Counting what counts: Moral considerations and market surplus

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COUNTING WHAT COUNTS:

MORAL CONSIDERATIONS AND MARKET SURPLUS

SUMMARY ― Public benefit-cost analysis of market policies often relies on a particular definition of market surplus that adds up consumer and producer surplus and external costs. This paper provides an overview of conceptual strategies to deal with moral considerations and then develops an adjusted market surplus function that is able to deal with heterogeneous normative perspectives. In a stylised model, new expressions for first-best Pigouvian taxes are developed that depend on moral considerations. A novel moral rule-of-half approximation is provided for the potential surplus gains of taxation or behavioural change.

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I.   Introduction

When moral considerations are real, what would be the implication for market surplus calculations? This paper discusses how the specification of economic market surplus is affected by moral considerations and what the implications are for policy. It seeks to account for the fact that moral philosophy has moved beyond utilitarianism, that a plurality of values may be at stake (such as pleasure, responsibility and liberty) and that there is a diversity of normative views on what should count as valuable for society (see Atkinson, 2009, p.796). This author therefore joins the choir of those who view economics as a moral science when policy recommendations on changes in economic surplus are given.[1] More specifically, it will be argued that economists can improve on their specification of economic surplus by allowing for multiple normative perspectives on value. Different groups in society or different economic experts might define economic surplus in different ways. Sen (2000, p.952) writes:

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[1] See Kelman (1981) and Etzioni (1987) on the limits of utilitarianism, Hausman and McPherson (2009, p.7-8) on preferences and welfare, Sandel (2013, p.138-139) on market reasoning as moral reasoning, Aldred (2009, p.480-485) on the status of revealed preferences and Atkinson (2009) on the normativity of making economic judgements. Furthermore, the discussions around the normativity of law in Kornhauser (1999) and Cooter (1984) can be useful to generate normative intuitions that provide motivations to move beyond the neo-classical perspective on value. Hoeft et al. (2022, section 2) provide a useful recent overview of the literature on norms. For a recent conversation that discusses the limits of utilitarianism: see Sen et al. (2020,p.18).

"sensible cost-benefit analysis demands something beyond the mainstream method, in particular, the invoking of explicit social choice judgments that take us beyond market-centered valuation".

In his *Theory of Moral Sentiments* Adam Smith (1790, PART III, Chapter I, p.136) suggested that individuals can have second-order judgements about their own conduct: *"When I endeavour to examine my own conduct, when I endeavour to pass sentence upon it, and either to approve or condemn it, it is evident that, in all such cases, I divide myself, as it were, into two persons; and that I, the examiner and the judge, represent a different character from that other I, the persons, the person whose conduct is examined into and judged of. "*

Smith (1790) therefore makes an intuitive distinction between the spectator which is 'the judge' and 'the agent' which is the person who makes the choice. For Smith (1790, p.134) a source of second-order judgements can be society which acts as a mirror and generates reflection on own behaviour. Although the sources for normativity might be different, such a distinction between choice value and normative value is not original and has been present in many worldviews in history except the Epicurean version of hedonism that equates what is good with (aggregate) choice or agent-based value resulting in an instrumental utilitarian view on virtues (Annas, 1987, p.10). According to Smith (1790, p.350) discussing Epicurus: *"This system is, no doubt, altogether inconsistent with that which I have been endeavouring to establish"*.

It is useful to illustrate conceptually why moral considerations are potentially important for market surplus calculations in our days using an example. Consider a producer who is active in the market for good *X*. The government has set specific rules for production for firms who want to become active in this market. With the goal of lowering marginal costs, the producer ignores some of these rules without providing good reasons and without changing external costs. The producer rationally trades off lower marginal costs with the probability of getting a fine when being caught (which does rarely happen in this assumed market, so expected fine costs are 0). According to the neo-classical economic model of value this leads to an *increase* in producer surplus in this market and thereby into an increase in economic surplus.

Or consider a moral philosopher who considers the consumption of *X* to be morally problematic for good reasons. If the reasoning of this philosopher is correct, counting consumer benefits and producer surplus fully as valuable *economic* surplus is questionable. These general examples provide intuition on particular normative considerations in markets that are not captured well by the neo-classical model.

Economists are well equipped to study consequences, but other moral considerations related to duties and virtues have received less attention in standard benefit-cost analysis of market policies. John Stuart Mill (1861, p.211) recognized these different kinds of pleasure in his *Utilitarianism*:

"It is quite compatible with the principle of utility to recognize the fact, that some kinds of pleasure are more desirable and more valuable than others. It would be absurd that while, in estimating all other things, quality is considered as well as quantity, the estimation of pleasures should be supposed to depend on quality alone."

Mill (1861, p.213) combines this with the idea that persons are the only competent judges because they experience how different modes or kinds of pleasures should be traded off. In line with Epicurus, Mill makes the choice to see duties and virtues only as instrumentally valuable (Annas (1987)). The paradox that results however, is that when a person is under an obligation, economic value is counted whenever the person makes a bad choice as this choice shows that the obligation is not valuable. Mill's perspective applied to economic surplus insufficiently accounts for the fact that persons do not always succeed in meeting their moral obligations and that in line with Adam Smith, -and the examples given earlier-, moral considerations in markets are thereby not always *only* a private matter. Mill (1861, p.214) seeks to resolve this issue by pointing to the Greatest Happiness Principle as the standard of morality. This principle states that the ultimate end is to maximize the total sum of pleasures and pains including the loss of value resulting from ignoring moral obligations. As Section II will show this is not the only route to deal with moral considerations for micro-economists, and probably not the best route. When economic surplus is defined, moral

considerations such as obligations can motivate adjustment of consumer and producer value instead of adding additional moral external costs for rule violations.

There can be disagreement about the status of moral considerations. Atkinson (2009, p.803) writes:

"Many of the ambiguities and disagreements stem not from differences of view about how the economy works but about the criteria to be applied when making judgments."

This paper also seeks to account for this normative diversity. It is useful for those who perform applied benefit-costs analysis of market policies and for teaching in economics and philosophy.

The remainder of this paper is structured as follows. Section II gives an overview of several conceptual strategies to deal with moral considerations when valuing market outcomes that are (sometimes implicitly) employed in the academic literature. This section motivates and positions the approach in the remainder of the paper. Section III develops a novel analytical specification of economic market surplus that accounts for normative diversity and sections IV and V discuss the implications for market regulation. Section VI concludes.

II.   Moral considerations and markets: general strategies

A. Introduction

This section discusses four general strategies to take moral considerations seriously when analysing changes in market surplus: the qualitative valuation approach (section II.B), the ethical checkbox approach (section II.C), the economizing ethics approach (section II.D) and the ethicizing economics approach (section II.D). These approaches are not necessarily perfect substitutes but can be employed and operationalised in a complementary way.

B. QUV: Qualitative valuation approach

The first approach to handle moral considerations is the qualitative valuation (QUV) approach. For this approach the quantitative calculation of exact changes in economic surplus is not directly relevant.

The QUV approach is valuable for at least seven reasons. First, it can enhance reciprocal understanding of those involved in valuation by fostering the conversation about the values underlying market regulation (Klamer, 2017; Sen et al. 2020). Second, it acknowledges that normative preferences for public policies can partly be socially constructed through reading, role switching or by a deliberative process. Third, the approach is helpful for articulating which moral considerations are relevant for market valuation and why. Fourth, QUV can be helpful for the selection of competent persons for policy decisions. Fifth, the QUV approach allows for an open conversation which is not dictated by a pre-defined analytical valuation method. Sixth, the QUV approach can be helpful for policy makers articulating their motivations for their public policies

(see for example Mouter et al. (2021), section 5). Seventh, the QUV approach might be helpful to select the appropriate valuation approach for the problem at hand and can help to determine whether the study object is a market in an economic sense (Rosenbaum, 2000; Wempe and Frooman, 2018).

