2018) argues that the populist rise - or *"the revenge of the places that don't matter"* - is the result of the unequal distribution of the globalization gains. Also, strong social reactions could have been predicted if one had acknowledged "social and economic, real or perceived distress in many non-agglomerated areas". This wider political and economic context gradually constituted a platform for contention against the perceived unfairness of the tax. Ultimately, the announcement of the next fuel tax hikes awoken deep passions and crystallized the overarching sentiment of powerlessness felt by some parts of the society.

The literature studying the determinants of climate policies acceptabilities has already acknowledged the feeling of powerlessness, as induced by the scope of climate issues (Tobler et al., 2012). Perceived as seemingly overwhelming for the average civilian who may feel that their individual action will have no effect, the scope of climate change might in turn trigger feelings of discouragement and prevent people from acting or supporting a policy (Kollmuss & Agyeman, 2002). More particularly, the degree of powerlessness can be understood at the individual level using the concept of the locus of control (McCarty & Shrum, 2001). Typically, the locus of control helps differentiate between individuals who believe their actions can influence outcomes (internal locus of control) and those who rely on powerful others as they believe they are relatively powerless over the outcomes of their own action (external locus of control). Naturally, beyond individual values, this psychological construct might also be influenced by socio-demographic components, related to one's real but also perceived condition.

Hence, based on the recent events in France, this study proposes to introduce a socio-economic dimension of powerlessness, as well as an additional dimension of individual perception: that of one's own condition, with regards to the ability or perceived legitimacy to respond to climate taxes.

4 Empirical framework

4.1 Baseline specification

In order to determine whether perceptive feelings of one's condition impact the level of support for fuel taxes, our analysis examines how individual differences in real and perceived socio-economic conditions and the associated degree of powerlessness (key independent variables) affect the level of willingness to pay higher taxes (dependent variable).

Studies focused on public support for climate policies and Willingness to Pay (WTP) fall into the economic or psychological domain. In the psychological literature, the concept of attitude is used and defined as *"a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor"* (Eagly & Chaiken, 1993). Most studies assessing the public support of a particular policy rely on individual data by means of questionnaires, asking the respondents to report their feelings towards the policy via a referendum-type question (Gaunt et al., 2007; Kallbekken & Sælen, 2011). Economic studies rely heavily on methods to estimate WTP to stabilize climate as a means to assess the support to an environmental policy and define its benefits (Stavins, 2007). However, the complex nature of climate impacts, particularly the fact that it transcends spatial and time boundaries, makes true valuation and monetization of climate change and associated policies extremely difficult. Hence, estimates of WTP should only be limited to *"relatively constrained scenarios with limited geographic, social and temporal boundaries"* (Nemet & Johnson, 2010). Overall, the evidence has shown that respondents' economic preferences, whether expressed as psychological attitudes or WTP, presented close similitude (Kahneman et al., 1999; Ryan & Spash, 2011).

The scope of this study is limited to France at a specific point in time, hence it complies with Nemet's restrictive proposition of WTP use for analytic purposes. More specifically, the ultimate goal is to determine the extent to which one's real and perceived socio-economic conditions, and the associated feeling of powerlessness contributed to the rejection of the carbon tax in France. Assessing the impact of such variables on the propensity to pay tax to mitigate the environment might provide information about what, inversely, created blockage or resistance. Hence, the analysis in this study will rely on a measure of willingness to pay for higher taxes as dependent variable.

As said, individual perceptions regarding one's own condition, in absolute and even more so in relative terms, matters for explaining individual and collective attitudes, such as

voting behavior (Rodríguez-Pose 2018). We build an empirical model to assess whether the perceptive feelings of one's conditions affect the "Willingness to Pay higher taxes to protect the environment" (WTP) in France. The variables used to proxy feelings of relative deprivation are the perceived social status as well as the degree of powerlessness one feels with regards to environmental action. In order to confront perceptive and absolute dimensions of one's condition, we also test for the direct effect of absolute individual income. For the baseline model, we first opt for the simplicity of a linear specification to facilitate the interpretation and comparison of the effect of each variable. The empirical model for explaining WTP as a function of Income, Social Ladder and Powerlessness hence becomes:

$$WTP_i = \beta_1 Income_i + \beta_2 SocialLadder_i + \beta_3 Powerlessness_i + X_i + \epsilon \quad (1)$$

An error term ϵ is added to the specification to account for the variance in WTP that is not explained by the model. X_i includes a set of control variables likely to relate to the propensity of supporting environmental policies, as identified in the literature (see section 3). The main empirical findings regarding the relationship with WTP can be summarized as follows. Coercive measures receive less support than their alternatives (Tobler et al. 2012), (Diekmann & Preisendörfer, 2003), hence being in support of coercive measures or government intervention is likely to increase the willingness to pay higher taxes. Low trust levels in the government hamper policy acceptability (Hammar & Jagers, 2006; Kallbekken & Sælen, 2011), while people who report feeling concerned about the environment are more inclined to pay to mitigate environmental externalities (Swim et al., 2009; Sibley & Kurz, 2013). The residential area was identified as an important factor (Streimikiene et al., 2019). Given the strong geographical focus emphasized in the literature to explain people's perceived unfairness and the subsequent *"geography of discontent"* (Los et al., 2017), we expect geographical features to also matter in explaining willingness to pay higher taxes. Political preferences influence the propensity to engage financially for climate mitigation (Thalmann, 2004; Bornstein & Lanz, 2008), and religious affiliation exert an effect in some contexts (Smith & Leiserowitz, 2013; Barker & Bearce, 2013). People with higher education and older people tend to exhibit higher levels of WTP (Rienstra et al., 1999), and gender was found to be a significant factor by some (Fujii et al., 2004; Jakobsson et al., 2000), while having no effect by others (Thalmann, 2004).

Typically, if only personal income matters in defining the willingness to pay higher taxes, the estimated coefficient of β_2 will be insignificant. If both "real" and "perceived" socio economic conditions matter, both β_1 and β_2 will be significant. A third option is for the perceptive dimension to overshadow the effect of absolute income. In that case, the (un)willingness to pay would rather stem from the (un)fair nature of the policy perceived by the respondent. The patterns identified between real and perceived dimensions might help understand whether the feeling of powerlessness is induced by economic rationality or rather by individual perception.

One potential bias to the WTP variable is the general resistance against tax (Jagers & Hammar, 2009). Independently of their socio-economic status, degree of environmental concern, or any other determinant likely to influence policy support, people may report being unwilling to pay higher taxes for the environment, simply because they dislike taxes generally. For instance, in some studies, simply adding the label "tax" to a series of climate measures significantly diminished the level of policy support and WTP (Brannlund & Persson, 2012; Kallbekken & Sælen, 2011). The explanatory variables related to individual's perception of most effective policy design may partially control for this potential bias. However, the variables in our model only refer to general perception, and not tax policies explicitly, hence the "general tax resistance" bias may still persist.

Environmental taxes induce behavioral change (Alló & Loureiro, 2014), which is often associated with making sacrifices to protect the environment. More precisely, the current dominant regime and associated normative behaviors gave birth to deep-rooting addictive routines that act as strong lock-in mechanisms, which impede the *"series of de- and reroutinization of social practices in everyday life"* (Spaargaren et al., 2012). Fuel taxes directly impact individual budget, or else force to choose an alternative which may be perceived as more inconvenient, hence reducing individual purchasing power and/or shaking up current established practices. The propensity to make such sacrifices and to reduce one's quality of life might be more directly associated with one's initial socio-economic condition. Henceforth, in order to capture the full spectrum, we extend the analysis to a second dependent variable: the Willingness to Cut one's standard of living (WTC). The baseline model mirrors that of WTP:

$$WTC_i = \beta_1 Income_i + \beta_2 SocialLadder_i + \beta_3 Powerlessness_i + X_i + \epsilon \quad (2)$$

According to the formulated hypothesis, we expect the coefficient for Social Ladder to be significant and positive. In other terms, the higher the perceived position on the social ladder, the higher the willingness to pay more taxes and cut one standard of living. The coefficient for Powerless is also expected to be significant and negative, meaning that the stronger the feeling of powerlessness, the lower the reported WTP and WTC. Whether this effect is mediated by one's absolute or perceived condition will be tested with interaction terms.

