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The Case of Tax Evasion

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Endogenous Norm Formation Over the Life Cycle – The Case of Tax Evasion *

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Abstract

This paper offers an explanation to why the general observation that elderly hold stronger moral attitudes than young ones may be an age rather than a cohort effect. We apply mechanisms from social psychology to explain how personal norms may evolve over the life cycle. We assume that people update their norms influenced by their own past behavior (e.g., cognitive dissonance) and/or by the attitudes of their peers (normative conformity). We apply the theory on actual norm distributions for young and old concerning tax evasion. Allowing for heterogeneous updating of norms where only those who identify with their network are actually conforming with it, while the others are only influenced by their own past behavior, we can explain the difference between young and old people's moral values as an age effect through endogenous norm formation.

Keywords: Social norms, Endogenous norms, Tax evasion, Cognitive dissonance, Self-signaling, Normative conformity.

JEL classification: D03, H26

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1 Introduction

The young are often claimed to be more immoral than the old. There are numerous records of this view, but few as eloquently stated as by Socrates more than 2000 years ago:

> The children now love luxury; they have bad manners, contempt for authority; they show disrespect for elders and love chatter in place of exercise. Children are now tyrants, not the servants of their households. They no longer rise when elders enter the room. They contradict their parents, chatter before company, gobble up dainties at the table, cross their legs, and tyrannize their teachers. (Attributed to Socrates)

Today we have more than anecdotal evidence regarding this generational difference in terms of attitudes and behavior in various contexts. List (2004) finds that older individuals behave more cooperatively and altruistically than middle aged and young ones. Halpern (2001) studies the World Values Survey and finds that older people hold stronger moral values concerning self-interest, legal/illegal activities and personal/sexual matters. Moral values and behavior are closely linked and values as such are important to study since they to a large extent explain intentions and also actual behavior.[1] This is particularly true for the policy important area of tax compliance where personal and social norms have proven to be important determinants of behavior. Moreover, also in this area several studies have found that the young hold weaker norms than the elderly.[2]

The question is why the above mentioned differences in value judgements have come about—is it a cohort effect, so that the youth of today is com-

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[1]See Tabellini (2008) and Torgler (2007) for two insightful discussions in different contexts.

[2]Using survey data from the UK, Orviska and Hudson (2003) find that young are less reluctant than old to tax evasion and Devos (2008) finds that among Australians, respondents (50+) are less tolerant to tax evasion than younger ones. McGee and Gelman (2008) find that older (50+) respondents are more negative to tax evasion than younger ones in the US and a similar result is found by McGee and Tyler (2006) in their study of tax-evasion attitudes in 33 countries.

pletely different from the older generation and will so remain? Or, may it be an age effect, i.e., are these value judgements endogenously determined and evolve over the life cycle? The answer to this question is important. If it is a cohort effect, we may experience a downward spiral in moral values, while an age effect could indicate that today's young are likely to become similar to today's old once they themselves turn old. (Reading the quote from Socrates, might make us inclined to believe in the age effect.) The question of age versus cohort effect is important, not least in the example of tax evasion. E.g., there may not be an alarming deterioration of people's tax morale in general if the observed differences are due to an age affect.

There are a few studies that have looked into the age versus cohort issue concerning tax morale. Braithwaite et al. (2010) conclude that the difference in taxpaying norms between young and old is more likely an age effect than a cohort effect although their study uses cross-section data.[3] Torgler and Valev (2006) use panel data to study attitudes toward tax evasion and corruption, and they observe an age effect rather than a cohort effect concerning both issues. Even though these studies conclude that there is an age effect, they say nothing about the mechanisms giving rise to changes in moral values over the life cycle. An age effect implies that value judgements are endogenous and therefore possible to affect by policy.[4] Trying to understand how such value judgements evolve over the life cycle therefore has important policy implications.

This paper thus fills a gap in the literature. It gives a new perspective on the attitudinal differences between young and old by investigating how individuals may change their moral values through social psychology mechanisms over the life cycle. There are several theoretical proposals of how personal attitudes change and we will test different mechanisms in a simulation model to see which mechanism best fits the observed differences. We allow for het-

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[3]"Networks may place limits on how much drift is possible as taxpayers develop a tax 'history' and 'routine' that shapes the way in which they deal with tax in their later years. The data seem most consistent with the drift interpretation and suggest that it is quite plausible that with time the under-30s will become like the over-55s" (Braithwaite et al., 2010).

[4]"If a government can influence a norm, tax evasion can be reduced by policy activities" (Torgler, 2007, p. 67.)

erogeneity in norm updating across individuals, who alter their preferences due to own past behavior and/or due to their peers' moral judgements.

Although we will analyze moral judgements specifically regarding tax evasion, the line of reasoning is valid for a whole range of topics where moral values are important for behavior.

The view that preferences are endogenously determined has long been held by sociologists and psychologists. Recently it has been acknowledged also in the economics literature that preferences are likely to be endogenously formed by our behavior and surroundings, especially concerning issues involving social interactions (see, e.g., Bowles, 1998; Ostrom, 2000; Tabellini, 2008). In the present paper, we extend the literature by presenting a dynamic evolution of the norms, while previous papers have modeled endogenous norms in static settings.[5]

Moreover, previous research on attitudes towards, e.g., tax evasion, has been concerned with average (or individual) changes. Although both individual and social norms have proven to be important for behavior and we know that people hold very different norms, we still know very little about how they evolve over time in aggregate. Also the theories within social psychology that have tried to explain how moral judgements change over time have mostly focused on the individual level. In order to actually explain what affects norms in society, we need to consider the whole norm distribution, since different norms may affect people differently (see, e.g., Myles and Naylor, 1996). Another novelty of the present paper is that we actually take the whole distribution of norms into account. This allows us to distinguish between different potential norm-updating mechanisms, which would not be possible if merely studying averages. To study the whole distribution is also important from a policy perspective. If people on average do not approve of evasion, while a few do and therefore evade a lot, this is still a problem that we fail to address if averages are our only concern.