A disadvantage of the QUV approach is that no *quantitative* estimation of impacts and value are provided that allow for a comparison of different economic policy interventions in markets including the status quo of doing nothing. Although qualitative questions such as: "should there be an externality tax on good X"? can be answered, quantitative questions such as: 'how high should an externality tax on good X be?' or 'what is the change of economic value for subsidizing X?' cannot be answered using the QUV approach only. A second disadvantage is that it is harder to reach consensus, as heterogeneous opinions are sometimes hard to weigh when they are based on qualitative statements only. A third disadvantage is that the outcomes of the QUV approach depend on the quality of expression of the people who are involved and their social skills. This might disadvantage those with less rhetorical and verbal qualities.

QUV analysis can be complementary to economic calculations, but does not employ a quantitative definition of value. Nevertheless, it can develop policy recommendations for market policies on the basis of qualitative reasoning that takes moral considerations into account.

C. ECH: Ethical checkbox approach

The second approach to deal with moral considerations is the 'ethical checkbox' approach (ECH). This approach analyses moral considerations independently of economic surplus assessments using a list of *necessary* ethical requirements or rules for the behaviour of market actors. It is closely related to the 'independent doctrine' which views (micro-)economic practice as separate from ethics (see High (1985, p. 4-6), for a brief history). The advantage of the ECH approach is that it gives room to the realm of moral and ethical reasoning for guiding market practices. This circumvents that ethical considerations are fully overtaken by utilitarian and game-theoretic arguments of economists when policy recommendations are given. When moral considerations are of a different kind than (monetized) utilitarian consumer value or producer profits and transcend consumer and producer choice behaviour such a separation seems useful and justified. When the ethical checkboxes are ticked, micro-economists can employ the standard definition of economic social surplus which is, - in the absence of externalities-, assumed to be equal to the sum of consumer and producer surplus.

A disadvantage of the ECH approach is that it ignores the loss of economic social surplus resulting from consumers and producers in the market who do not act according to the ethical checkbox. The example in the introduction of the producer who violated the rules illustrates this problem. Furthermore, the ECH approach also

ignores other moral considerations that are not part of the checkbox but are nevertheless important for individual market actors, the communities they participate in or for society. This is because the standard specification of economic social surplus is based on choice-based normativity: choices perfectly track value. The ECH approach assumes that costs and benefits of market actors *should* be counted without further normative consideration by the individual, the community or society among other sources. Consumer and producer moral responsibility do not enter the equations insofar this responsibility is not fully expressed in the particular market under consideration. The economic surplus that is employed by this strategy is equal to the neo-classical approach as moral considerations are analysed as independent *necessary* conditions. Economic surplus (ES) is equal to the consumer benefits (CB) minus producer costs (PC) minus the external costs (EC) (which can be negative when there are external benefits):

(1) $$ES = CB - PC - EC.$$

D. ECE: Economizing ethics approach

The third approach to deal with moral considerations when calculating economic surplus is the 'economizing ethics' approach (ECE). This approach views moral considerations as (monetized) utilitarian internalities or externalities and has been applied to analyse repugnant markets, morality and identity, public policy decisions

with an ethical component and regulations in the social domain (Bénabou and Tirole, 2011; Roth, 2018; Chorus et al. 2018; Elías et al. 2019; Mouter et al. 2021).

A good aspect of ECE is that it might enhance understanding of individuals' choice behaviour when moral considerations for private or public decisions are present (Chorus, 2015). Furthermore, this approach frankly acknowledges that ignoring moral considerations in markets can lead to a loss of utilitarian value for people inside and outside these markets. Posner and Sunstein (2017, p.1812) write:

"Our simple answer, put too briefly, is that on welfarist grounds, moral commitments can matter, and that when people would suffer a welfare loss when their moral commitments are violated, regulators should ask: how much are people willing to pay to honor those commitments?"

And in another section of this paper Posner and Sunstein (2017, p.1840) write:

"Our major goal is to acknowledge rather than to resolve the measurement problem and to insist on the basic principle: people experience welfare losses from social outcomes that offend their moral commitments, even if those outcomes do not involve their own wealth or health. Private willingness to pay is the best way to measure those losses."

The ECE approach therefore assumes that all experiences should count including experiences of moral gains and losses by third parties due to the market choices of consumers and producers.

ECE might also explain descriptively why there are societal laws that put restrictions on market trade. This is because the loss of monetized moral value by third parties can go beyond the value of market transactions, but is related to the actual market behaviour of consumers, producers and the regulator. According to the ECE approach, including the monetized utilitarian externalities stemming from the violation of moral considerations thereby can lead to better estimates of (changes in) economic surplus. An advantage of the ECE approach for economists is that it can be operationalized using empirical choice data in combination with the micro-econometric toolbox of applied economists. It is possible to estimate the willingness to accept for violating a particular moral consideration in order to measure the size of moral externalities.

The ECE approach does make distinctions between particular kinds of external effects but in the end only relies on utilitarian considerations and therefore has the same problems that Epicurus and Mill where wrestling with. Economic surplus for this approach is defined as:

(2) $$ES = CB - PC - EC - MOEC,$$

where $MOEC$ are the moral external costs.

E. ETE: Ethicizing economics approach

The third approach to estimate market value in the presence of moral considerations is the 'ethicizing economics' (ETE) approach. In the climate change literature, the ETE

approach has been pursued to deal with distributional effects using a novel specification of the social welfare function that employs a single ethical perspective such as prioritarianism instead of ECE (Spash, 1997, p.404; Adler et al. 2017, p.450). A first variant of the ETE approach investigates whether market outcomes are just in terms of the distribution of aggregate surplus between buyers and sellers (see Luttens (2022) for a recent discussion and contribution inspired by Aristotle). For completeness, two versions of this approach are discussed. First, *aggregate distributive justice* approaches seek to evaluate market outcomes in terms of the relative and absolute size of aggregate consumer surplus ($CS = CB - CC$) and aggregate producer surplus ($PS = PB - PC$), where total consumer costs (CC) are equal to producer benefits (PB). Economic surplus is then defined as:

$$(3) \qquad ES = CS + PS - f(CS - PS) = CB - PC - f(CS, PS),$$

where $f(.,.)$ is a non-negative function with its minimum equal to 0 at $CS = PS$. Eq. (3) accounts for the level of surplus and brings in 'inequality costs' for example related to the (absolute) difference in aggregate consumer and aggregate producer surplus in a market.

A second variant investigates whether each transaction is just by comparing the net benefits of the consumer to the net benefits of the producer for each unit of consumption (Luttens, 2022). This *transactional distributive justice* approach leads to a different specification of the inequality term. The net benefits of the consumers are

equal to the marginal willingness to pay (defined by $p(Q)$) minus the equilibrium price (defined by p^*). The net benefits of the producer are equal to the equilibrium price minus the marginal costs of production (defined by $s(Q)$). Economic surplus is then defined as:

$$(4) \qquad ES = CB - PC - \int_0^{Q^*} g\big(p(Q) - p^*, p^* - s(Q)\big)dQ,$$

where Q^* is the equilibrium demand and $g(.,.)$ a non-negative function with its minimum equal to 0 at $p(Q) - p^* = p^* - s(Q)$.

A second variant of the ETE approach uses ethical weights to scale consumer benefits, producer costs and external costs using a single ethical perspective. For this approach, the definition of economic surplus for a particular ethical perspective n is given by:

$$(5) \qquad ES = \alpha_n CB - \delta_n PC - \eta_n EC,$$

where α_n, δ_n and η_n are ethical weights applied to consumer benefits, producer costs and external costs motivated from the application of normative perspective n. For the neo-classical perspective $\alpha_n = 1$, $\delta_n = 1$ and $\eta_n = 1$.