4.2 Powerlessness: economically rational, or perceived condition?

The simple linear form of the baseline model does not allow to capture interaction effects between variables. Assuming that all three variables contribute to explaining the variance in WTP and/or WTC, one might wonder whether the powerlessness feeling is mediated by one's absolute economic condition or rather perceptive feelings. The baseline interaction model is specified as follows for WTP:

$$WTP_i = \beta_1 Income_i + \beta_2 SocialLadder_i + \beta_3 Powerlessness_i + \gamma_1 Income_i * Powerlessness_i + \gamma_2 SocialLadder_i * Powerlessness_i + X_i + \epsilon \quad (3)$$

and for WTC:

$$WTC_i = \beta_1 Income_i + \beta_2 SocialLadder_i + \beta_3 Powerlessness_i + \gamma_1 Income_i * Powerlessness_i + \gamma_2 SocialLadder_i * Powerlessness_i + X_i + \epsilon \quad (4)$$

If the interaction term $\gamma_1 Income * Powerless$ is significant and negative (positive), it would imply that having a higher income mitigates (amplifies) the feeling of powerlessness and its subsequent effect on the dependent variable. If the interaction *term* γ_2 *SocialLadder * Powerless* is significant and negative (positive), it would imply that reporting a higher perceived position on the social ladder mitigates (amplifies) the feeling of powerlessness and its subsequent effect on the dependent variable. Intuitively, we expect the signs to be negative, so that actually being or feeling better off economically and socially prevents sentiments of powerlessness and, thus, augments the willingness to pay.

A potential issue with the estimated model is that of endogeneity of some predictors, which is often the case when attitudinal variables are included as explanatory variables

(Kallbekken & Sælen, 2011). This might partially explain why attitudinal factors are generally found to have a greater impact on social acceptability than socio-economic factors do (Schade et al., 2000; Jaensirisak et al., 2005). Also, the concept of cognitive dissonance has been identified as a potential bias to the interpretation of some predictors (Festinger, 1957). For instance, in order to reduce this conflicting situation of mental discomfort, people who do not want taxation, to avoid cost or preserve their self-interests (Rosentrater et al., 2013), might report lower levels of environmental concern. In simpler words, if someone reports being concerned by the negative impact of human activity on the environment, while not being willing to change their lifestyle, they might experience an uncomfortable tension. Consequently, readjusting the importance given to the environmental problem allows to justify "business as usual" behaviors and, in turn, reduce the cognitive dissonance (Tobler et al., 2012). Likewise, the reported feeling of powerlessness can stem from similar mechanisms. Yet, Kallbekken & Sælen (2011) contend that, while it is difficult to rule out that cognitive dissonance can affect the direction of causality, the direction implied in models similar to the one used in this study is considered to be the most plausible direction of causality.

5 Available data and variables

5.1 Data

This research relies on survey data drawn from the Standard Eurobarometer, initiated in 1974. Data are collected by means of face-to-face interview for approximately 2000 respondents per country. Several surveys were conducted on the topic of Attitudes of Europeans towards the Environment. In 2010, the International Social Survey Programme focused on the theme of the Environment and sought to investigate the attitudes to environmental protection and preferred government measures for environmental protection. Unfortunately, there is no more recent data which comprises information as extensive as the one offered in the questionnaire for 2010. However, if the analysis conducted for the 2010 sample confirms the hypothesis presented in this study, it might hold some implications for understanding the recent turmoil in France. The sample was restricted to French respondents only. Table 11 in the Appendix recapitulates all the questions used in the survey to derive the subsequent variables and Table 12 gives details about the summary statistics. The sample is equally distributed between men and women, the mean value of income is close to 2000 euro monthly, a majority of people has religious beliefs, and the median age is close to 60.

5.2 Available variables

5.2.1 Dependent variables: Willingness To Pay for higher taxes and Willingness to Cut one's standard of living

The dependent variable "Willingness to Pay higher taxes" (WTP) stems from the question "To which extent are you willing to pay much higher taxes to protect the environment?". The respondents can choose between five alternatives: very willing, fairly willing, neither willing nor unwilling, fairly unwilling and very unwilling. The variable "Willingness to Cut one's standard of living" (WTC) is derived from the respondents answer to: "To which extent are you willing to cut your standard of living to protect the environment?". Similar alternatives to WTP can be chosen by the respondent. Table 1 displays the sample scores for both variables.

Table 1: WTP and WTC scores

	Pay Higher Tax	Cut Standard of Living
=1 Very willing	2%	6%
=2 Fairly willing	14%	27%
=3 Neither willing or unwilling	23%	26%
=4 Fairly unwilling	26%	21%
=5 Very unwilling	35%	20%
Observations	2165	2188

The distribution of the two variables clearly show that, generally in France, people are more reluctant to pay higher tax (60% are fairly unwilling or very unwilling to do so) than to cut their standard of living (40% are unwilling). "Cut Standard of Living" registers the most positive reaction, with 32% fairly or very willing, against 16% only for higher tax. Again, this distribution is in line with the "general tax resistance" explanation as advanced by (Jagers & Hammar 2009) and justifies the use of the WTC variable in the empirical analysis.

5.2.2 Proxies for real and perceived socio-economic conditions, and powerlessness

Real socio-economic conditions: absolute individual income - Measured by the monthly individual salary income. The personal monthly income variable was coded according to an ordinary scale of income categories using increments mid-points. The income distribution with 11 ranges is described in more details in Table 2.

Perceived socio-economic conditions: position on the social ladder - Respondents were asked to report their perceived position on the social ladder. The variable was elicited from the following question: "In our society, some groups are rather situated at the bottom and some rather at the top. On a scale from 1 (bottom) to 10 (top), where would you rank yourself?". Table 3 displays the distribution of responses.

Table 2: Income distribution

Less than 500 EUR a month	5%
500-800 EUR	8%
800-1200 EUR	16%
1200-1700 EUR	23%
1700-2400 EUR	23%
2400-3100 EUR	11%
3100-3800 EUR	5%
3800-4500 EUR	3%
4500-6000 EUR	3%
6000-7500 EUR	1%
More than 7500 EUR a month	1%
Observations	1763

Table 3: Social Ladder

Bottom 1	3%
2	4%
3	12%
4	21%
5	25%
6	18%
7	12%
8	4%
9	1%
Top 10	0.5%
Observations	2078

The social ladder distribution reveals that a majority (65%) of people consider themselves ranked on the first half (between 1 and 5). Another 30% report being ranked slightly above average (on the 6th and 7th position), while the last quintile represents 5.5% of the sample. Turning to the income distribution, 85% of respondents report having an income lower than 3100 euro per month, which would represent the mid-point in our distribution.

This difference between absolute individual income and reported position on the social ladder stems from the fact that, during the social comparison process, people may value not only value their individual income but also that of their household, including also wealth and pensions. Overall, all family members benefit from the income or wealth accumulated by some members of the family, so that individual income may not reflect the way people actually perceive their socio-economic position (Rojas, 2014). Hence, using a wider measure of family earnings could provide more sensitive information. However, an evident and major problem is that income becomes a variable at the household level, while willingness to pay higher taxes is an individual-level variable. For this reason, the analysis will be based on individual income only and supported by a robustness check using household income.

Feeling of powerlessness - The question ”It is way too difficult for someone like me to do something for the environment” allows to scale the feeling of powerlessness of the respondent. If somebody chooses “strongly agree”, we might expect that the respondent feel they cannot act for the environment, or that they feel their action is worthless. This in turn might decrease the reported levels of Willingness to Pay or Act for the environment.

According to the concept of the locus of control introduced further above, since climate change is a global issue, individuals may adopt an external locus of control and feel they have no control over the outcome of their action (Swim et al. 2009). However, the question in this survey captures a different dimension: that of “relative powerlessness”. In fact, the question mentions *”for someone like me”*, which implies that the respondent must consider their own personal situation to assess whether or not they can do something for the environment. Hence, this dimension of powerlessness is highly dependent on one’s perception of their own socio-economic condition, in comparison to others’. 30% of respondents agreed (22%) or agreed strongly (8%) with the statement.

5.2.3 Control variables

In line with the theoretical discussion, and the available measures from the survey, several predictors have been identified as impacting willingness to pay higher taxes and, thus, need to be controlled for.

Individual perceptions of policies - Several questions test for the opinion of the respondent on the different measures they think to be most effective to mitigate environmental externalities. First, the question "Which of the following do you think is the most effective way to incentivize French citizens to protect the environment?". The respondent can choose between "Fine heavily those who harm the environment", "'Reward those who act to protect the environment through tax benefits" and "Inform and educate people on the advantages to protect the environment". The first answer refers to coercive measures, the second to non-coercive measures and the third to educational measures. This provides us with information on which type of measure the respondent perceives as effective, though we have no information on the degree to which they think it is effective.