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[5]See, e.g., Fischer and Huddart (2008), Lindbeck et al. (1999), Lindbeck et al. (2003), and Östling (2009). Tabellini (2008) regards norm evolution over time in an intergenerational setting, where parents choose what values to pass on to their children.

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In Section 2, we present actual moral judgements of a special kind of tax evasion, namely buying black market services, by young and old and ask whether endogenous norm evolution could explain the transition from one to the other. Section 3 presents norm evolution theories. We will assume that own past behavior affects one's personal attitudes as proposed by the theories of cognitive dissonance (see, e.g., Festinger, 1957; Akerlof and Dickens, 1982; Lieberman et al., 2001) and of self-signaling (see, e.g., Bénabou and Tirole, 2004, 2006, 2010). Hence, those who evade become less reluctant to tax evasion and those who do not become more reluctant. An alternative updating of norms is that people are influenced by their networks, e.g., by family, friends, and colleagues, and tend to conform with their views as in the normative conformity theory by, e.g., Deutch and Gerard (1955).

In Section 4 we set up a simple model where both personal and social norms influence the decision of whether to evade or not. Then, we incorporate the proposed norm-updating mechanisms. The complexity of the model (heterogeneous norm updating, history dependence, network effects, and considering the whole distribution of preferences), makes it necessary to adopt simulations. In Section 5, we therefore calibrate the model with actual numbers and simulate people's behavior and norm changes in an intertemporal setting using an agent-based model where cohorts come and go and people interact with each other. None of our proposed updating mechanisms can alone explain the transition. However, a combination where those who identify with their group and have lower than average moral standard tends to conform with the values of one's peers and the others are influenced by their own past behavior, gives rise to the evolvement of attitudes that is actually observed. Hence, we can offer a plausible explanation for why there may be an age effect; we can, however, by no means prove that it is the only (or true) explanation. Section 6 concludes the paper and discusses some potential policy implications.

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2 An illustrative example

Illustrative for the reasoning put forward in the introduction are the answers in a survey made by the Swedish tax agency regarding buying black market services. We use the question capturing the moral judgement rather than actual behavior for two reasons: First, everyone may make a moral judgement, while not everyone has the need to buy the service or the possibility to do it in the black market. Analyzing behavior would therefore imply selection problems. Second, since buying black market services is illegal, it is questionable whether people would respond truthfully to a question about their behavior. We therefore focus on moral values, and as already pointed out this may indeed have an impact on actual behavior (which is also assumed in the theoretical model in Section 4). Sweden is one of the countries with the highest labor-income tax wedges in the world, implying large incentives to trade services in the black market. The question we use to capture personal attitudes to such activities is the following:

> Do you agree or not with the statement: *It is immoral to buy black-market services.*

The respondents could answer on a scale from 1 to 7, where 1 meant *Do not agree at all* and 7 meant *Agree completely.* Figure 1 shows how young and old respondents responded to this statement; it is obvious that the two groups differ in their moral valuation. According to a t-test, the old have a significantly higher mean value than the young and a χ^2-test rejects that the two distributions are the same (in both tests, $p = 0.000$). The distribution for the middle-aged lies between the two presented ones. The finding that the old report higher aversion to buying black-market services is in line with previous literature, as reported above, but we also note the difference in the total distribution: The distribution for the old is more skewed than the one for the young.[6] This also points to why it is important to conduct the analysis

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[6] Although we depart from one special question in one country, there are reasons to believe that there are similar differences in general. When looking at answers from people in

Figure 1: Distribution of answers to whether it is immoral to buy black-market services

Do you agree or not with the statement: It is immoral to buy black market services
1= Do not agree, 7= Agree completely
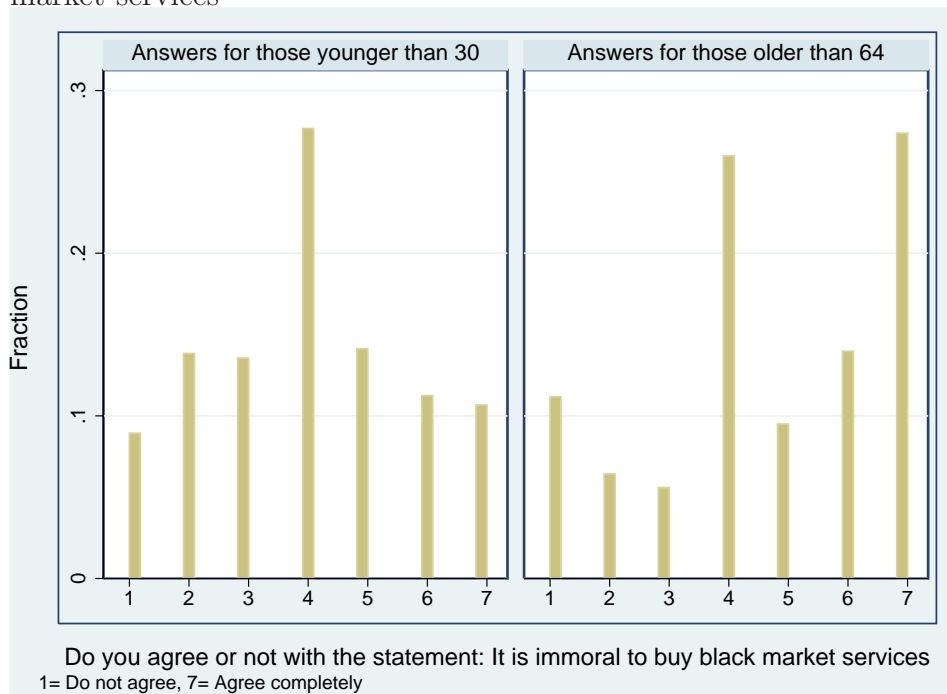
in terms of the whole distribution and not only average values. There is much more information in the whole distribution and, as we will argue later on in the paper, the key to how people's attitudes change over time lies in the study of the whole distribution since we allow for heterogenous agents. In our agent-based simulations in Section 5, we calibrate our model with figures from this survey. Although this is just one specific example, the way of reasoning about endogenous norm updating mechanisms should be valid for a wide range of topics where value judgements are important.