A third variant of the ETE approach extends this perspective and operationalises diverse normative ideas about what is socially valuable by re-specifying economic social surplus using ethical parameters for each normative perspective. This normative *diversity* might even be present at the level of the individual as a mixture of deontological, virtue and consequential arguments play a

role in the reflection on behavioural choices of market actors (Van Staveren, 2007; White, 2009; Atkinson, 2009). For this approach, economic surplus is defined as:

(6) $$ES = \bar{\alpha}CB - \bar{\delta}PC - \bar{\eta}EC,$$

$\bar{\alpha}, \bar{\delta}$ and $\bar{\eta}$ are averaged ethical weights over different normative perspectives. This variant acknowledges that there are multiple reasonable normative positions each resulting in a particular specification of the economic 'pie'. Eq. (6) remains agnostic about normative views regarding the specification of the economic pie. The economist is then impartial with respect to the different normative views in society. One of the perspectives in Eq. (6) can be the neo-classical perspective. This model will be developed, motivated and explained in more detail in section III. The ECE and ETE approaches account for moral considerations but do this in a different way depending on whether researchers find ECE or ETE the correct perspective.

F. Scope of the analysis

Before moving on, it is useful to think about the scope of the second variant of the ETE model: where can it be applied, and for which decisions can it not be applied? The model is applicable for the analysis of the taxation of a consumption externality in existing markets with remaining moral considerations. It is *not* applicable for the analysis of whether a market should be opened or closed by a government. This class of policy decisions leads to other kinds of moral considerations related to offering choice opportunities and limiting or increasing freedom of choice. It therefore raises

more fundamental freedom questions of which the analysis is beyond the scope of this paper.

Furthermore, distributional concerns, price and tax discrimination, bounded rationality of market actors, strategic firm interactions, limited information, general equilibrium, bargaining between consumers and producers and heterogeneous interactions are ignored. This is done for clarity of exposition and argumentation and to stay close to how benefit-cost analysis of market policies is often operationalized in practice.

III.   Redefining the economic pie

A. *The advisory committee*

This section redefines the economic 'pie' for a stylised partial equilibrium model of a single good or service in more detail. Furthermore, a graphical exposition is given. Suppose that an advisory committee is summoned that has N members. Assume that each member n of this advisory committee receives a weight $\omega_n \geq 0$ and that these weights sum up to 1. Depending on the kind of market, the committee could consist of one benevolent dictator, the full population of a region, city, country or the world, a group of representative elected officials, representatives of particular communities, representatives of responsible advisory institutions, a group of (scientific) experts, moral philosophers, the market participants or a weighted combination of all these groups. Membership of the committee can be based on experience, knowledge and

expertise, the degree that the expert represents a community or population of interest or simply on the status of being a citizen.

This paper will not discuss how this advisory committee *should* look like, what the requirements of membership should be and what the procedural process of deliberation should be. The mathematical description also abstracts away from potential strategic considerations within the advisory committee. It is assumed that members are honest and truthful about their normative position and do not play (institutional) games to maximize their own pay-offs.

It is assumed that all normative perspectives of the committee members are based on internally consistent reasoning. This pragmatic assumption is inconsistent with the observation that in the presence of objective moral considerations there can be mutual exclusive logical positions where given the underlying (meta-)ethical assumptions the moral reasoning of only a subset of the committee members is correct.

B. *Adjusted consumer surplus*

Marginal consumer benefits are given by $p(Q)$. This market inverse demand function reflects the maximum marginal willingness to pay for a group of anonymous consumers. In equilibrium, marginal consumer benefits are equal to the private costs, resulting in an equilibrium demand of Q^*. It is assumed that all consumers all have the same private access costs and pay the same equilibrium price p^* for the good or service. Total monetized consumer benefits for the market are denoted by $CB =$

$\int_0^{Q^*} p(Q)dQ$ where Q is the demand for the good or service. For simplicity this paper

abstracts away from heterogeneity in the inverse demand curve.[2] From a normative

perspective the assessment of marginal consumption benefits of the consumer as

reflected by the consumers' marginal willingness to pay deserves more investigation.

When there are moral considerations related to consumers' marginal benefits,

member n of the committee can adjust the consumer benefits with an ethical weight

$0 \leq \alpha_n \leq 1$. This adjustment can be based on moral considerations and reasons related

to consumer responsibility. Committees can use survey data and interviews to learn

more about the reasons and intentions of consumers or for example to investigate

whether the consumption choice has been made under free conditions. The adjustment

of marginal consumer benefits does not entail that choice *should* be restricted or

forbidden. At the moment of choice, consumers are fully sovereign to determine the

private value of consumption and to make their consumption choice.[3]

For simplicity, the ethical parameter is assumed to be an aggregate parameter.

When a committee member wants to apply the weight only for a sub-group of

consumers it can be weighted with the share of consumers belonging to this sub-group

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[2] For I consumers and J firms in the market, the total consumer surplus is given by:

$\sum_{j=1}^{J} \sum_{i=1}^{I} \int_0^{q_{ij}^*} p_i(q_{ij})dq_{ij}$, where q_{ij}^* is the equilibrium demand for the product of firm j by consumer i with inverse demand $p(q_{ij}^*)$. This is ignored for notational simplicity.

[3] See the summary of Hutt (1936, p.23) on consumer sovereignty who claims in point (10) that consumer value "*can be claimed as good only if liberty possesses supreme ethical significance*". The ETE approach assumes there is at least one normative perspective in the political community for which this assumption of 'supreme ethical significance' is not true.

assuming that these consumers are randomly spread out over the market inverse demand curve.

Moral considerations relating to consumer behaviour lead to scaling down consumer benefits in particular markets and thereby change the calculation of consumer surplus. Eq. (7) gives the weighted average of the consumer surplus over all committee members:

$$(7) \qquad ACS = \sum_{n=1}^{N} \omega_n \left(\int_0^{Q^*} \alpha_n \, p(Q) dQ - p^* Q^* \right) = \bar{\alpha} \int_0^{Q^*} p(Q) \, dQ - p^* Q^*.$$

In Eq. (7), $\bar{\alpha} = \sum_{n=1}^{N} \omega_n \, \alpha_n$ is the weighted average sum over all committee members for the ethical parameters for consumer benefits.[4] Adjusted consumer surplus estimates in markets with moral considerations will decrease in comparison to the case where moral sufficiency of consumers is assumed ($\bar{\alpha} = 1$). Moral sufficiency is defined here as the situation where none of the normative perspectives scale down net consumer benefits.