Perceived effect of government intervention - A dummy variable for the individual's opinion regarding government intervention is added. The respondent needs to choose the statement they agree with most: "The government should implement regulations to force the civil society to protect the environment, even if that entails restraining individual freedom". The dummy variable takes the value 1 when the respondent chooses the second answer, meaning they are supportive of government intervention and climate policies in general.

Figure 1: Policy design preferences:

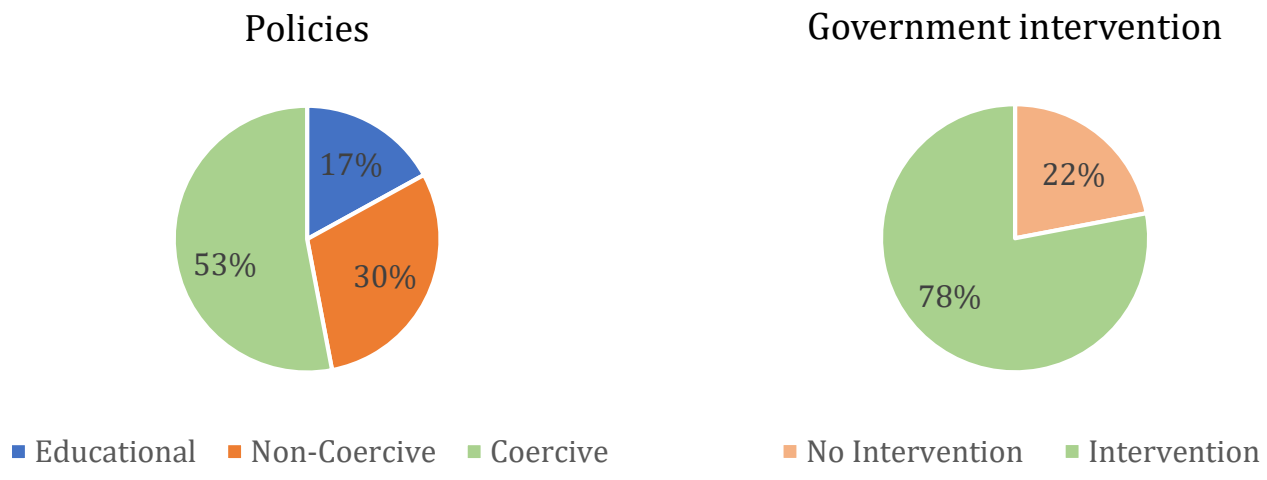
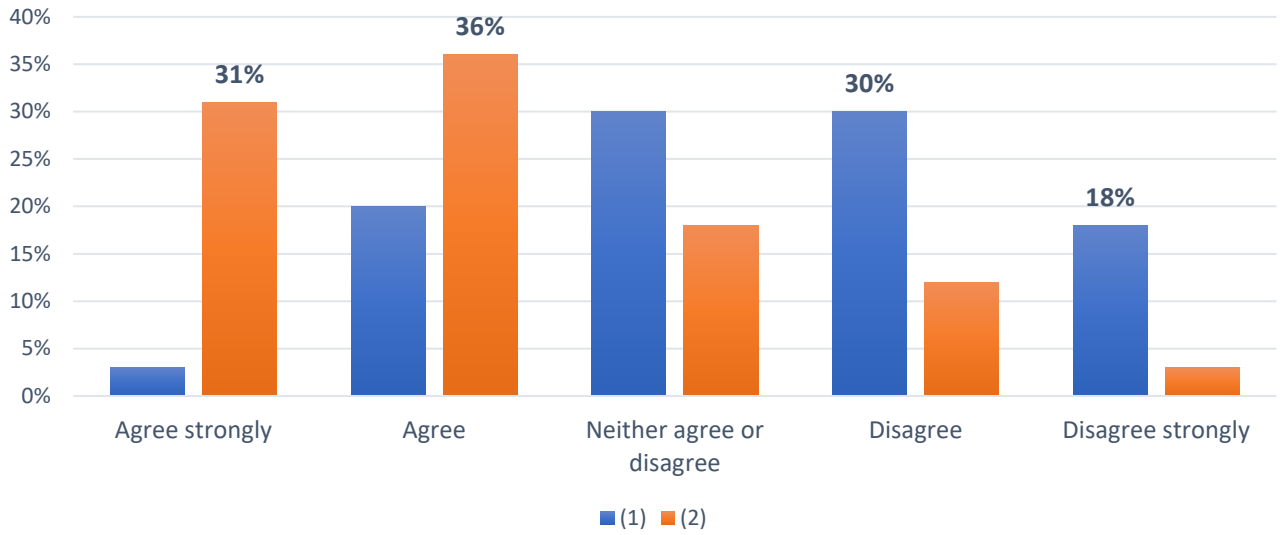


Figure 1 shows the distribution for both questions. In line with the literature, people seem significantly more favorable of non-coercive or educational measures than coercive measures. Regarding government intervention, regulation is preferred, though an appreciable percentage of people responded in favor of the free-rider option.

Figure 2: Trust in the government scores



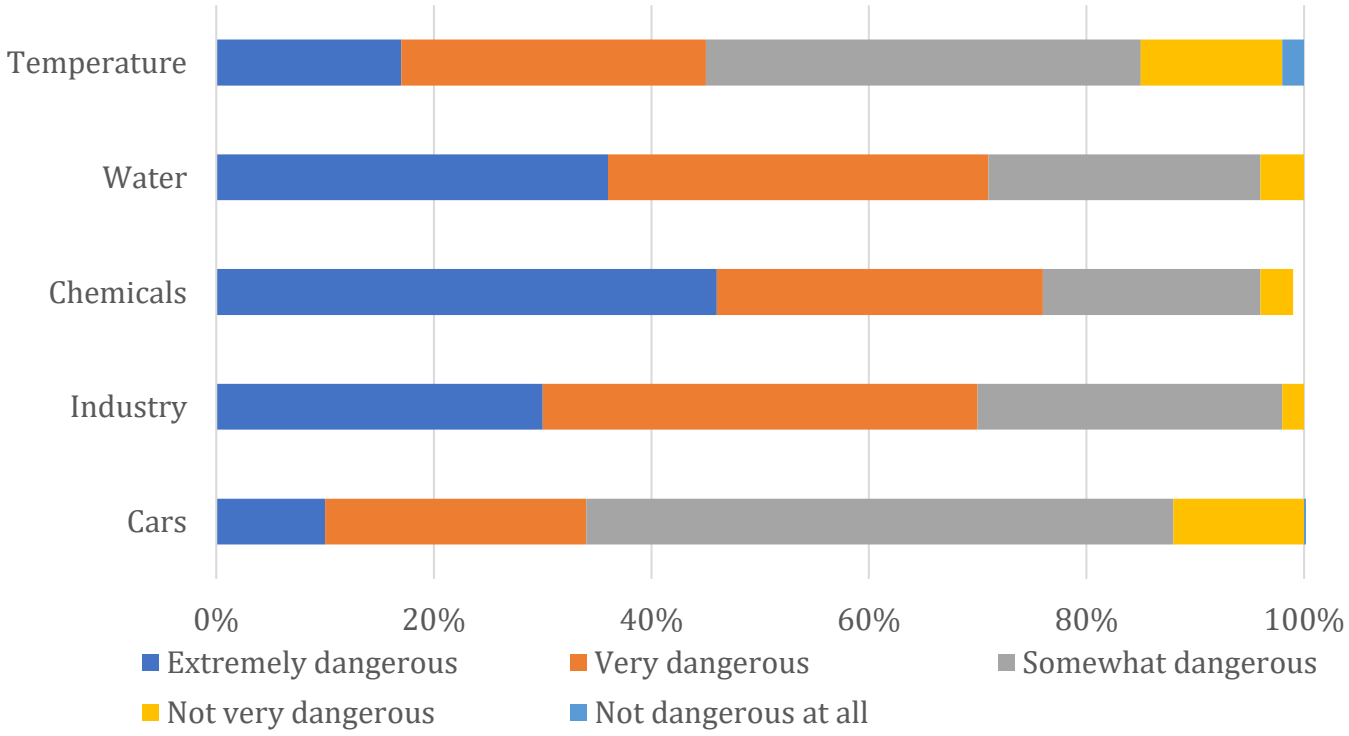
Trust in the government - The level of trust in the government is captured by the question: "To which extent do you agree with the following statement: (1) I can trust the government to make the right decisions most of the time and (2) Most politicians only look after their own interests". The answer is a five-point scale ordinal measure ranging from agree strongly to disagree strongly. It is to be noted that, given the direction of the questions, answering "Agree strongly" to (1) suggests high trust levels in the government, while the same answer for (2) implies low trust levels in politicians. The variable TrustGov (1) will thus be recoded for a more intuitive interpretation of the results in the analysis. The distribution in Figure 2 shows that a large majority of respondents (67%) do not trust politicians for seeking people's interests and 48% do not trust the government for making good decisions.