3 Theories of norm evolution

Theories concerning the evolution of moral values and norms have mainly been proposed within social psychology (for a comprehensive overview, see

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25 European countries to the statement "Citizens should not cheat on taxes" in European Social Survey, old are more prone to agree with the statement and the distribution for their answers is more skewed than that for the young.

Turner, 1991). Personal norms may change due to own past behavior, others' behavior, others' attitudes, or some combination of these.

One explanation to why people alter their personal norms is that one adjusts them to fit one's actual behavior. One example is the theory of cognitive dissonance, as first presented by Festinger (1957), where if people act in conflict with their attitudes they tend to change their attitudes to fit their behavior. Lieberman et al. (2001) find that there can even be an automatic attitude change from behavior. Akerlof and Dickens (1982) and Östling (2009) are two examples from the economics literature of when one chooses what personal attitude to hold in order to match behavior.According to cognitive dissonance, people who, e.g., disapproves of tax evasion but cannot resist the temptation and therefore evades will modify their attitudes toward tax evasion in order to justify their behavior. Similarly, someone who has not evaded will be (more) convinced that evasion is wrong. Since we observe less people actually evading than not, this could be one explanation to why people become more reluctant to evasion over time.

A related theory according to which personal norms are affected by own past behavior is the self-perception theory proposed by Bem (1972) and later developed and incorporated in the economics literature as the self-signaling theory (Bénabou and Tirole, 2004, 2006, 2010). Self-perception and self-signaling do in many cases yield similar predictions as cognitive dissonance, yet the cause for attitude change is slightly different. Behavior does not create dissonance but instead reveals the personal norm to the individuals who are unaware of their true preference before they act. On observing or remembering their own behavior the individuals conclude what kind of persons they are and what their attitudes should be in order to agree with their actions. I.e., by the choice of evading or not, one signals to oneself whether one is an evader or a non-evader. We will not directly distinguish between self-signaling and self-perception, but analyze them interchangeably.

A different form of attitude change may arise not due to own behavior but through social interaction and the influence of others' attitudes. Manski (1993) defines social effects as when the propensity of an individual to behave in a certain manner depends on the prevalence of that behavior in some

reference group that the individual belongs to. Simply put, if the propensity to buy black market services is high within one's network, then the probability that one will buy such services increases. We will, however, not restrict this social interaction to concern observed behavior only, but instead allow for a direct effect from attitudes within the network. "*After all, humans do communicate about all sorts of things*," as pointed out by Manski (2000). The pioneering paper in the area was by Deutch and Gerard (1955), who found that normative social influence makes people adopt views of others (in a group). Hence, in their terminology, we focus on *normative conformity* motivation, implying that one conforms to what the others view as right, as opposed to *informational conformity*, which is rather concerned with conforming to what one knows that others do. This means that people tend to adjust their attitudes toward those of the majority of their peers, and, e.g., Wenzel (2005b) finds that social norms have a causal effect on personal ethics. Moreover, according to Terry and Hogg (1996) and Smith and Terry (2003), the group norm should have a greater influence when one's group identification is high, which is also supported by the empirical findings by Wenzel (2004). This line of thought is also drawn by Cialdini and Goldstein (2004) in their overview when they point at findings that people are more likely to conform with the attitudes of more proximate than with those of less proximate people. In economics, Bernheim (1994) was the first to adopt and develop the theory of conformity, but then rather as informational conformity when one wants to do what the majority does, and Myles and Naylor (1996) adopt it into a tax compliance setting. In our analysis, we adopt the idea of normative conformity from social psychology and let attitudes themselves conform to group norms.

Although endogenous preferences have been studied (see, e.g., Bowles, 1998; Ostrom, 2000) there are very few studies that actually do it in a dynamic setting and try to explain how they evolve over time. Some previous studies use a static setting where individual preferences are formed simultaneously with the behavioral decision, e.g. Fischer and Huddart (2008), Lindbeck et al. (1999), Lindbeck et al. (2003), and Östling (2009). Tabellini (2008) regards norm evolution over time in an intergenerational setting where

parents choose what values to pass on to their children. In the present paper, we regard norms as endogenous and specifically study them in a dynamic setting where we focus on how they evolve over the life cycle.

Azar (2004) presents a theoretical model for the evolvement of the social norm of tipping. Akerlof (1980) claims that also social norms that are costly to the individual will prevail, while Azar's model predicts that such norms will erode over time. In the present paper, we explicitly model the link between personal moral values and social norms and find that the long-run equilibrium depends on the mix of updating mechanisms.

In the tax compliance literature, both social and personal norms have been put forward as important for attitudes about tax evasion as well as for actual behavior (see, e.g., Erard and Feinstein, 1994; Myles and Naylor, 1996; Wenzel, 2004, 2005a; Fortin et al., 2007; Kirchler, 2007; Torgler, 2007). These papers, however, have not dealt with the formation and evolution of these norms. Myles and Naylor (1996) assume conformity with others' evasion behavior and Fortin et al. (2007) discuss that expectations about others' behavior among other things influence the social cost of evading taxes. These studies, however, assume exogenous norms of informational conformity. Wenzel (2004) also finds evidence of conformity, and that it is more important if one identifies with the group than if one does not. Wenzel (2005b) investigates in an experimental setting how personal and social norms affect tax compliance, and then in turn how tax compliance affects norms, and finds evidence that tax compliance actually has a causal effect on personal tax paying ethics. In this sense he actually endogenizes norms related to tax compliance and through his controlled laboratory experiment he can actually distinguish between exogenous and endogenous impacts. Also Torgler (2006) finds evidence of endogenous personal norms concerning tax evasion in his finding that religiosity affects tax morale. Hence, there are good grounds to assume that moral values in general and concerning tax evasion in particular are endogenously determined and that they may change over time.