Figure 1 summarizes this section with a graphical illustration of the impacts of averaged ethical weights for consumer surplus in markets. It shows that market equilibrium is established at the point where the inverse demand is equal to the supply price p^*. In the presence of moral considerations related to consumer benefits, the

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[4] An additional assumption is required for a valid model: at least one committee member needs to have $\alpha_n > 0$. It is not necessary to have a weighted average: a majority voting decision on the weights is possible, or using the median or minimum weight. But this fully leaves out the normative perspectives of particular minorities in the advisory committee.

inverse demand applied for evaluation shifts inwards with a factor $\bar{\alpha} < 1$. As equilibrium demand remains at Q^*, the counted total consumer benefits are equal to $A + B$ and are $C + D$ lower compared to the case $\bar{\alpha} = 1$ which is the neo-classical case. Adjusted consumer surplus Eq. (1) is given by $(A + B) - (B + D) = A - D$. This is lower compared to the consumer surplus calculation that ignores moral considerations $(A + C)$.
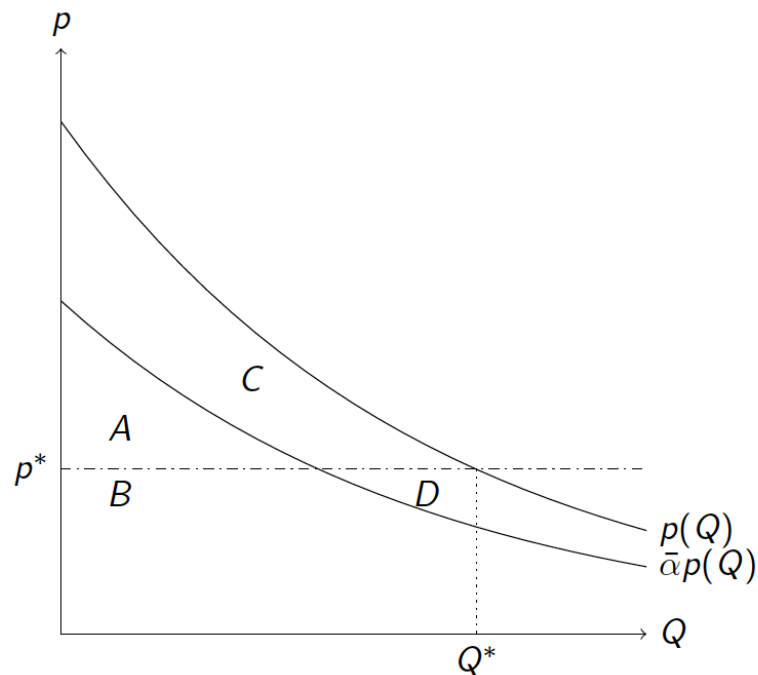

Figure 1: Moral considerations and adjusted consumer surplus.

C. Adjusted producer surplus

Producer behaviour is described by a market inverse supply function $s(Q)$ that shows the minimum price for which a total of Q units are supplied by a group of anonymous firms. The area under this inverse supply function up to the equilibrium demand gives the total costs for all firms in the market. It is assumed that fixed costs are zero. Again, heterogeneity of firms is assumed away for reasons of analytical clarity.[5] Given the assumptions made, the area above this inverse supply curve up to the equilibrium price then measures the total producer surplus in the market. As in the basic micro-economic model, firms are assumed to be price-takers and general equilibrium and potential market power considerations are ignored. Furthermore, it is assumed that costs for production inputs can be counted as real societal costs instead of transfers to other firms or workers. The adjusted (equilibrium) producer surplus is written as a weighted average over all committee members:

$$(8) \qquad APS = \sum_{n=1}^{N} \omega_n \left(p^* Q^* - \int_0^{Q^*} \delta_n \, s(Q) dQ \right) = p^* Q^* - \bar{\delta} \int_0^{Q^*} s(Q) \, dQ,$$

where $\bar{\delta} = \sum_{n=1}^{N} \omega_n \, \delta_n$ are the weighted average sums of the producers' related ethical weights over all representatives. Moral considerations lead to higher producer costs compared to the neo-classical model. In highly controversial markets there is no reason

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[5] With J firms in the market and I consumers, the total consumer costs are given by: $\sum_{j=1}^{J} \int_0^{\sum_{i=1}^{I} q_{ij}^*} s_j(Q_j) dQ_j$. Note that firm heterogeneity would imply heterogeneous market prices which we avoid for simplicity.

why this adjusted producer surplus cannot be negative. Figure 2 summarizes this sub-section with a graphical illustration of the impacts of moral weights on the determination of producer surplus in markets. The figure shows that equilibrium is established at the point where the market inverse supply curve $s(Q)$ is equal to the equilibrium price as firms with higher marginal production costs will not produce for a lower price. In the presence of moral considerations, the market inverse supply curve applied for evaluation shifts upwards with a factor $\bar{\delta} > 1$.
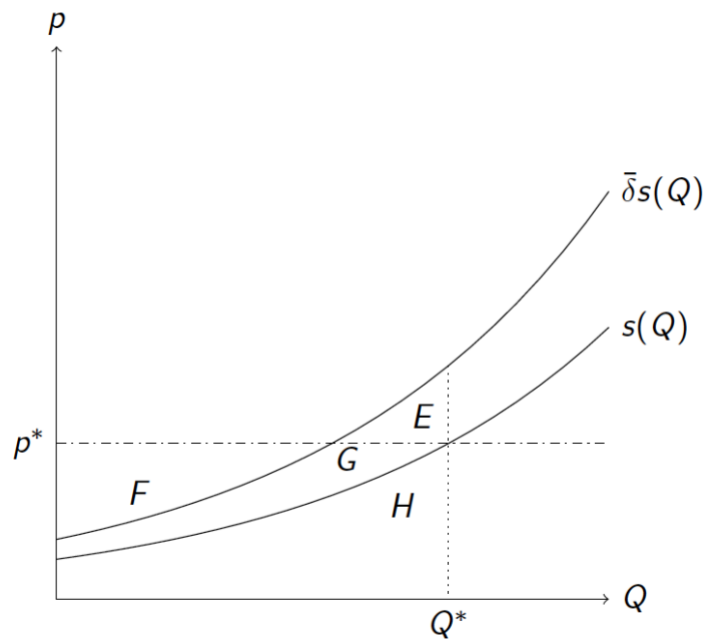
Figure 2: Moral considerations and producer surplus.

As equilibrium demand remains at Q^* regardless of how costs are counted, the total counted producer costs in the economic social surplus are then $E + G + H$. Total

counted producer surplus is equal to $(F + G + H) - (E + G + H) = F - E$. This is

$G + E$ lower compared to the neo-classical case $(F + G)$ where $\bar{\delta} = 1$ is assumed.

D. *Adjusted economic surplus*

In the absence of external costs, the adjusted equilibrium social surplus is given by the

sum of the adjusted consumer and producer surplus:

$$(9) \qquad AES = ACS + APS = \bar{\alpha} \int_0^{Q^*} p(Q) \, dQ - \bar{\delta} \int_0^{Q^*} s(Q) \, dQ.$$

Eq. (9) shows that moral considerations bring down the consumer benefits and raise

the producer costs. Figure 3 shows the welfare loss that follows from the assumption

of moral sufficiency of consumers and producers. Equilibrium demand Q^* results from

the intersection of the inverse demand curve $p(Q)$ and the inverse supply curve $s(Q)$.

Q^{**} would be the socially optimal quantity as it is determined by the intersection of

weighted marginal consumer benefits and weighted marginal producer costs.
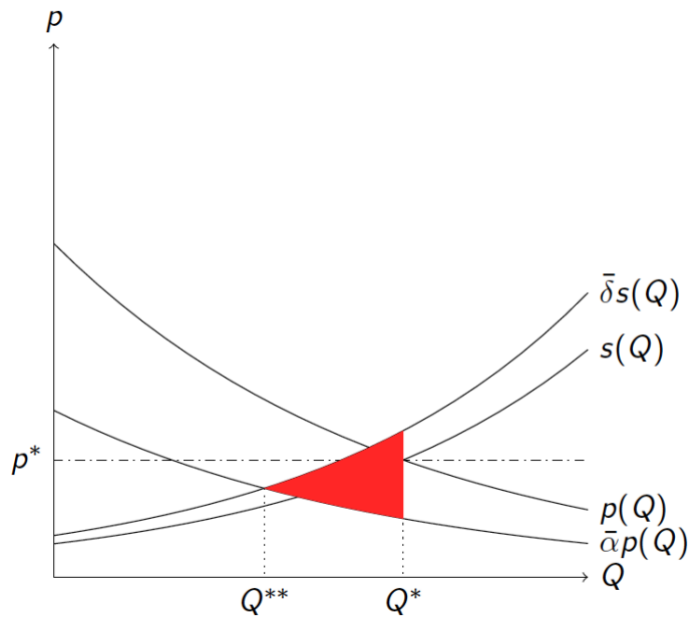
Figure 3: Potential welfare gain resulting from market regulation.