Environmental concern - The questionnaire comprises a question which allows to test directly for environmental concern. To the question "Would you say that you feel concerned about environmental issues", the respond can choose on a five-point scale from "not concerned at all" to "very concerned". 62% of the respondents report feeling concerned or extremely concerned.

From the survey, the respondent's subjective vision on climate change was also elicited, through their reported degree of concern towards pollution across three categories. The opinion towards different types of pollution is aggregated from the following questions: "Generally, do you think that emissions from (a) car use, (b) industries, (c) pesticides and chemicals are (1) not dangerous at all, (2) not really dangerous, (3) rather dangerous, (4) very dangerous or (5)

extremely dangerous". The degree of concern towards temperature rises is also added to this self-constructed concern index. It is interesting to note that the pollution generally induced by the industry and businesses (Industry, Chemicals and Water) is perceived as very/ extremely dangerous by a large majority of respondents, while the pollution induced by cars is perceived as only relatively dangerous. There might be two reasons for that. The first one might be due to the fact that, in 2010, gasoline and diesel pollution were much less highlighted in the media and policy agenda, while heavy industry and chemicals have been pointed at for already quite some time. The second one might be related to the concept of cognitive dissonance (Festinger, 1957). Expressed simply, for someone who feels concerned about the environment, reporting that car pollution is only relatively dangerous helps justifying why they keep using their car (this idea will be further developed in section 4.2).

Figure 3: Environmental concern scores



Geographical areas - The area of residence - rural, town or urban - is given, which allows to control for potential geographical disparities. Each alternative is derived into a dummy variable.

Socio-demographic variables - Age, gender and educational background of the respondent are reported. We only retain a dummy variable if the respondent attended university.

5.2.4 Additional and robustness check data

Household income - Monthly household income, including salary income, pensions and any other income. The household monthly income variable was coded according to an ordinary scale of income categories using the same increment mid-points as for absolute income. The distribution of the household income mirrors more closely that of the perceived position on the social ladder than absolute individual income.

Sustainable Behavior Index - As an alternative to the WTP and WTC dependent variables, we construct an index of sustainable behavior, using a set of questions from the survey: ”In order to protect the environment, how often do you make the effort to (1) recycle, (2) buy organic fruits and vegetables, (3) reduce your energy consumption, (4) reduce your water consumption, (5) avoid buying specific products, (6) not use your car?” For each statement, the respondent can answer with never, sometimes, often or always. Each response gives the respondent a score (never=0, sometimes=1, often=2 and always=3), hence the sustainable behavior index ranges from 0=not sustainable to 18=very sustainable. The distribution of the index can be found in Table 13 in the Appendix.

Effort to reduce car use - To the question ”How often do you make the effort to avoid using your car to protect the environment”, the respondent can answer with ”never, sometimes, often or always”.

5.3 Chosen regression model

Table 4 recapitulates the dependent and hypothesis variables. All the control variables are summarized in Table 14 in the Appendix.

Most of the variables are categorical or ordinal. For some variables (such as trust and environmental concern), the participants could indicate their level of agreement, disagreement or satisfaction with a particular statement according to a Likert-type scale. These variables are technically ordinal since they consist of a clear ordering of categories. However, they often are treated as continuous. In fact, several authors have found support for the use of “five or more-scale Likert-type” ordinal variables as continuous without causing any harm to the analysis (Norman, 2010; Sullivan & Artino Jr ,2013).

Table 4: Dependent and hypothesis variables in the model, definition and alternatives

Label	Definition	Alternatives
	Dependent variables	
WTP	Willingness to pay higher taxes	Very unwilling to Very willing (1-5)
WTC	Willingness to cut standard of living	Very unwilling to Very willing (1-5)
	Hypothesis variables	
Income	Mid-point of personal monthly income	Continuous
SocialLadder	Reported social class	Bottom to top (1-10)
Powerless	Feeling of powerlessness	Low to High (1-5)

Non-ordered categorical variables (such as individual perceptions of policy) were deconstructed into *k* dummy variables, corresponding to each alternative of the categorical variable. For instance, if the respondent can choose among *k* alternatives to answer a question, the derived explanatory variable will be decomposed into *k* different dummy variables. For each set of constructed dummy variable, one dummy is left out to avoid perfect collinearity.

As said, the two dependent variables were rated on a five-point Likert scale ranging from 1 "Very unwilling" to 5 "Very willing". Based on the "five or more-scale Likert-type" rule, the dependent can be treated as continuous without hampering the quality of the analysis. This allows for a linear analysis using OLS regressions, which makes the interpretation of the estimated coefficients much more intuitive as they reflect marginal effects. In the ordered probit model, preferred when cardinality is assumed, the sign of the coefficient gives information about the impact of an increase of a given explanatory variable on the predicted probability of reporting the highest ranked choice. As such, it allows to identify whether a predictor impacts the dependent variable, and the direction of that impact. However, grasping the impact's magnitude and comparing it between variables is much less intuitive. Since the aim of the study is to identify whether real or perceived condition is most influential to determine one's degree of powerlessness, and the subsequent effect of it on WTP, we lean towards the more intuitive and informational linear analysis. A set of robustness checks will then confirm the consistency of the results when using an ordered probit model assuming ordinality for the dependent variables.

6 Empirical findings

6.1 Linear analysis

The empirical procedure in this analysis begins with estimation results of the linear OLS regressions for both dependent variables. Table 5 reports the results derived from equation (1) and (2), i.e. the individual effect of each explanatory variable on WTP and WTC, respectively.

6.1.1 Assessing and comparing the isolated effect of the control variables

Being in favor of government intervention to make people protect the environment exerts a positive effect on both variables. This suggests that respondents who support environmental regulations are also willing to comply to those regulations, through taxes, or by adapting lifestyles. As expected, the level of trust in politicians impacts the reported willingness of the respondents to engage with climate action in all three ways under study. In line with Hammar & Jagers (2006) and Kallbekken & Sælen (2011) findings in a Swedish context, the positive and significant coefficients imply that, when French respondents believe that politicians act in favor of the civil society's interests rather than for their own, they will in turn be more inclined to engage with climate action.

The relationship between preference for an ecological political party and willingness is also confirmed with coefficients which are relatively large and significantly different from the omitted groups for both variables. The positive (negative) relationship between affiliation to a Far left (right) party and willingness identified in Switzerland (Tobler et al., 2012) and Sweden (Hammar & Jagers, 2007; Harring & Jagers, 2013) is not verified in the French setting.

Environmental Concern is, unsurprisingly, positive and significant for both estimations. The effect is stronger for WTC. One explanation may be found in the 'low-cost hypothesis' proposed by (Diekmann & Preisendörfer, 2003). They contend that the effect of attitude is strongest for low-cost behavior and lowers when the perceived cost increases. Considering that people tend to overestimate the cost associated with a tax (Diekmann & Preisendörfer, 2003), it is fair to assume that "paying higher taxes" induces higher and inescapable cost in people's minds, while "Cutting one's standard of living" may be seen as less costly (as it may simply be interpreted as taking shorter showers or recycling for instance).

The Religion dummy is significant at the 5% level for both WTP and WTC. The direction of the coefficient tells us that having a religious affiliation diminishes the respondent's reported willingness. The literature is not extensive about the impact of religious tendencies on environmental behaviors. In the US, American Evangelicals and adherents of "Christian end-times theology" were found to be less supportive of climate policies (Smith & Leiserowitz, 2013; Barker & Bearce, 2013). In line with Thalmann (2004) findings, holding a University degree increases the Willingness to Cut one's standard of living, while gender is not a significant determinant.