4   A theory of buying black-market services

In a very simple partial equilibrium model, individuals live for two periods and in each they have to decide whether they should buy a service in the white or in the black market. For simplicity, we abstain from including any supply side effects, but assume that both markets are characterized by perfect competition, so that buyers are price takers. Moreover, the services sold in the black and in the white market are perfect substitutes in terms of result. The difference in price between the two services is equal to the tax wedge. We also assume that buying this service is something that has to be done in each period, so the only choice for the individuals is whether to buy it in the black or in the white sector and the choices in the two periods are made independent of each other. Buying from the black sector is cheaper and leaves more resources for consumption than buying in the white sector. However, buying from the black market is illegal, and if one is detected buying black-market services, one has to pay a sizable fine, which reduces consumption possibilities:

$$c_b > c_w > c_f, \tag{1}$$

where c_b and c_f are consumption if buying the black market service and getting away with it and being fined, respectively, while c_w is consumption if one buys the service in the white market. For simplicity, individuals are homogeneous in terms of these consumption possibilities, which also are equal across the two periods in life.[7]

Utility from consumption, $u(c)$ is a quasi-concave function (and the same for all individuals in the economy). In order to avoid trivial solutions, we make the plausible assumption that

$$(1 - p)u(c_b) + pu(c_f) - u(c_w) > 0, \tag{2}$$

where p is the exogenous, commonly known probability of being detected

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[7]We abstract from savings and from any interdependency of utility in the two periods, so that each decision is made in isolation.

if buying in the black market. Hence, everyone faces the same material incentives to buy the service in the black or white market, incentives that imply that everyone would buy the service in the black rather than in the white market if only expected utility of consumption mattered.

However, there may be a psychological disutility from buying a black market service: The convex function $\varphi(.)$ with $\varphi(0) = 0$ and $\varphi(1) = \infty$ reflects the degree of guilt or shame that the individual experiences if she buys the black market service, irrespective of whether she is detected by the authorities or not. We assume that guilt is experienced if acting against one's personal moral norm and shame if acting against the social norm.[8]

We assume that people have an intrinsic moral attitude toward buying black market services, $\gamma_i \in [0, 1]$. If $\gamma_i = 0$ one has no moral doubts about buying black market services. At the other extreme where $\gamma_i = 1$, one would never dream of violating the law, irrespective of the material payoff. Whenever $\gamma_i \in (0, 1)$, there is a trade-off between economic incentives and feelings of guilt when deciding whether to buy black or white market services. Individuals differ in terms of γ_i, and in their first period of life, the value is drawn from some specific distribution.

Each individual i has a unique social network, meaning that even if both k and l are part of i's network, they need not be part of each other's. Moreover, the network influences the individual through their attitudes; one is concerned with the approval or disapproval from family, friends, and colleagues. We assume that people talk freely within their networks, so that the γ's of everyone within it is known to the individual, as is their actual behavior. We thus assume that the average moral attitude in the network, $\bar{\gamma}_i$, is what may affect utility through shame.[9] If one buys the black-market service, one experiences shame if the network disapproves. Hence, the shame if evading increases in the network's average moral judgement.

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[8]According to Erard and Feinstein (1994), shame is only felt when detected. However, as will become clear below, an illegal action will always be detected by the peers.

[9]Myles and Naylor (1996), Lindbeck et al. (1999, 2003), and Fischer and Huddart (2008) model conformity in terms of others' actual behavior, where one wants to act in accordance with the network's average behavior. However, they do not consider information about attitudes as such.

Each individual i knows her own moral value, γ_i, and also the $\bar{\gamma}_i$ of her network. There will thus be both an intrinsic personal norm and a social norm affecting the utility of buying the service from the black market. These two effects can be joined in the psychological disutility of buying from the black market:

$$\varphi\big(\delta\gamma + (1 - \delta)\bar{\gamma}\big), \tag{3}$$

where $\delta \in (0.5, \ 1]$ reflects the relative importance of the personal and social norms. Since Wenzel (2004) found that personal ethics were more important for compliance than were social norms, we assume that $\delta > 0.5$.[10]

Individual i will buy from the black market if the material pay-off, as presented in (2), exceeds the psychological disutility in (3), i.e., iff

$$(1 - p)u(c_b) + pu(c_f) - u(c_w) > \varphi\big(\delta\gamma_i + (1 - \delta)\bar{\gamma}\big). \tag{4}$$

This implies that people with low γ_i, i.e., a low degree of personal moral doubts about black market services, are more likely to actually buy from the black market, but so are those who belong to a social network where one, on average, has low moral doubts about it.

4.1   Updating norms

Hence, like previous literature, we show how personal and social norms influence decision making. However, in our model people live for two periods and may therefore change their moral views as time goes by. We assume that moral views may change via two mechanisms, namely through own behavior and through influence from the network, as presented in Section 3.

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[10]Also Fischer and Huddart (2008) model the norm as a weighted average of personal and social norms, although they assume the latter to be the per-capita average level of the actions of others.

4.1.1 Cognitive dissonance and self-signaling

In our setting, the material payoff from buying in the black-market sector may be very high, so that condition (4) holds, although one has a strong moral norm against buying black market services. Then, according to cognitive dissonance, one is likely to adjust one's personal ethics afterwards in order to justify one's behavior.

Hence, if one bought a black market service in Period 1, one becomes less reluctant to doing so in the future (γ_i is reduced in accordance with some parameter $\alpha_b \geq 0$). Likewise, if one bought in the white market in the first period, then one's personal ethics about not buying in the black market grow even stronger in Period 2 (γ_i increases in accordance with some $\alpha_w \geq 0$). Moreover, the norm need not react to buying in the white and black market symmetrically, i.e., α_w is not necessarily equal to α_b. This updating mechanism is also consistent with the theories of self-perception and self-signaling, although this interpretation is most plausible for those with γ_i in the middle of the distribution.