The red 'triangle' then indicates the potential welfare gain resulting from market regulation. As the demand in equilibrium is higher than optimal, there is a loss of surplus for the consumers between Q^{**} and Q^*, as for these consumers counted marginal costs are higher than counted marginal consumer benefits. According to the model, ignoring moral considerations leads to structural overconsumption in markets as the socially optimal demand is always lower than the equilibrium demand in the unregulated situation. This qualitative result depends on the assumptions on the ethical parameters: when all committee members agree that behaviour would be praiseworthy, the behaviour is by definition also morally sufficient and therefore there would be no need to abandon the neo-classical assumption $\bar{\delta} = \bar{\alpha} = 1$.

The result in Figure 3 is qualitatively different compared to behavioural welfare economic models where behavioural errors are made by consumers and producers. These behavioural errors can lead to higher or lower 'experienced' inverse demand and 'experienced' inverse supply curves. This can result both in equal, lower or higher equilibrium demand than the socially optimal demand under perfect rationality. This is not the case for the conceptual model developed in this section: optimal demand will *always* be lower than observed demand when $\bar{\delta} > 1 \geq \bar{\alpha}$.

IV. Taxation and moral considerations

Because market surplus is not socially optimal, a regulator can correct for this using a price instrument. Such a price instrument does not interfere with the freedom to consume or produce and does not have to be a substitute for using policy measures to combat remaining injustice in the market. The assumption that the ethical parameters are independent of the equilibrium price and quantity helps to obtain some stylized results. Appendix B shows that the equilibrium tax expression that optimizes the adjusted social surplus Eq. (9) is given by:

$$(10) \qquad \tau = p^{*R} \frac{\bar{\delta} - \bar{\alpha}}{\bar{\alpha}}.$$

The adjusted economic surplus Eq. (9) does not include any external costs and can serve as a motivation for consumption taxes. The first observation is that this tax is non-negative as the equilibrium price in the regulated equilibrium (p^{*R}) is positive

and $\bar{\delta} \geq 1 \geq \bar{\alpha} > 0$. In the presence of moral considerations, it is therefore economically justified to impose a positive tax that corrects for the fact that in the unregulated equilibrium, consumers and producers in the market ignore moral considerations. This observation is consistent with the discussion around Figure 3: socially optimal demand is below equilibrium demand in the unregulated equilibrium.

Second, because the ethical weights enter proportionally, the tax in Eq. (9) is proportional to the equilibrium supply price p^{*R} in the regulated equilibrium. As Appendix D shows, this result does not hold anymore when ethical weights are functions of the demand levels. The tax is then corrected with the equilibrium elasticities of the ethical weights multiplied with the corresponding average consumer benefits and producer costs.

Third, moral considerations related to consumer benefits raise the tax as decreasing $\bar{\alpha}$ is equivalent with shifting the adjusted market inverse demand curve inwards. The level of the tax increases in $\bar{\delta}$, -as intuitively-, moral considerations related to producer costs are equivalent with shifting the market inverse supply curve upwards, leading to a lower socially optimal equilibrium demand.

Fourth, the red 'triangle in Figure 3 can be approximated using a 'moral' rule-of-half. The gain in surplus from taxation is approximately given by:

$$(11) \qquad \Delta ES_{gain} \approx \frac{1}{2}\left(\bar{\delta}s(Q^*) - \bar{\alpha}p(Q^*)\right)(Q^* - Q^{**}),$$

$$\approx \frac{1}{2}(\bar{\delta}p^* - \bar{\alpha}p^*)(Q^* - Q^{**}),$$

$$\approx \frac{1}{2}p^*(\bar{\delta} - \bar{\alpha})(Q^* - Q^{**}),$$

which is a function of the socially optimal demand Q^{**}. Appendix A shows that with constant elasticity of demand $\in$ and constant elasticity of supply k this can be written as:

$$\Delta ES_{gain} \approx \frac{1}{2}p^*Q^*(\bar{\delta} - \bar{\alpha})\left(1 - \left(\frac{\bar{\delta}}{\bar{\alpha}}\right)^{\frac{\in k}{k - \in}}\right).$$

The potential surplus gain for this case is therefore proportionally related to the total revenues in the unregulated equilibrium and depends on the ethical parameters and the price-elasticity of market demand and supply in a non-linear way. When one of these elasticities is 0 there are no surplus gains as demand will not respond to the tax.

V. Externality taxation and moral considerations

A. *Moral considerations related to external costs*

The last category of moral considerations that this paper deals with stems from the application of the model to the taxation of externalities by a regulator. This category of considerations does justice to discussions on good governance in political science: for some kinds of external effects imposing a tax is more reasonable than for others. Intrinsic considerations, social customs, governance goals, value and externality

tolerance and moral reasons related to liberty might therefore 'overrule' (part of the) utilitarian external costs.[6]

Members of the advisory committee therefore have to decide on their weight for the external costs in the economic surplus to do justice to these moral considerations. Define $0 \leq \eta_n \leq 1$ as the weight attached to the externality. Then the weighted external costs over all committee members are given by $\bar{\eta}e(Q)$, where $\bar{\eta} = \sum_{n=1}^{N} \omega_n \eta_n$ is the average weight over all committee members. Again, it is assumed for simplicity that the ethical weights η_n of committee members do not depend on the equilibrium quantity.

B. Application: pricing of a consumer externality

The insights of Sections III.A and III.B can be used to adjust the economic social surplus and to investigate the implications for the optimal taxation of consumption externalities. For simplicity it is assumed that these externalities do not affect the generalized prices of consumers in the market. Adding adjusted external costs to Eq. (9) leads to the following adjusted economic social surplus:[7]

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[6] See Medema (2007) for the historical development of the idea of market failure and Mildenberger (2018) and Endörfer (2021) for a recent comprehensive philosophical discussion of market harms. It is sufficient to accept that for at least one valid normative perspective not all external costs can be considered as harms relevant for economic surplus. One simple rule in the spirit of 'level playing fields' can be: do not include all external costs when there exists an unregulated market (now and the near future) with higher marginal external costs in the political community that could be regulated using taxes.

[7] Eq. (12) excludes monetized moral external costs to remain consistent with the ethicizing economics approach as discussed in Section II. In principle these moral externalities could be added, but only for those members in the committee who consider the ECE approach to be more appropriate. This would

$$(12) \qquad AES = \bar{\alpha} \int_0^{Q^*} p(Q)\, dQ - \bar{\delta} \int_0^{Q^*} s(Q)\, dQ - \bar{\eta} e(Q^*).$$

In the optimum adjusted marginal consumer benefits $\bar{\alpha} p(Q)$ should be equal to adjusted marginal social costs $\bar{\delta} s(Q) + \bar{\eta} e(Q)$. The implicit equilibrium expression for the first-best externality tax is given by (see Appendix C for the interested reader):

$$(13) \qquad \tau = p^{*R} \frac{\bar{\delta} - \bar{\alpha}}{\bar{\alpha}} + \frac{\bar{\eta}}{\bar{\alpha}} MEC,$$

where p^{*R} is the price in the regulated equilibrium. This tax expression has two analytical terms. The first component is isomorphic to the tax Eq. (10) derived in Section IV. The second term in Eq. (13) is related to the external costs. It multiplies the marginal external costs in the regulated equilibrium MEC with a factor $\frac{\bar{\eta}}{\bar{\alpha}}$. This shows that the externality part interacts with the moral considerations related to consumer benefits and external costs. Appendix D provides extensions related to endogeneity of ethical weights and moral weights for consumer payments and producer revenues.