Perhaps a more surprising non-effect is that neither the urban or the rural dummy variables have a significant predictive power. While Rodríguez-Pose (2018) affirm that the current political crisis stems from *"strong territorial, rather than social foundations",* the findings in the present study suggest that territorial features do not account for the variance in willingness to pay higher taxes (So far. This point will be further discussed in section 7.2 down below). Hence, we turn to the analysis of socio-economic grounds.

6.1.2 Real and perceived socio-economic contingencies of WTP

In line with Thalmann (2004), Income is not a significant determinant of either willingness to pay higher taxes or cut one's standard of living. However, it is worth mentioning that, when the Social Ladder variable is excluded from the model, the coefficient for Income is positive and significant at the 1% level (for WTP, it remains insignificant for WTC), though the magnitude is can alter its interpretation. Because the statement stipulates "It is too difficult *for someone like me* to act for the environment", we consider that this variable does not illustrate a generic feeling of powerlessness towards climate change mitigation, but does instead include an individual, perceptive dimension of powerlessness. As such, this reported feeling might be mediated by other factors, such negligible. When both Income and Social Ladder are included in the model, only Social Ladder appears to matter for explaining the variance in the dependent variables. The positive and significant coefficient, though only at the 5% level for WTC, suggests that the higher the perceived position on the social ladder, the higher the willingness to pay higher taxes or reduce one's quality of life. More particularly, a one point increase on the social ladder increases the score for willingness to pay by 0.088 for WTP, and by 0.056 for WTC.

The difference in significance of the "real" and "perceived" condition might hold some interesting implications. In fact, Income is an objective measure of the respondent's economic

position, while Social Ladder is a subjective measure which reflects the respondent's *perceived* position in the socio-economic hierarchy of the society. The latter measure hence induces a process of social comparison, in order to be able to place oneself within this hierarchy. The fact that Social Ladder alone shows significance might suggest that the degree of willingness is not necessarily linked to income, and thus economically rational, but rather dependent on people's perception of what their position enables them to do.

Table 5: Estimation of Willingness to Pay higher taxes and Cut standard of living

	(WTP)		(WTC)	
	β	SE	β	SE
Hypothesis variables				
Income	0.000	(0.000)	-0.000	(0.000)
SocialLadder	**0.088*****	(0.025)	**0.056****	(0.025)
Powerless	-0.040	(0.031)	**-0.098*****	(0.031)
Control variables				
CoercivePpl	0.037	(0.092)	-0.024	(0.092)
NoncoercivePpl	-0.029	(0.077)	-0.109	(0.077)
GovPpl	0.441***	(0.085)	0.436***	(0.085)
TrustGov	-0.047	(0.036)	-0.014	(0.036)
TrustPolit	0.150***	(0.032)	0.125***	(0.032)
FarLeft	0.273	(0.237)	0.072	(0.238)
Green	0.370***	(0.113)	0.459***	(0.113)
FarRight	-0.208	(0.200)	-0.014	(0.200)
EnvConcern	0.174***	(0.036)	0.273***	(0.036)
PolConcern	0.015	(0.012)	0.005	(0.012)
Urban	-0.015	(0.092)	-0.046	(0.092)
Rural	-0.090	(0.079)	-0.018	(0.079)
Religion	-0.126*	(0.071)	-0.140*	(0.072)
University	0.068	(0.082)	0.188**	(0.082)
Gender	-0.085	(0.074)	-0.013	(0.074)
Age	0.003	(0.003)	0.002	(0.003)
Observations	1030		1036	
Pseudo R^2	0.207		0.239	

* p <.01; ** p <.05; *** p <.001.

Column (1) reports estimation results derived from Equation (1). Column (2) reports estimation results derived from Equation (2). Full set of control variables included, all variables displayed

Probably the most interesting finding is the significance at the 1% level of the Powerless variable for WTC. The negative sign of the coefficient suggests that feeling powerless towards environmental protection reduces the reported willingness to cut one's standard of living. In fact, a one point increase on the 5-point powerlessness scale decreases the score for WTC by 0.098. As already mentioned, one important detail from the design of this variable as individual's income or the perceived position on the social ladder. The next section hence tests for the interaction between these variables.

6.2 Roots of the powerless feeling

The powerless variable being insignificant when regressed against WTP, both interaction terms with income and social ladder also fail to show significance. Hence, Table 6 reports results for WTC only. Column (1) is the empirical estimation of equation (4) including the interaction term with Income, and column (2) the estimation including the interaction term with Social Ladder.

The interplay between Powerless and Income is insignificant, while that between Powerless and Social Ladder is significant at the 5% level. Although the magnitude of the coefficient is quite small (-0.036), the negative coefficient suggests that a (one point) increase in the perceived position on the social ladder mitigates the negative effect of feeling powerless towards environmental protection (by 0.036). Most importantly, Powerless becomes insignificant when both interaction terms are added, thereby confirming that the negative effect of powerlessness on willingness is mediated by the respondent socio-economic condition, by Social Ladder more specifically.

Table 6: Estimation of Willingness to Cut standard of living: interaction terms included

	(1)		(2)	
	β	SE	β	SE
Hypothesis variables				
Powerless * Income	-0.000	(0.000)		
Powerless * SocialLadder			**-0.036****	(0.017)
Income	0.000	(0.000)	-0.000	(0.000)
SocialLadder	**0.055****	(0.025)	**0.108*****	(0.035)
Powerless	-0.046	(0.051)	0.071	(0.085)
Control variables				
EnvConcern	0.271***	(0.036)	0.268***	(0.036)
GovPpl	0.438***	(0.085)	0.446***	(0.085)
TrustPolit	0.126***	(0.032)	0.127***	(0.032)
Green	0.460***	(0.113)	0.460***	(0.113)
Religion	-0.140*	(0.071)	-0.142**	(0.071)
University	0.196**	(0.082)	0.189**	(0.081)
Observations	1036		1036	
Pseudo R^2	0.230		0.231	

* p <.01; ** p <.05; *** p <.001.

The variable Willingness to Cut one's standard of living is used as dependent variable.

Column (1) reports estimation results with the interaction term between Income and Powerless only. Column (2) reports estimation results with the interaction term between Income and Powerless only. Full set of control variables included, only significant variables displayed.

6.3 "Actions speak louder than words"

In their study on a wide range of environmentally significant behaviors, Tobler et al. (2012) recognize that using self-reported willingness to act as the dependent variable, instead of actual behavior, presents a limitation. The reason is that large discrepancies have been observed between intentions to act and actual behavior, with intentions explaining about 28% of the variance in general behavior (Sheeran, 2002) and environmentally significant behavior (Bamberg & Möser, 2007).

The aim of the present study is not to identify a broad range of determinants specifically, but instead to assess the effect of perceptive variables. Confronting those variables to actual behaviors, rather than the reported willingness, might help giving weight to the analysis, by testing whether the influential factors identified in the above analysis do explain (or prevent) a more sustainable lifestyle, and not only the reported propensity to adopt (or reject) it. Hence, we use a self-constructed index of sustainable behavior, as well as a more specific behavior related to car use. This particular dimension is chosen since it is the most closely related to the initial problematic in the French setting, fuel tax.

In order to further refine the estimations, the variables of interests are confronted to one last dependent variable. We analysed the willingness to cut one's living of standard, and its counterpart the sustainable behavior index. Ideally, we would like to investigate a more tangible counterpart to the willingness to pay higher taxes variable. This particular dimension is chosen since it is the most closely related to the initial problematic in the French setting, fuel tax.

6.3.1 Sustainable Behavior Index

The specifications using the Sustainable Behavior Index as dependent variable are reported in Table 7. In line with studies on environmentally significant behaviors, a higher degree of environmental concern, as well as the perception of climate change (proxied by the variable PolConcern) increase the score of the sustainable behavior index. Also, all three political affiliation dummies are significant: supporting a green or far left party increase the score (though possibly less so for the latter given the low significance level of the coefficient), while being affiliated with a far right party diminishes it. This suggests that, while political affiliation does not exert an impact on the reported willingness to pay higher tax or cut one's living of standard, it does impact the behaviors people actually adopt. Quite surprisingly, neither income or social ladder come out as significant predictors of the sustainable behavior result. However, the powerless variable does, and the magnitude of the coefficient is greater than in the previous estimations.