If people update their norms in accordance with their own past behavior, whether it is due to cognitive dissonance or self-signaling, we should see a more polarized distribution of attitudes among old than among young. Moreover, since most people do not buy black-market services (according to our data about 30 % have bought such services), we would expect the distribution for the old to be more skewed than for the young, something we actually observe in Figure 1. However, that the peak in the middle of the distribution seems to prevail among the older cannot be explained by this updating mechanism of personal norms.

4.1.2 Conformity with network preferences

Not only one's own past behavior determines how social human beings update their personal norms; people discuss and influence each other. We thus assume that due to normative conformity one conforms to the social norm, measured as the average personal norm in the social network, $\bar{\gamma}$, when updating their own personal norm. This means that people with a personal

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$\gamma_i > (<)\bar{\gamma}_i$ will reduce (increase) their γ a bit to come closer to their peers.

If normative conformity with the network is decisive for updating the personal norm, people should approach the middle of the distribution as time goes by. This updating mechanism could thus explain that the peak in the middle of the distribution is more pronounced among the old than among the young. Yet the increased skewness or the change of the mean is not supported by normative conformity updating. Hence, we need to consider both cognitive dissonance and conformity in order to replicate the change from the left panel to the right one in Figure 1 with dynamic norm evolution.

When people update their personal norm, we therefore assume that both mechanisms may be important and we allow for heterogeneity across individuals. People react to new information differently: some alter their attitude a lot and some almost nothing, given the same initial personal norm. We therefore let the magnitude of the change depend on the stochastic parameter $\theta_i \in [0, 1]$. Hence, personal norms are updated between the two periods of life according to

$$\gamma_{i2} = \begin{cases} \gamma_{i1} + \theta_i \big[\mu_i(\bar{\gamma}_{i1} - \gamma_{i1}) + (1 - \mu_i)\alpha_w\big] & \text{if } i \text{ bought white in Period 1} \\ \gamma_{i1} + \theta_i \big[\mu_i(\bar{\gamma}_{i1} - \gamma_{i1}) - (1 - \mu_i)\alpha_b\big] & \text{if } i \text{ bought black in Period 1} \end{cases}$$
$$(5)$$

where $\mu_i \in [0, 1]$ determines the relative importance of own behavior and the social norm for the updating process. This relative importance may differ across individuals and may itself be a function of where in the network distribution γ_i is, so that one is more inclined to adopt the network norm if one identifies with the group than if one does not, something we will consider in our simulations.

Our proposed updating mechanisms are also consistent with empirical findings by Wenzel (2005b). He finds that personal ethics (corresponding to our γ_i) affect taxpaying behavior, which in turn affects personal ethics in the next period. In his study, he also finds that social norms have a causal effect

on personal ethics.

Since none of the mechanisms alone seem to be able to fully explain the observed difference in attitudes presented in Figure 1, we will analyze some specific combinations of the mechanisms to be able to explain the attitudinal change.

4.1.3 Specific updating mechanisms

The general updating rule in (5) contains several possible variations of updatings of the personal norm. Below, we present some specific mechanisms that we also test in Section 5 to identify the most likely mechanism (or, combination of mechanisms) to generate the transition of norms that we actually observe.

- *Symmetric cognitive dissonance:*
  $\mu = 0, \ \alpha_w = \alpha_b > 0$. In this case, there is only updating due to own behavior, but the personal norm is affected symmetrically if one has bought in the white and in the black market. Hence, $\gamma_{i2} > \gamma_{i1}$ if one bought in the white market and $\gamma_{i2} < \gamma_{i1}$ if one bought in the black market in the first period.

- *Asymmetric cognitive dissonance:*
  $\mu = 0, \ \alpha_w = 0, \ \alpha_b > 0$. In this case, there is no updating according to the network norm and it is only if one actually breaks the law that one reduces the moral reluctance to buying black-market services. Hence, $\gamma_{i2} = \gamma_{i1}$ if one bought in the white market and $\gamma_{i2} < \gamma_{i1}$ if one bought in the black market in the first period.

- *Self-signaling:*
  $\mu = 0, \ \alpha_w = \alpha\gamma_{i1}(1-\gamma_{i1}), \ \alpha_b = \alpha\gamma_{i1}(\gamma_{i1}-1)$. In this case, individuals in the middle are not aware of their own norms but will infer it from their behavior. The more extreme γ_{i1} people have, the more likely it is that they are aware of their norms, and thus their behavior will not alter their norms.

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- *Normative conformity:*

  $\mu = 1$. In this case, one updates the norm in order to conform with the network norm and not depending on own behavior. Hence, $\gamma_{i2} > \gamma_{i1}$ if $\gamma_{i1} < \bar{\gamma}_{i1}$ and $\gamma_{i2} < \gamma_{i1}$ if $\gamma_{i1} > \bar{\gamma}_{i1}$.

- *Combination of conformity and cognitive dissonance:*

  $\mu \in (0, 1)$, $\alpha_w > 0$, $\alpha_b > 0$. In this case both mechanisms are effective, but the relative strength depends on μ.

- *Network identification conformity:*

  $\alpha_w = \alpha_b > 0$. If $|\gamma_{i1} - \bar{\gamma}_{i1}| > X$, then $\mu = 0$. If $|\gamma_{i1} - \bar{\gamma}_{i1}| \leq X$, then $\mu \in (0, 1]$. If one's personal norm is too far from the average network norm, then the identification with the group is low and one is not influenced by the network, but only updates the norm depending on one's own behavior. If, on the other hand, one has a strong identification with the group, then the influence from the social norm on the personal norm is stronger. In the extreme case, which we will also simulate in Section 5, one either conforms with the group norm, i.e., $\mu = 1$, or updates depending on previous behavior, i.e., $\mu = 0$.