Assume a horizontal supply curve with marginal costs equal to 10 euros and marginal external costs equal to 2 euros. Suppose total consumer benefits are counted

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result in a blended approach of the ECE and ETE approaches with an economic surplus function equal to: $ES = \bar{\alpha} CB - \bar{\delta} PC - \bar{\eta} EC - \omega_{nc} MOEC$, where ω_{nc} is the weight for the neo-classical representative in the committee. For reasons of clarity and the argument given in Section II, this blended approach is not pursued in this paper. In the presence of moral external costs this would increase the level of the proposed tax in Eq. (13).

for 90% and total producer costs for 110%. Also assume external costs are counted for 100%. The tax is then given by:

$$\tau = 10\frac{1.1 - 0.9}{0.9} + \frac{1}{0.9}2 = 4.44 \text{ euros.}$$

This is more than two times the marginal external costs showing the potential importance of moral considerations for economic policy analysis. When giving recommendations for pricing consumption externalities, moral considerations interact in a non-linear way and potentially have substantial quantitative implications.

Again, the welfare gains can be approximated using a moral rule-of-half. Assume constant marginal external costs and let $MSC(Q^*) = \bar{\delta}s(Q^*) + \bar{\eta}MEC$ be the morally weighted marginal social costs in the unregulated equilibrium. The surplus gains from taxation are approximately given by:

$$\Delta ES_{gain} \approx \frac{1}{2}\big(MSC(Q^*) - \bar{\alpha}p(Q^*)\big)(Q^* - Q_s{}^*),$$

$$\approx \frac{1}{2}\Big(\bar{\delta}s(Q^*) + \bar{\eta}MEC - \bar{\alpha}p(Q^*)\Big)(Q^* - Q_s{}^*),$$

(14)

$$\approx \frac{1}{2}\big(\bar{\delta}p^* + \bar{\eta}MEC - \bar{\alpha}p^*\big)(Q^* - Q_s{}^*),$$

$$\approx \frac{1}{2}p^*\big(\bar{\delta} - \bar{\alpha}\big)(Q^* - Q_s{}^*) + \frac{1}{2}\bar{\eta}MEC(Q^* - Q_s{}^*).$$

The first part shows the moral-rue-of half Eq. (11) evaluated at the socially optimal demand $Q_s{}^*$. The second part shows a weighted rule-of-half for external costs.

Appendix A, sub-section B provides an analytical example for a horizontal inverse supply and a constant elasticity of demand function.

VI.   Conclusion and discussion

This paper has argued that moral considerations can have implications for economic policy valuation as these considerations go to the root of the normative matter: the specification of economic social surplus or the so-called economic 'pie'. This specification is at the heart of the concept of economic efficiency operationalized in micro-economic policy analysis. When externalities are absent, Section IV shows that, -from an economic perspective-, taxation is justified because 'free' markets do not lead to the optimization of economic social surplus when moral considerations are present. These results contrast with one of the core ideas in micro-economics, namely "*that competitive equilibrium is efficient since the time of Marshall*" (Lazear, 2000, p.102). A moral rule-of-half was developed that can serve as an approximation for the potential surplus gains resulting from taxation in markets with moral considerations. For those working on behavioural change, this rule-of-half can also be used to estimate the moral potential of a market.

Section V extended this model to account for moral considerations related to external costs. This section shows how the popular expressions for first-best Pigouvian consumption taxes are affected by moral considerations. In the framework of this paper, moral considerations *interact* with externality pricing and are not simply

additive monetized external costs. A new rule-of-half was developed that approximates the surplus gains that result from optimal externality taxation.

Ignoring moral considerations when calculating economic social surplus implicitly *assumes* that these considerations are irrelevant for the specification of economic value. This leads to the ignorance of other normative perspectives in the valuation stage of a policy intervention in a market. This insight is especially relevant for the current use of practical benefit-cost analysis for public policies in markets with contested commodities or markets that impact health, safety and/or the environment. For these decisions moral considerations that transcend market valuations of consumers and producers are often relevant.

The central claim underlying the analysis in sections III-V is fairly modest as the neo-classical perspective is viewed as one of the many ways to specify the economic pie for a political community. The presence (of an experience) of only one perspective that diverges from the neo-classical perspective would justify the use of the model. Other normative perspectives are taken seriously implying that normative impartiality is assumed when specifying the economic surplus function. Consumer and producer sovereignty of valuation *at choice* and freedom of choice are respected. The value that markets actors derive from their choices is not ignored and is still present in the calculation of economic surplus.

However, in order to take moral considerations seriously not all benefits and costs are counted one-to-one as economic surplus which in turn results in implications for externality taxes. Therefore, there is a trade-off for the reader between paternalism about (some of the) market actors' value calculations or paternalism about the specification of the economic pie due to the ignorance of moral considerations in neo-classical economic surplus. The model proposed in this paper gives room to different schools of normative thinking about this trade-off, which might be a practical and peaceful solution for benefit-cost analysis of market policies. It also might transform "*the vigorous warfare against one another*" (Mill, 1861, p.205) into a fruitful conversation between and within normative schools about what should (not) count when estimating changes in market surplus.

Appendix A. Moral rule-of-half approximations

A. *Example for a market without external costs*

The gain from taxation is given by:

$$\Delta ES_{gain} \approx \frac{1}{2}p^*\big(\bar{\delta} - \bar{\alpha}\big)(Q^* - Q^{**}).$$

Assume constant elasticity of demand and supply functions given by:

$$Q^D(p) = Ap^\epsilon,$$

$$Q^S(p) = Mp^k,$$

where $\in< 0$ is the price-elasticity of market demand and $k > 0$ the price-elasticity of market supply, leading to decreasing demand in prices and increasing supply in prices. The inverse demand and inverse supply functions are given by:

$$p(Q) = A^{-\frac{1}{\in}}Q^{\frac{1}{\in}},$$

$$s(Q) = M^{-\frac{1}{k}}Q^{\frac{1}{k}}.$$

The weighted inverse demand and inverse supply curves determine the equilibrium condition for optimal demand:

$$\bar{\alpha}A^{-\frac{1}{\in}}Q^{\frac{1}{\in}} = \bar{\delta}M^{-\frac{1}{k}}Q^{\frac{1}{k}}.$$

Solving for Q gives the optimal demand:

$$Q^{**} = \left(\frac{\bar{\delta}}{\bar{\alpha}}\right)^{\frac{\in k}{k-\in}} \left(\frac{A^{\frac{k}{k-\in}}}{M^{\frac{\in}{k-\in}}}\right).$$

From this we can directly obtain the equilibrium demand (at the point $\bar{\delta} = \bar{\alpha} = 1$):

$$Q^{*} = \left(\frac{A^{\frac{k}{k-\in}}}{M^{\frac{\in}{k-\in}}}\right).$$

Therefore, the optimal demand is proportionally related to the equilibrium demand:

$$Q^{**} = \left(\frac{\bar{\delta}}{\bar{\alpha}}\right)^{\frac{\in k}{k-\in}} Q^{*}.$$

Substituting in the rule-of-half expression gives:

$$\Delta ES_{gain} \approx \frac{1}{2} p^* Q^* (\bar{\delta} - \bar{\alpha}) \left(1 - \left(\frac{\bar{\delta}}{\bar{\alpha}} \right)^{\frac{\epsilon k}{k - \epsilon}} \right).$$

Because $\frac{\epsilon k}{k - \epsilon} < 0$, and $\frac{\bar{\delta}}{\bar{\alpha}} \geq 1$, this term is positive.