Table 7: Estimation of Sustainable Behavior Index

	β	SE
Hypothesis variables		
Income	-0.000	(0.000)
SocialLadder	-0.029	(0.065)
Powerless	**-0.491*****	(0.079)
Control variables		
CoercivePpl	0.085	(0.236)
NoncoercivePpl	-0.084	(0.196)
GovPpl	-0.397*	(0.219)
TrustGov	-0.067	(0.092)
TrustPolit	-0.076	(0.083)
FarLeft	1.080*	(0.610)
Green	1.053***	(0.288)
FarRight	-1.039**	(0.514)
Urban	0.059	(0.235)
Rural	0.198	(0.202)
EnvConcern	0.591***	(0.092)
PolConcern	0.178***	(0.030)
Religion	0.051	(0.183)
University	0.018	(0.209)
Gender	0.180	(0.189)
Age	0.035***	(0.007)
Observations	1013	
Pseudo R2	0.214	

* p <.01; ** p <.05; *** p <.001. OLS estimations using Sustainable Behavior Index as dependent variable. Similar set of control variables to that used in Table 5 included.

6.3.2 Effort to reduce car use

Table 8 shows the results for the specification using the variable referring to how often the respondent avoids using their car to protect the environment. Again, environmental concern and pollution concern act positively on limiting people's car use. Again, powerlessness exerts a negative impact, hence confirming the intuition of the previous estimations. However, the social ladder variable shows a negative and significant at the 1% level coefficient. Expressed differently, respondents with a higher perceived position on the social ladder are less likely to give up using their car to protect the environment. A potential explanation is that, with car use is associated high cost. Lower income groups may be willing to reduce their car consumption because it also means saving on some expenditures. For higher incomes groups however, not using the car might be appear quite inconvenient and is not worth the trouble.

Most interestingly, the Urban dummy variable becomes positive and statistically significant at the 1% level. This suggests that people who live in urban areas report avoiding to use their car to protect the environment more frequently than the omitted group does.

Table 8: Estimation Effort Car

	EffortCar	
	β	SE
Hypothesis variables		
Income	-0.000	(0.000)
SocialLadder	**-0.048*****	(0.018)
Powerless	**-0.077*****	(0.022)
Control variables		
Green	0.232***	(0.080)
FarRight	-0.192	(0.144)
Urban	**0.250*****	(0.066)
Rural	**-0.104***	(0.056)
EnvConcern	0.092***	(0.026)
PolConcern	0.027***	(0.008)
Age	0.008***	(0.002)
Observations	1016	
Pseudo R2	0.141	

*p <.01; ** p <.05; *** p <.001. OLS estimations using Effort Car as dependent variable. Similar set of control variables to that used in Table 5 included.

6.4 Robustness checks

6.4.1 Ordered Probit Model

As said, the dependent variables used to estimate the model are ordinal. In order to assess whether treating the variables as ordinal or cardinal impacts the findings, the estimation results are run using an ordered probit model, i.e. the preferred model in case of a more than two outcomes ordinal dependent variable (Hill et al., 2008).

The results are presented in Table 9. The interpretation of the coefficients differs from that of a linear regression analysis. More particularly, the coefficients give information about the probability of reporting the highest ranked value on the ordinal scale - here "Very willing". Hence, a positive coefficient implies that, all other variables held constant, a one point increase of the predictor increases the probability of reporting the highest value, i.e. the probability of being "Very Willing". Inversely, a negative coefficient signifies that a one-point increase in the scale of the predictor diminishes the propensity of the respondent to be "Very Willing".

The signs of the coefficients bring support to the above findings in the OLS analysis. The direction of the impact of the control variables is confirmed using the oprobit model. In line with the OLS estimations, the coefficient of Powerless becomes significant when WTC is the dependent variable, and the sign is still negative. The interaction term between Powerless and SocialLadder also shows significance for explaining WTC, while Powerless * Income is insignificant. This confirms again that the social ladder variable matters most for explaining WTC, directly and through the channel of the powerlessness variable.

6.4.2 Household income as a measure for "real" economic condition

As mentioned in section 5, using household earnings instead of individual salary may capture more precisely the way people perceive their financial position. It might be according to this wider definition of one's "real" economic condition that people decide to which extent they are willing to pay higher taxes. The results using household earnings are displayed in Table 10.

Table 9: Estimation of WTP and WTC: ordered probit model robustness check

	WTP		WTC	
	β	SE	β	SE
Hypothesis variables				
Income	0.000	(0.000)	-0.000	(0.000)
SocialLadder	**0.090*****	(0.026)	**0.056****	(0.026)
Powerless	-0.042	(0.031)	**-0.101*****	(0.031)
Control variables				
GovPpl	0.466***	(0.089)	0.422***	(0.086)
TrustPolit	0.158***	(0.033)	0.128***	(0.033)
Green	0.361***	(0.113)	0.501***	(0.114)
EnvConcern	0.181***	(0.037)	0.283***	(0.037)
Religion	-0.114	(0.072)	-0.143**	(0.072)
University	0.060	(0.082)	0.190**	(0.081)
Observations	1001		1007	

* p <.01; ** p <.05; *** p <.001.

This table displays the same specifications as in Table 5, using an ordered probit model. Full set of control variables included, only significant variables displayed.

Table 10: Estimation of WTP and WTC: household income robustness check

	(1) WTP		(2) WTC		(3) WTC		(4) WTC	
	β	SE	β	SE	β	SE	β	SE
Hypothesis variables								
Household Income	0.000	(0.000)	-0.000	(0.000)	0.000	(0.000)	-0.000	(0.000)
SocialLadder	**0.087*****	(0.027)	0.055**	(0.027)	**0.055****	(0.027)	**0.101*****	(0.037)
Powerless	-0.030	(0.032)	**-0.094*****	(0.032)	-0.017	(0.061)	0.055	(0.088)
Powerless * HousIncome					-0.000	(0.000)		
Powerless * SocialLadder							**-0.031***	(0.017)
Control variables								
GovPpl	0.419***	(0.087)	0.443***	(0.087)	0.447***	(0.087)	0.455***	(0.088)
TrustPolit	0.156***	(0.033)	0.139***	(0.033)	0.141***	(0.033)	0.141***	(0.033)
Green	0.388***	(0.114)	0.455***	(0.114)	0.460***	(0.114)	0.455***	(0.114)
FarRight	-0.383*	(0.205)	-0.088	(0.206)	-0.070	(0.207)	-0.069	(0.206)
EnvConcern	0.200***	(0.037)	0.291***	(0.037)	0.288***	(0.037)	0.287***	(0.037)
Religion	-0.115	(0.073)	-0.147**	(0.073)	-0.147**	(0.073)	-0.147**	(0.073)
University	0.057	(0.084)	0.216**	(0.084)	0.227***	(0.085)	0.219***	(0.084)
Observations	974		980		980		980	
Pseudo R^2	0.204		0.237		0.239		0.240	

* p <.05; ** p <.01; *** p <.001. This table displays the same specifications as in Tables 8 and 9, using household income as a measure for real income. Column (1) shows the linear estimations with WTP as dependent variable, column (2) shows the linear estimations with WTC as dependent variable, column (3) includes the interaction term between Powerless and Income with WTC as dependent variable and column (4) includes the interaction term between Powerless and SocialLadder with WTC as dependent variable. Full set of control variables included, only significant ones displayed.

The results for the control variables are essentially similar to those obtained using individual income in the regressions. Regarding the control variables, Social Ladder remain significant, while Household Income is insignificant. Powerlessness also remains significant, only when regressed against WTC. We obtain slightly different results for the interaction terms. In fact, the interplay of Powerless with both Income and Social Ladder are significant, though only at the 10% level. This suggests that when household income is considered, both "real" economic condition and "perceived" economic condition account for the sentiment of powerlessness. However, the coefficient for Income remains quasi null, and Social Ladder still exerts a direct effect on WTC, given the significance at 1% level of the coefficient when the interaction term is added. Hence, it seems reasonable to affirm that the robustness checks involving household earnings yield results which are qualitatively consistent with those for the alternative version of the income variable, in terms of relationship between perceptive feelings of one's condition and willingness to reduce quality of life.

7 Bridging the gap

In this study, the underlying aim was to test Rodrik's (2017) proposition, that *perceived* unfairness is more so a defining factor of popular opposition that inequality per se, in light of the recent opposition to climate policies in France. The data used for the analysis was drawn from survey data collected in 2010 and, therefore, may only partially explain today's tendencies. This section will thus intend to present the patterns identified in the results in light of the current situation in France almost a decade later, and explain why this matters for the more global need for sustainable transitions.