- *Asymmetric network identification conformity:*

  $\alpha_w = \alpha_b > 0$. If $\gamma_{i1} - \bar{\gamma}_{i1} > 0$ or if $\bar{\gamma}_{i1} - \gamma_{i1} > X$ then $\mu = 0$. If $|\gamma_{i1} - \bar{\gamma}_{i1}| \leq X$, then $\mu \in (0, 1]$. In this case one will not identify with the group if one's personal norm is above the average network norm[11] or if it is too far below the average network norm. In these cases one is not influenced by the network, but only updates the norm depending on one's own behavior. If, on the other hand, one identifies with the group, then the influence from the social norm on the personal norm is stronger. In the extreme case, which we will also simulate in Section 5, one either conforms with the group norm, i.e., $\mu = 1$, or updates depending on previous behavior, i.e., $\mu = 0$.

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[11]c.f., Myles and Naylor (1996).

5 Simulations

The simulations are made in an agent-based model and follow in spirit the approach of Schelling (1971). We simply state the behavior of the agents, determined by the theory presented above, and then investigate the aggregate outcome. Just as in Shelling's original model need to run the simulation model and analyze the outcome in order to ascertain that there is a stable equilibrium. This is the approach that we take and if the ratio of tax evaders and the distributions over attitudes remain stable over time we consider the model to be in equilibrium. The main difference compared to Shelling, who considered racial segregation, is that in our case individuals change their "race," i.e. attitudes. When calibrating the model we are mainly interested in obtaining plausible ratios for tax evasion. Agent-based models have been used to analyze tax evasion previously; see, e.g., Hokamp and Pickhardt (2010) and references therein.

5.1 Individuals and networks

Individuals live for at least one and at most two periods. They are randomly connected in networks of N individuals and each individual has a unique network. There are two generations alive at the same time and a young person has more young than old people in his/her network ones and vice versa. An individual, i, is born and receives a network consisting of some old and mostly young people in the first period. With some probability $p < 1$, i survives into Period 2 and turns old. Then her network changes: A share ϑ of the former young friends have now turned old and remain in the network, a share $(1-\vartheta)$ of the former young have died and so have all the former old ones in the network. Those in i's network not surviving into Period 2 are replaced by a new generation of young individuals. On average, the network size is $N = 50$, while the share within the network that are not of the same age as the network head is on average 20 percent. The total simulated population consists of 10,000 individuals.

5.2 Attitude distribution

When an individual enters the model as young, she receives an exogenous attitude, γ_{1i}, which we draw from a certain distribution. We choose to approximate the observations of the young people's attitudes toward buying black market services, $\gamma_i \in [0, 1]$, as a normal distribution to resemble Figure 1. Clearly, this is a simplification where we fail to account for the large tails and the extreme concentration of responses in the middle. We simulate a continuous distribution, but in order to resemble Figure 1, we divide the whole distribution into seven septiles. The starting attitude distribution that we simulate is presented in Figure 2. The moral attitude γ_{i1} is on the X-axis, where 0 means that it is totally accepted to buy black market services, and 1 means that it is totally unacceptable. The individual's and her network's attitudes toward buying black market services then determine whether the individual will buy from the black or from the white market as young. The next, and most important, step is to apply an updating mechanism that determines the individual's attitude during old age.

Figure 2: Simulated attitudes of young
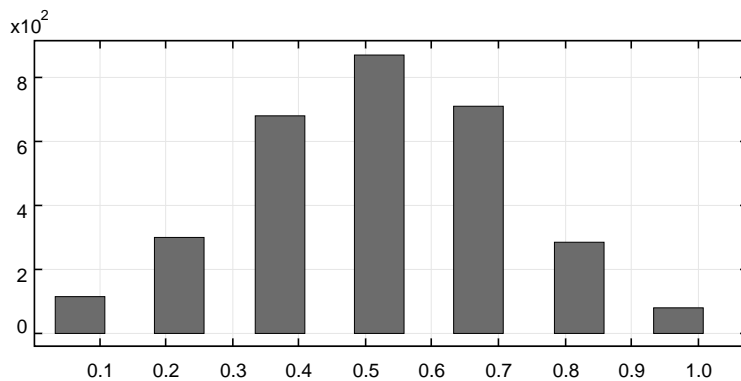
5.3 Results

The present paper aims to explore how the attitudes of the young will evolve under different assumptions of the norm-updating process and whether we

can come up with some updating mechanism that creates a long-run equilibrium with a distribution of norms of the old generation that resembles the actual one in the right-hand panel of Figure 1. The different old-age attitude distributions presented in the figures below are the stochastic equilibria that emerge when the model converges over time. In order to find stable equilibria we present the average of 100 periods (although the model often converges already after three or four periods).

The results of the attitudes for the old individuals under the different norm-updating assumptions are presented below. Investigating the cognitive dissonance effect alone, with both the symmetric (in Figure 3) and the asymmetric (when only cheaters were affected, Figure 4) response, we see that it is not possible to obtain a distribution for the old that is close to what we observe in Figure 1. With asymmetric dissonance we manage to obtain the move toward the lower extreme, yet the distribution of the majority does not alter. With a symmetric attitude change there is an increase in both extremes, but what is most important is that we are not able to maintain the concentration in the middle.

Figure 3: Symmetric cognitive dissonance
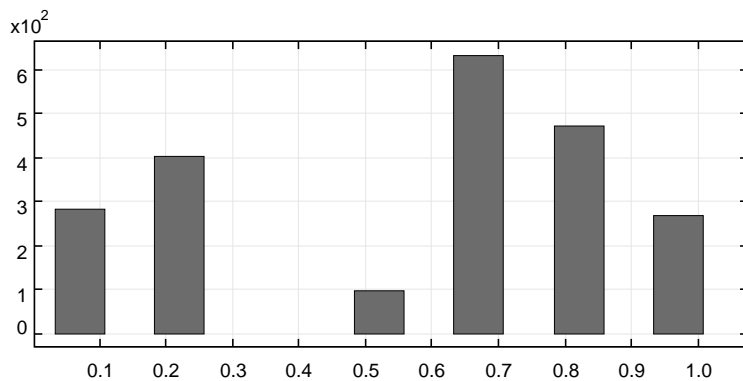
According to the self-signaling or self-perception mechanism, only those with non-extreme attitudes will infer their attitudes from their behavior, while the others already know their attitudes and therefore do not change