B. Example for a market with external costs

Consider a market with general costs with a horizontal inverse supply curve $s(Q) = MC$ and with price equal to marginal costs, and a constant elasticity of demand curve. The supply price after the tax is introduced is therefore equal to the supply price in the unregulated equilibrium ($p^* = p^{*R} = MC$). The rule-of-half for the surplus gains of taxation is given by:

$$\Delta ES_{gain} \approx \frac{1}{2} p^* (\bar{\delta} - \bar{\alpha})(Q^* - Q_s{}^*) + \frac{1}{2} \bar{\eta} MEC (Q^* - Q_s{}^*)$$

The socially optimal consumer price is given by the equilibrium price plus the tax:

$$p^* + p^* \frac{\bar{\delta} - \bar{\alpha}}{\bar{\alpha}} + \frac{\bar{\eta}}{\bar{\alpha}} MEC = p^* \frac{\bar{\delta}}{\bar{\alpha}} + \frac{\bar{\eta}}{\bar{\alpha}} MEC.$$

The socially optimal demand is given by:

$$Q_s{}^* = A \left(p^* \frac{\bar{\delta}}{\bar{\alpha}} + \frac{\bar{\eta}}{\bar{\alpha}} MEC \right)^{\epsilon}.$$

The socially optimal demand can be written as a proportion of the market demand in the unregulated situation:

$$Q_s{}^* = Q^* \frac{Q_s{}^*}{Q^*} = Q^* \frac{A\left(p^* \frac{\bar{\delta}}{\bar{\alpha}} + \frac{\bar{\eta}}{\bar{\alpha}} MEC\right)^{\in}}{A(p^*)^{\in}} = Q^* \left(\frac{\bar{\delta}}{\bar{\alpha}} + \frac{\bar{\eta}}{\bar{\alpha}} \frac{MEC}{p^*}\right)^{\in}.$$

Substituting in the rule-of-half gives:

$$\Delta ES_{gain} \approx \frac{1}{2} p^* Q^* (\bar{\delta} - \bar{\alpha}) \left(1 - \left(\frac{\bar{\delta}}{\bar{\alpha}} + \frac{\bar{\eta}}{\bar{\alpha}} \frac{MEC}{p^*}\right)^{\in}\right)$$

$$+ \frac{1}{2} \bar{\eta} MEC Q^* \left(1 - \left(\frac{\bar{\delta}}{\bar{\alpha}} + \frac{\bar{\eta}}{\bar{\alpha}} \frac{MEC}{p^*}\right)^{\in}\right).$$

This expression is positive and depends on the observed equilibrium price which is equal to the marginal costs, the equilibrium demand, the ethical parameters, the marginal external costs and the elasticity of market demand.

Appendix B. Deriving the tax that optimizes adjusted economic surplus

The derivations in Appendix B and C follow the methodological approach of Verhoef et al. (1996) for deriving implicit tax expressions. For the regulated and unregulated case, it is assumed that an equilibrium exists. For the case without external costs, the adjusted social surplus AES is given by Eq. (9). The Lagrangian function is given by:

(B.1) $$L = AES + \lambda(p(Q) - p - \tau),$$

and the first-order conditions are given by:

(B.2) $$\frac{\partial L}{\partial Q} = \bar{\alpha} p(Q) - \bar{\delta} s(Q) + \lambda \frac{\partial p(Q)}{\partial Q} = 0,$$

(B.3)
$$\frac{\partial L}{\partial \lambda} = p(Q) - p - \tau = 0,$$

(B.4)
$$\frac{\partial L}{\partial \tau} = -\lambda = 0.$$

Substituting Eqs. (B.4) and (B.3) in Eq. (B.2) and using $s(Q) = p^{*R}$ gives an implicit

equilibrium expression for the tax:

(B.5)
$$\tau = p^{*R} \frac{\bar{\delta} - \bar{\alpha}}{\bar{\alpha}} > 0.$$

Appendix C. Pricing of a consumption externality

The adjusted social surplus AES with external costs is given by Eq. (11). The

Lagrangian is given by:

(C.1)
$$L = AES + \lambda(p(Q) - p - \tau),$$

and the first-order conditions are given by:

(C.2)
$$\frac{\partial L}{\partial Q} = \bar{\alpha}p(Q) - \bar{\delta}s(Q) - \bar{\eta}\frac{\partial e(Q)}{\partial Q} + \lambda\frac{\partial p(Q)}{\partial Q} = 0,$$

(C.3)
$$\frac{\partial L}{\partial \lambda} = p(Q) - p - \tau = 0,$$

(C.4)
$$\frac{\partial L}{\partial \tau} = -\lambda = 0.$$

Substituting Eqs. (C.3) and (C.4) in Eq. (C.2) and rearranging gives the equilibrium

expression for the first-best tax:

(C.5)
$$\tau = p^{*R} \frac{\bar{\delta} - \bar{\alpha}}{\bar{\alpha}} + \frac{\bar{\eta}}{\bar{\alpha}}\frac{\partial e(Q)}{\partial Q}.$$

Appendix D. Extensions

For the interested reader this Appendix presents some extensions of the model. The first extension deals with the dependency of the ethical parameters on quantity levels. The second extension deals with the inclusion of moral considerations related to consumer payments and producer revenues. Define adjusted economic surplus as:

(D.1)
$$AES = \bar{\alpha}(Q) \underbrace{\int_0^Q p(Q)\, dQ}_{CB} - \bar{\delta}(Q) \underbrace{\int_0^Q s(Q)\, dQ}_{PC} - \bar{\eta}(Q) \underbrace{e(Q)}_{EC}.$$

The marginal change in surplus for a quantity change is given by:

$$\frac{\partial AES}{\partial Q} = \bar{\alpha}(Q)p(Q) + \frac{\partial \bar{\alpha}(Q)}{\partial Q} CB - \frac{\partial \bar{\delta}(Q)}{\partial Q} PC - \bar{\delta}(Q)s(Q)$$

(D.2)

$$- \bar{\eta}(Q)MEC(Q) + \frac{\partial \bar{\eta}(Q)}{\partial Q} EC.$$

Now define the following (equilibrium) elasticities:

$$r_\alpha = \frac{\partial \bar{\alpha}(Q)}{\partial Q} \frac{Q}{\bar{\alpha}(Q)} \leftrightarrow \frac{\partial \bar{\alpha}(Q)}{\partial Q} = r_\alpha \frac{\bar{\alpha}(Q)}{Q},$$

$$r_\delta = \frac{\partial \bar{\delta}(Q)}{\partial Q} \frac{Q}{\bar{\delta}(Q)} \leftrightarrow \frac{\partial \bar{\delta}(Q)}{\partial Q} = r_\delta \frac{\bar{\delta}(Q)}{Q},$$

$$r_\eta = \frac{\partial \bar{\eta}(Q)}{\partial Q} \frac{Q}{\bar{\eta}(Q)} \leftrightarrow \frac{\partial \bar{\eta}(Q)}{\partial Q} = r_\eta \frac{\bar{\eta}(Q)}{Q}.$$