7.1 From 2010 to 2019

The findings in this study suggest that, for a representative sample of French respondents surveyed in 2010, the reported willingness to pay higher taxes was negatively impacted by the

perceived position of the respondent on the social ladder. Also, the reported willingness to cut one's standard of living was mitigated by the feeling of powerlessness towards climate action that the respondent experienced in response to their perceived socio-economic position. However, that same feeling of powerlessness did not seem to exert any impact on the willingness to pay higher taxes. As said, one possible explanation is the "general tax resistance". Furthermore, it is to be noted that both WTP and WTC do not refer to actual environmental behaviors but, instead, to the reported willingness to do something. As such, the degree of willingness a respondent chooses to report is directly linked to the idea that the respondents have of the particular behavior.

Back in 2010, the adoption of the carbon tax was rejected for the second time. It is only later on that the carbon tax was finally included in the French scheme, while taxation devices began to be underlined as the most efficient mechanisms on the international front. The taxation channel soon became obvious and almost inescapable, especially in France where an intense love-hate relationship with fiscality perpetuates. Being taxed and paying higher prices in the name of "L'écologie"[3] became pervasive and passively accepted among the civil society - until the recent breaking point. Thus, one might consider that, in 2010, environmental behaviors were mostly associated with individual actions and cutting one's own standard of living, rather than taxation. Expressed differently, *"doing something for the environment"* may have been more broadly associated with recycling or reducing one's water consumption than with paying higher taxes for the environment. As such, the variable derived from the statement "It is way too difficult *for someone like me* to do something for the environment" explains part of the variance in the Willingness to Cut standard of living, but not to pay higher taxes or prices. Considering the recent sentiment towards taxation, one could expect the relationship between powerlessness and willingness to pay higher taxes to be significant in a more recent setting.

When it comes to actual behavior then, the powerlessness variable does indeed play a significant role and negatively affects the propensity to adopt a more sustainable lifestyle. However, neither the relative position in society or income contribute to explaining the variance.

[3] "The ecology » in French.

For a particular sustainable behavior (reducing car use), the effect of ranking higher on the social ladder even produces a negative impact. For that specific behavior, a geographical component adds to the equation: urban residents are more inclined to give up using their car, while rural residents much less so. This differentiation is probably accounted for by the wider range of alternatives available in cities and, thus, might be explained by "capacity" rather than "willingness". In other terms, although some socio-demographic variables such as education might account for some of the difference, we expect rural residents to score lower on this variable, not because they do not want to, but because they are unable to.

Social acceptability of an environmental policy aiming at reducing the frequency of car use is expected to be higher if people are offered alternatives. For instance, after interrogating a Norwegian group study, Kallbekken & Aasen (2010) found that a tax imposed in the absence of environmentally friendly options would be perceived as unfair. Back in 2010 already, the geographical divide in terms of range of action and alternatives was perceptible. Assuming that the patterns emerging from the "Effort Car Use" variable influence the perception of the fuel and diesel taxes, hence it is no wonder that the feeling of unfairness perceived in rural areas also transpired during the recent dissent, in response to the increasing burden associated with carbon pricing.

In sum, when actual sustainable behaviors such as the effort to reduce car use are under scrutiny, the lack of incidence of socio-economic variables and the significance of geographical variants bring support to Rodríguez-Pose (2018) proposition that severe social reactions emanated from *"strong territorial, rather than social foundations".* Henceforth, although our results suggest that reactions with regards to climate policies do rely on social grounds, perhaps would geographical components also be revealed in studies of WTP in more recent settings.

7.2 Why does this matter for sustainable transitions?

The transition literature has sought to conceptualize system dynamics of sustainable transition. As a point of departure, the transition research acknowledges that current challenges cannot be addressed by incremental changes but, instead, require shifts to new kinds of systems (Markard

et al., 2012). Geels (2002) contributed to the transition framework with the formulation of the multi-level perspective as an analytical tool to identify and discuss the different levels of scale of a system. Typically, during a transition process, socio-technical regimes – the mainstream regime - are challenged by niche-innovations that build up internal momentum in response to pressures exerted by the socio-technical landscape.

Several authors have argued that early transition theories have overly focused on technological dimension of social systems and somewhat relinquished the values, behaviors and interests of human agents. (Grin et al., 2010; Grin, 2013; Spaargaren et al., 2012). As they contend, transitions are also the result of human interventions and depend on sets of routine behaviors, social practices, and norms, which are integrated in the civil society. In order to reshape those, a new *vision* ought to be designed, presented and adopted by political leaders, as much as by the civil society. The challenge is then twofold. On the one hand, the civil society must be given the opportunity to nurture a process of social learning (Seyfang & Smith, 2007), in order to achieve the *"collective discovery"* mentioned by Meadowcroft (2007). On the other hand, in order to sublimate current practices, even those who do not actively elaborate a new vision – because they are unaware, unwilling, or unable – must also fuel the new regime via their consumer practices. This, according to Grin (2013), was the subtlety that gave momentum to the regime post WWII. In response to *"the cultural appeal of the landscape trend, a spreading vision of 'Americanization'"*, the emergence of material logic gave rise to certain consumer practices which helped fuel the regime, even for those who did not share its vision. We contend that similar mechanisms are bond to unfold for the transition towards a new vision of "Environmentalization".

As said, traditional top-down policies such as carbon pricing stand as the epitome of the environmental effort. However, instead of enabling a smooth process of transition by (1) empowering civil actors and (2) embedding consumers, it seems as though fuel taxes have further reinforced the widespread sentiment of being relatively "unable", and thus "unwilling".

Based on quantitative grounds, this report shed light on this potential chain of causation, and further highlighted the importance to include perceptive feelings to understand human motives and interests in the framework of transitions processes.

7.3 Limitations

The patterns identified in this study by the direction and significance of the variables must, however, be nuanced by the low magnitude of the coefficients. If both feelings of powerlessness and the perceived position on the social ladder exert an impact, the magnitude of the impact is actually quite small. This is only partially worrisome considering that it is quite common for socio-economic factors to explain less of the variation in acceptability when attitudinal variables are also used as predictors, due to potential endogeneity (Kallbekken & Sælen, 2011). Yet, an obvious limitation of our study is the timeframe of the data which are drawn from a survey sample in 2010. The last decade has witnessed an intense rebound of contestation against inequality, with a growing inequality gap within country. The proximity must indeed have reinforced the feeling of perceived unfairness, perhaps even deteriorated the perceived position on the social ladder for some. Hence, one may expect the estimated coefficients to be larger in a more recent setting. Future research could investigate the impact of our variables of interest using more recent data in order to assess whether the impact has changed over time.

Another limitation stems from the inconclusive list of predictors included in the analysis. Several determinants, such as values and social norms, could add explanatory power to the analysis. For instance, considering that people tend to act in a social context, thus being influenced by values and beliefs shared in the communities within which they have a sense of belonging (Hoffman, 2011), such values and social norms might influence public support for climate policies (Adaman et al., 2011; De Groot & Schuitema, 2012). In other terms, the level of others' support can impact one's own support (Bolsen et al., 2014). Consequently, if the socio-economic context shapes the way a majority feels about the government and environmental policies, a snowball effect can occur under social norms influence. Also, by contrast with most studies on Willingness to Pay, the questionnaire used in this analysis does not comprise a direct question on a specific policy, the carbon tax for instance, and its perceived effectiveness. Although we contend that the questionnaire in this survey provides appropriate and useful information, we also acknowledge that a self-designed survey remains the best alternative to investigate a specific problem, in order to avoid too many arbitrary assumptions.

8 Conclusion

In lieu of the recent proliferation of scientific reports, simultaneous to the extremely rapid development of emerging countries such as China and India, it becomes apparent that the need for sustainable transitions is no longer a utopian conception, but rather an inescapable trajectory. Although skepticism prevailed for a long time - and still does so to some extent - the awareness of climate change and concerns towards its detrimental consequences is now widespread in the industrialized world. Yet, not often does it translate into personal engagement, as defined by commitment at the cognitive, emotional and behavioural levels (Lorenzoni et al., 2007). Several constraints to taking action, as well as to supporting climate policies have been documented, essentially at the social and individual level.

In this research, a parallel is drawn between the patterns attached to the recent political context and people's attitude with regards to climate policies. Beyond economic rationality, the increasing intolerance for inequality and inequity seems to produce feelings of despair, frustration, enragement, and ultimately, sparks opposition and resistance. It is considering this wider socio-political context and the allegation of the Yellow Vests movement in France that this study sought to re-calibrate the role of individual perceptions in models explaining public support for climate policies. Using survey data from a sample collected in 2010, we use linear regressions to comparatively assess the effect of individual income and that of one's perceived position on the social ladder, as well as the reported feeling of powerlessness, alongside a wide array of other determinants of the willingness to pay higher taxes to mitigate environmental externalities.