Figure 4: Asymmetric cognitive dissonance: only if cheating
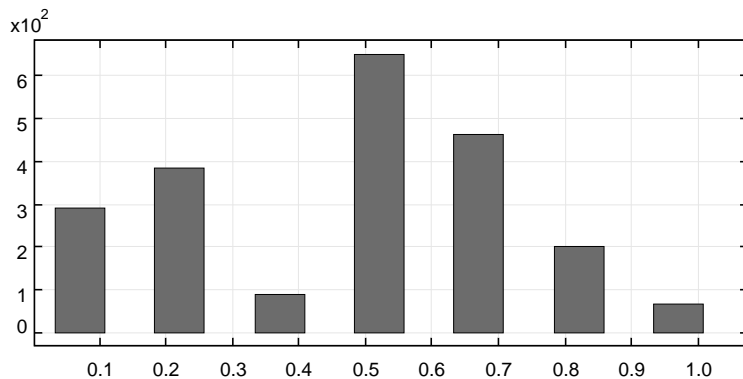
them. In this case we have a clear shift away from the middle, since they are the only ones who update their norms; see Figure 5.

Figure 5: Self-signaling
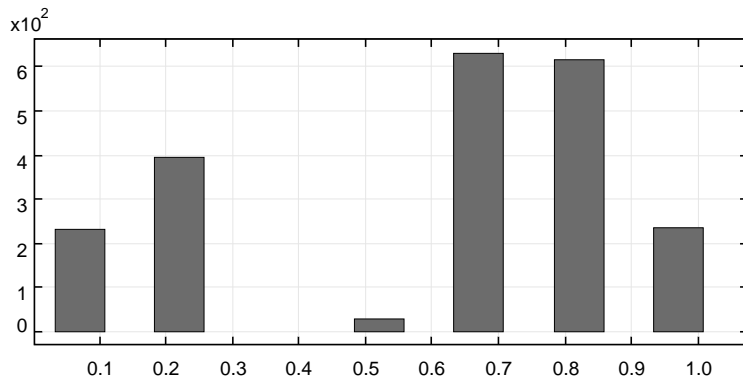
By solely updating the norms based on own behavior, we are therefore not able to generate the observed old-age distribution from the initial distribution in Figure 2.

Next, we investigate the old-age equilibrium when instead updating norms according to normative group conformity. Then we obtain a clear concentration in the middle but there is no move toward the extreme values; see Figure 6.

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Figure 6: Normative conformity
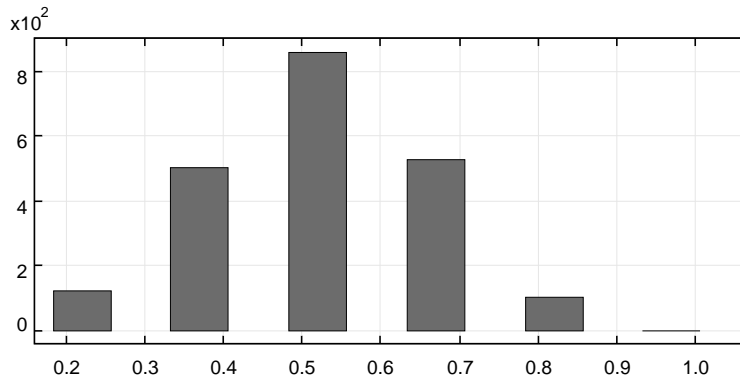
The normative conformity theory is thus not able to explain the observation either. By combining normative conformity with symmetric cognitive dissonance (see Figure 7), we obtain a similar pattern as for the symmetric cognitive dissonance in Figure 3, yet not as extreme since normative conformity smooths the effect. Moreover, since the dissonance effect dominates, the peak has moved to the right.

Figure 7: Symmetric dissonance and group conformity
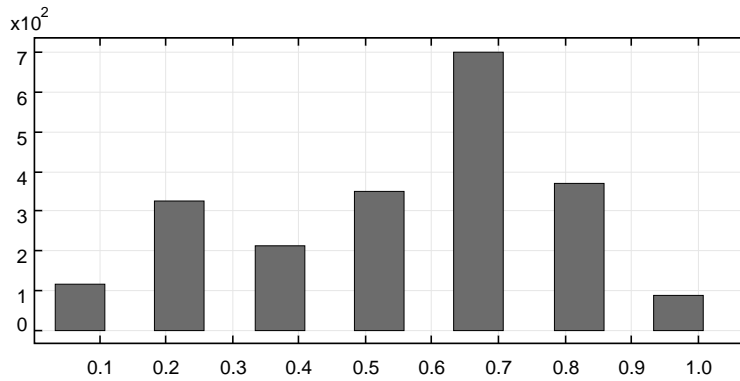
Above we tested combining the cognitive dissonance with normative conformity simultaneously, in the same way for all individuals. But what if

one decides to update *either* according to cognitive dissonance *or* according to normative conformity based on whether or not one identifies with the network? If the individual identifies with the group, she updates the norm according to the normative conformity theory. But if not, i.e., if the individual's attitude differs too much from the mean attitude of the group, she instead updates her norm in accordance with cognitive dissonance. Figure 8 shows that this norm-evolution process is able to generate both a concentration in the middle and a move toward the extremes simultaneously, and hence a similar outcome as the observed one. The match to the observed distribution is far from perfect, though, since the simulations result in a symmetric move toward the extremes.