Substituting in Eq. (D.2) gives:

$$\frac{\partial AES}{\partial Q} = \bar{\alpha}(Q)p(Q) + r_\alpha \overline{CB} - r_\delta \overline{PC} - \bar{\delta}(Q)s(Q) - \bar{\eta}(Q)MEC(Q) - r_\eta \overline{EC},$$

where $\overline{CB}$ are the average consumer benefits in the regulated optimum, $\overline{PC}$ the average producer costs in the regulated optimum and $\overline{EC}$ the average external costs in the social optimum $Q_s{}^*$. In equilibrium the condition must be 0:

$$\text{(D.3)} \qquad \frac{\partial AES}{\partial Q} = \bar{\alpha}(Q_s^*)(p^{*R} + \tau) + r_\alpha \overline{CB} - r_\delta \overline{PC} - \bar{\delta}(Q_s^*)p^{*R}$$

$$- \bar{\eta}(Q_s^*)MEC(Q_s^*) - r_\eta \overline{EC} = 0.$$

Solving for the tax gives:

$$\text{(D.4)} \qquad \tau = \underbrace{\frac{\bar{\delta}(Q_s^*) - \bar{\alpha}(Q_s^*)}{\bar{\alpha}(Q_s^*)}p^{*R} - \frac{\bar{\eta}(Q_s^*)}{\bar{\alpha}(Q_s^*)}MEC(Q_s^*)}_{Eq.(13)evaluated\ at\ Q_s^*} - r_\alpha \overline{CB} + r_\delta \overline{PC} + r_\eta \overline{EC}.$$

The first part is the tax Eq. (13) but with ethical parameters evaluated at the socially optimal equilibrium demand. The other term corrects the tax Eq. (13) by multiplying the average consumer benefits, producer costs and external costs with the corresponding elasticities of the ethical parameters. When moral considerations become more important when demand increases, $r_\alpha < 0$, $r_\delta > 0$ and $r_\eta > 0$, and the sum of the last three terms will be positive. Eq. (13) is therefore a lower bound for this case.

The second extension that is provided is to assume that consumer payments and producer revenues should be morally weighted with parameters $\bar{\gamma} > 1$ and $\bar{\theta} < 1$. This leads to adjusted economic surplus equal to:

$$\text{(D.5)} \qquad AES = \bar{\alpha}(Q) \underbrace{\int_0^Q p(Q)\,dQ}_{CB} - \gamma \underbrace{pQ}_{CC} + \theta pQ - \bar{\delta}(Q) \underbrace{\int_0^Q s(Q)\,dQ}_{PC}$$

$$- \bar{\eta}(Q) \underbrace{e(Q)}_{EC}.$$

The tax Eq. (13) then changes to:

$$(D.6) \qquad \tau = p^{*R}\frac{\bar{\delta}-\bar{\alpha}}{\bar{\alpha}} + p^{*R}\frac{\bar{\gamma}-\bar{\theta}}{\bar{\alpha}} + \frac{\bar{\eta}}{\bar{\alpha}}MEC,$$

This shows that when consumer payments and producer revenues are morally weighted, the tax Eq. (13) increases with a factor proportional to the equilibrium price in the regulated equilibrium. This factor decreases in $\bar{\alpha}$. When weights are applied to consumer surplus and producer surplus, $\bar{\gamma} = \bar{\alpha}$, and $\bar{\theta} = \bar{\delta}$, resulting in a tax equal to $\frac{\bar{\eta}}{\bar{\alpha}}MEC$.

References

Aldred, J. (2009). Ethics and climate change cost-benefit analysis: Stern and after. *New Political Economy*, *14*(4), 469-488.

Annas, J. (1987). Epicurus on pleasure and happiness. *Philosophical Topics*, 15 (2), 5-21.

Atkinson, A.B. (2009). Economics as a moral science. *Economica*, 76, 791-804.

Bénabou, R., & Tirole, J. (2011). Identity, morals, and taboos: Beliefs as assets. *Quarterly Journal of Economics*, 126 (2), 805-855.

Chorus, C.G. (2015). Models of moral decision making: Literature review and research agenda for discrete choice analysis. *Journal of choice modelling*, 16, 69-85.

Chorus, C.G., Pudāne, B., Mouter, N., & Campbell, D. (2018). Taboo trade-off aversion: A discrete choice model and empirical analysis. *Journal of choice modelling*, 27, 37-49.

Cooter, R. (1984). Prices and sanctions. *Colum. L. Rev.*, *84*, 1523.

Endörfer, R. (2021). Should market harms be an exception to the Harm Principle?. *Economics & Philosophy*, 1-21.

Etzioni, A. (1987). Toward a Kantian socio-economics. *Review of social Economy*, *45*(1), 37-47.

Hausman, D. M., & McPherson, M. S. (2009). Preference satisfaction and welfare economics. *Economics & Philosophy*, *25*(1), 1-25.

High, J. (1985) Is economics independent of ethics? *Reason Papers* 10 (1), 3-16.

Hoeft, L., Kurschilgen, M., Mill, W., & Vannuccini, S. (2022). Norms as Obligations. *Working paper No. 22*. TUM School of Governance at the Technical University of Munich.

Hutt, W.H. (1936) Economists and the public. A study of Competition and Opinion. *Jonathan Cape, Thirty Bedsquare London.*

Klamer, A. (2017). Doing the right thing. Available online and downloaded on 08/06/2020.

Kornhauser, L. A. (1999). The normativity of law. *Am. L. & Econ. Rev.*, *1*, 3.

Lazear, E.P. (2000). Economic imperialism. *The Quarterly Journal of Economics*, 115 (1), 99-146.

Luttens (2022). On Aristotle's harmonic mean. *Mimeo, Vrije Universiteit Amsterdam. Available upon request.*

Mouter, N., Koster, P., & Dekker, T. (2021). Contrasting the recommendations of participatory value evaluation and cost-benefit analysis in the context of urban mobility investments. *Transportation Research Part A: Policy and Practice* 144: 54-73.

Medema, S.G. (2007). The hesitant hand: Mill, Sidgwick, and the evolution of the theory of market failure. *History of Political Economy*, 39(3), 331-358.

Mildenberger, C. D. (2018). A liberal theory of externalities?. *Philosophical studies*, *175* (9), 2105-2123.

Mill, J.S. (1861) Utilitarianism. *Collected works of john Stuart Mill, Vol 10: Essays on Ethics, Religion and Society. Liberty Fund.* Indianapolis. (Edited by Robson, J.M.).

Posner, E.A., Sunstein, C.R. (2017). Moral commitments in cost-benefit analysis. *Va. L. Rev.*, *103*, 1809-1860.

Rosenbaum, E. F. (2000). What is a market? On the methodology of a contested concept. *Review of Social Economy*, 58(4), 455-482.

Roth, A.E. (2018). Marketplaces, markets, and market design. *American Economic Review*, *108* (7), 1609-58.

Sandel, M.J. (2013). Market reasoning as moral reasoning: why economists should re-engage with political philosophy. *Journal of Economic Perspectives*, *27* (4), 121-40.

Sen, A. (2000). The discipline of cost-benefit analysis. *The Journal of Legal Studies*, *29* (2), 931-952.

Sen, A., Deaton, A., & Besley, T. (2020). Economics with a moral compass? Welfare economics: Past, present, and future. *Annual Review of Economics*, 12, 1-21.

Smith, A. (1790) *The Theory of Moral Sentiments. 6th Edition*. Penguin Classics, published by Penguin Books.

Spash, C.L. (1997). Ethics and environmental attitudes with implications for economic valuation. *Journal of Environmental Management*, 50 (4), 403-416.

Van Staveren, I. (2007). Beyond utilitarianism and deontology: Ethics in economics. *Review of Political Economy*, 19 (1), 21-35.

Verhoef, E., Nijkamp, P., & Rietveld, P. (1996). Second-best congestion pricing: the case of an untolled alternative. *Journal of Urban Economics*, 40 (3), 279-302.

Wempe, B., & Frooman, J. (2018). Reframing the Moral Limits of Markets Debate: Social Domains, Values, Allocation Methods. *Journal of Business Ethics*, *153* (1), 1-15.

White, M. D. (2009). In defense of deontology and Kant: a reply to van Staveren. *Review of Political Economy*, 21 (2), 299-307.