As hypothesized, the results suggest that one's perceived condition matters more for explaining the willingness to pay higher taxes than absolute income, hence providing quantitative foundations that shed light on the importance to consider perceptive dimensions for explaining the public support of climate policies. This study went a step further by identifying more closely the mechanisms behind the sentiment of disempowerment induced by feelings of relative deprivation. In fact, the findings suggest that the feeling of powerlessness that some people might feel with regards to climate action tends to be mediated by one's

"perceived" rather than "real" condition. Thereby echoing Rodrik's (2017) account that *"what arouses popular opposition is not inequality per se, but perceived unfairness"* , this reveals that not only does absolute inequality matter, but also the *perceived* societal imbalances, which ultimately crystallize into a severe sentiment of unfairness and inequity.

Mirroring Rodríguez-Pose (2018) emphasis on territorial foundations to account for the recent social reactions in many de-industrialized countries, the findings in this paper do reveal the role of a geographical component for explaining the differences in terms of range of action for reducing car use. From these results in 2010, one could potentially foresee the subsequent unreadiness to pay higher taxes for climate mitigation affirmed by a featured share of the population which, quite suddenly - though (this study argues) expectedly - burst almost a decade later. Henceforth, Rodríguez-Pose (2018) statement that strong social reactions could have been predicted if one had acknowledged *"social and economic, real or perceived distress in many non-agglomerated areas"* appears to also apply to the very specific case of social reactions to fuel taxes in France. In a similar way, Lorenzoni et al. (2007) predict that the barriers perceived to engaging with climate change identified in a UK setting may subsist as they were only partially addressed by the government, and might in turn continue to impede the achievement of policy aspirations. One might consider that in the French case, the barrier identified in this study – the feeling of powerlessness induced by one's perceived condition - was not just "partially addressed", and even less so predicted, but actually solidified by the present policy.

Although supported by quantitative foundations, this research builds on narrative assumptions. Quite evidently, the very recent nature of the social movement which was used as a point of departure in this study does not allow for a thorough and precise analysis of the underlying mechanisms that sparked the resistance. Future analyses could rely on more contemporary data in order to confront the variables of interests to dependent variables representative of the perception of fuel taxes specifically.

Overall, our analysis contributed to a clearer understanding of the recent French contestation by apprehending its deeper foundations. We are hopeful that perceptive variables such as the ones highlighted in this thesis will keep penetrating research agenda and, most importantly, will truly be considered by policy makers, especially in such challenging times.

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Appendix

Table 11: Definition of study variables sample 2010

Variables	Definition
	Dependent variables
WTP	"To which extent are you willing to pay much higher taxes to protect the environment?". (1=very unwilling, 2=fairly willing, 3=neither willing nor unwilling, 4=fairly willing, 5=very willing)
WTC	"To which extent are you willing to cut your standard of living?". (1=very unwilling, 2=fairly willing, 3=neither willing nor unwilling, 4=fairly willing, 5=very willing)
	Hypothesis variables
Feeling of powerlessness	"It is way too difficult for someone like me to do something for the environment" Five-point scale ranging from 1=disagree strongly to 5=strongly agree
Social adder	"In our society, some groups are rather situated at the bottom and some rather at the top. On a scale from 1 (bottom) to 10 (top), where would you rank yourself?"
Individual income	Mid-point of personal monthly income in Euro 11 categories of income
	Control variables
Types of measures:	"Which of the following do you think is the most effective way to getting businesses and industries to protect the environment?"
Coercive	=1 if "Heavy fines for people who damage the environment"
Non-coercive	=1 if "Use the tax system to reward people who protect the environment"
Educational	=1 if "More information and education for people to protect the environment"
Government Intervention	"Which statement do you agree with the most?" =1 if "The government should let the civil society decide freely how to protect the environment, even though they might sometimes make the wrong decisions" =0 if "The government should implement regulations to force the civil society to protect the environment, even if that entails restraining individual freedom"
Trust in	"I can trust the government to make the right decisions most of the time."

the government	Five-point scale ranging from 1=disagree strongly to 5=agree strongly
Trust in politicians	”Most politicians are in politics only to get out of it personally.” Five-point scale ranging from 1=agree strongly to 5=disagree strongly
Environmental concern	”Would you say that you feel concerned about environmental issues” Five-point scale ranging from 1=not at all concerned to 5=very concerned
Pollution concern	”Generally, do you think that emissions from car use, industries, pesticides are” Five-point scale ranging from 1=not dangerous at all to 5=extremely dangerous
Political affiliation	=1 if ”Far left” =1 if ”Green party” =1 if ”Far right”
Religion	=1 if the respondent has religious beliefs
Residential area	=1 if ”Urban” =1 if ”Rural”
Age	Continous scale in years (full sample)
Gender	Male=0, Female=1
University	=1 if the respondent’s educational level is university, master or PhD degree

Table 12: Summary Statistics of all the variables

	Obs	Mean	SD	Min	Max
Dependent variables					
WTP	2177	2.23	(2.16)	1	5
WTC	2188	2.77	(2.21)	1	5
Hypothesis variables					
Income	1763	1999.69	(1402)	250	8250
SocialLadder	2078	4.94	(1.69)	1	10
Powerless	2150	2.67	(2.21)	1	5
Control variables					
CoercivePpl	2133	0.17	(0.38)	0	1
NonCoercivePpl	2133	0.30	(0.48)	0	1
GovPpl	1682	0.78	(0.41)	0	1
TrustGov	2165	1.60	(1.08)	0	1
TrustPolit	2191	2.21	(1.11)	0	1
FarLeft	2009	0.02	(0.14)	0	1
Green	2009	0.09	(0.29)	0	1
FarRight	2009	0.02	(0.16)	0	1
EnvConcern	2173	3.74	(1.12)	1	5
PolConcern	2253	13.59	(3.52)	0	20
Urban	2245	0.24	(0.43)	0	1
Rural	2245	0.45	(0.50)	0	1
Religion	2177	0.62	(0.49)	0	1
University	2225	0.38	(0.49)	0	1
Gender	2253	0.46	(0.50)	0	1
Age	2253	58.36	(15.22)	18	98
Additional variables					
Sindex	2253	10.38	(3.22)	0	18
EffortCar	2133	2.20	(0.80)	1	4
HousIncome	1601	3248.1	(1872.73)	250	8250

Table 13: Sustainable behavior index

	Distribution	Percent	Cumul
0	3	0.13	0.13
1	8	0.36	0.49
2	15	0.67	1.15
3	33	1.46	2.62
4	33	1.46	4.08
5	84	3.73	7.81
6	87	3.86	11.67
7	150	6.66	18.33
8	198	8.79	27.12
9	229	10.16	37.28
10	278	12.34	49.62
11	271	12.03	61.65
12	266	11.81	73.46
13	214	9.50	82.96
14	164	7.28	90.24
15	121	5.37	95.61
16	60	2.66	98.27
17	27	1.20	99.47
18	12	0.53	100.00
Observations	2253	2253	2253

Table 14: Definition of control variables

Label	Definition	Alternatives
	Policy perception	
CoercivePpl	Support coercive measures for civil society	No -/ Yes +
NoncoercivePpl	Support non-coervice measures for civil society	No -/ Yes +
EducPpl	Support educational measures for civil society	No -/ Yes +
	Government intervention	
GovPpl	Support for government intervention civil society	No -/ Yes +
	Trust	
TrustGov	Trust in government	Low to high (1-5)
TrustPolit	Trust in politicians	Low to high (1-5)
	Attitudinal factors	
EnvConcern	Environmental Concern	None to high (1-5)
PolConcern	Pollution concern	None to high (0-20)
	Political and religious preferences	
FarLeft	Affiliation with a Far left political party	No-/ Yes+
Green	Affiliation with a Green political party	No-/ Yes+
FarRight	Affiliation with a Far right political party	No-/ Yes+
Religion	The respondent has religious beliefs	No -/ Yes +
	Geographical areas	
Urban	Whether the responds lives in an urban area	No-/ Yes+
Region	Department of residence of the respondent	21 dummies
	Socio-demographic variables	
Age	Age of respondent	Continuous +
Gender	Sex of respondent	Male -/ Female +
University	The respondent has attended University	No-/ Yes+