Figure 8: Group identification: either group conformity or cognitive dissonance
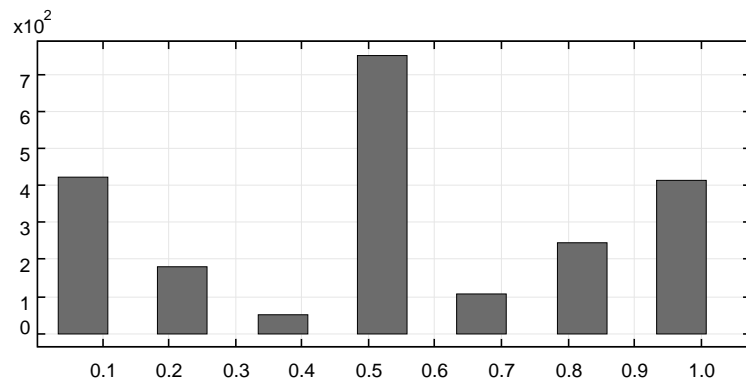

Finally, we test for another group identification criterion, namely that one will only be influenced by the network if one's personal norm is below the average network norm, but not too far below. Hence, one needs to identify with the network to conform with it, but if one feels that one has a "stronger morale" than one's peers, then one is not influenced by them. This is what we call the asymmetric network identification conformity. With this type of updating, the old will hold preferences that are distributed as in Figure 9; hence we are able to obtain the observed asymmetry with these heterogenous

and asymmetric updating mechanisms. In this case the long-run equilibrium of the simulated model actually replicates the observed distribution.

Figure 9: Asymmetric group identification: either group conformity or cognitive dissonance
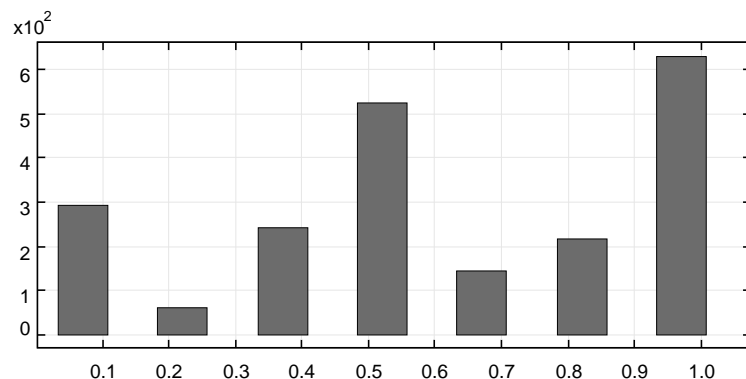
6   Conclusions

In this paper we have tried to explain the mechanisms behind the common observation that young and old hold very different moral attitudes in general. We have particularly focused on the attitudes toward buying black-market services, where Figure 1 shows the distributions of the moral views of the young and old, respectively. The old are more reluctant, yet are also more polarized in their attitudes than the young.

Although our example is a specific one, the line of reasoning is applicable to other topics as well. Our explanation to the attitudinal differences is that it is a result of the formation of endogenous norms, implying that the observed differences may be an age effect rather than a cohort effect. We propose a theoretical model where, apart from material incentives, people may find it immoral to buy illegal black market services. One may therefore feel guilty if one acts in opposition to one's own moral values. Moreover, people interact with each other in social networks and feel ashamed if they act in opposition

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to the average norm in their network. Hence, both personal and social norms hamper the occurrence of buying black market services, which has also been proposed in previous literature (e.g., Myles and Naylor, 1996; Wenzel, 2004, 2005b; Kirchler, 2007).

Even more importantly, we model the evolvement of norms depending on different psychological mechanisms: cognitive dissonance or self-signaling on the one hand and normative conformity on the other. Due to cognitive dissonance or self-signaling, one's preference as old is influenced by one's behavior as young. Since we actually observe a minority engaging in the illegal activity, these mechanisms could explain why the older are not only more polarized in their views but also on average more reluctant to buying black market services. Normative conformity, on the other hand, makes one approach the average moral value in one's network, at least if one identifies with the network. Hence, our paper not only addresses the question of endogenous social norms as such, we also propose in what ways they may evolve over the life cycle.

in addition, to see whether a distribution of personal norms like the one we observe for young people could transform into the one we observe for elderly, we took our model to an agent based simulation model by applying the utility maximization and norm updating from our theoretical model. We found that none of our suggested updating mechanisms alone can explain the transition. Not even a combination of the two, where relative weights are the same for everyone, can. However, when we allow for heterogeneous updating mechanisms, where people with strong identification with their networks are more prone to conform with their "more moral" peers, and those who do not identify with their network are instead influenced by their own past behavior in altering their personal norms, we are able to replicate the observed pattern as an equilibrium. Then we can explain how the young population (with a normal distribution of preferences), when they turn old, will hold preferences with still a large share in the middle, but also a very large fraction thinking that it is completely immoral to buy black market services and a smaller, yet substantial, share who think it is completely justifiable.

Of course, we have not proven that our explanation is the true one; there

could be other explanations as well. However, we have presented a plausible theory that is consistent with suggestions in previous literature and that is able to explain the transition from one observed norm distribution to another. Hence, we find it likely that the difference between the generations actually is an age effect, so that today's young people, when they turn old, may hold personal norms similar to today's old, which in turn means that we will not see an erosion of society's tax morale due to the younger generation's more permissive attitudes.

Our findings have important policy implications: since previous behavior affect norms, which in turn affects consequent behavior, policies that affect behavior may have more long-term effects than what is usually assumed (see also Funk, 2005). Increased audits in one period or a temporary tax reduction would reduce the expected gain from buying in the black market and would thus make more people buy in the white market instead. This would result in a generally higher reluctance to black market services, which could make people abstain from buying in the black market also in the future. Moreover, since people update their norms heterogeneously, general policies will be less effective than targeted ones. Young people who evade taxes are more likely the ones with less tax morale, and targeted actions towards them may be important to combat overall tax evasion.

Although we have analyzed a specific topic, this paper has given a hint of how we should think of dynamic norm evolution. It is likely that both our own past behavior and the attitudes of our peers influence our moral judgements. Moreover, it may well be the case that different people update their norms according to different mechanisms. Hence, it would be desirable to analyze endogenous norm formation in the aggregate also in areas other than tax morale.

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