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Abstract

An important difficulty in many models of behavioral economics is that preferences are endogenous and unstable. Therefore, preferences may not provide the most desirable yardstick to evaluate social states. This paper proposes unconditional love as a candidate for such a yardstick. The concept of unconditional love, although sublime, is often hard to apply for practical policy recommendations. We propose an intermediary learning stage, where learning to unconditionally love is desirable, and policies that promote such learning are deemed to be good. We illustrate the use of this principle in models of endogenous altruism.

Keywords: Normative economics; Behavioral economics; Weak Pareto principle; Principle of learning to unconditionally love; Virtue ethics; Endogenous preferences

JEL classification: D03, Z18

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I INTRODUCTION

In behavioral economics, preferences are often endogenous and unstable; thus, the weak Pareto criterion has serious limitations if we are to adopt it as the sole basis for the comparison of social outcomes. Even though the weak Pareto criterion and welfarism are still appealing, in many cases it may be desirable to combine utility-based welfarism with other ethical considerations.

The first step in doing this is to find a yardstick that is exogenous and stable and which has wide appeal. This paper proposes unconditional love as a candidate for such a yardstick. In our terminology, unconditional love means to unconditionally will the good of another. The key features of unconditional love are its unchanging nature and wide appeal. Even though the concept of unconditional love may find different mathematical expressions in different models (just as social norms have been modeled in many ways), we can use this yardstick to search for appropriate measures for evaluating outcomes in various classes of models. In this paper, we provide a mathematical framework for our conceptualization of unconditional love in a model with endogenous preferences.

The concept of unconditional love, although sublime, is often hard to apply for practical policy recommendations. This is because most people find it hard to practice unconditional love. We propose an intermediary learning stage, where learning to unconditionally love is desirable and policies that promote such learning are deemed to be good. This leads to the principle of learning unconditional love.

This principle is closely related to moral virtue ethics, because cultivating and practicing virtues is one important part of the principle. However, exclusive focus on moral virtues with total disregard for welfarism may not be socially desirable from the principle of learning unconditional love.

In order to apply the unconditional love principle to economic models, we need criteria. The weak Pareto criterion is based on evaluation of social states based solely on welfarism, so we need to modify it in order to add the ethical consideration of moral virtue. We adapt Tempkin's (2011, p.408) modification of the Pareto criterion:

Definition The Modified Weak Pareto Criterion: Given two social states x and y, if everyone strictly prefers x to y, then x should be evaluated to be better than y for society as long as x is not evaluated to be worse than y in terms of other ethically relevant factors.

By adding the last part starting from "as long as" to the definition of the weak Pareto criterion, we allow for the possibility that other ethically relevant factors such as moral virtue may outweigh the factor of welfarism. For example, let x be a social state in which a person produces child pornography from computer graphics without involving any real children and sells them to an adolescent whose taste for child pornography would not develop without such products. Let y be a social state in which such products do not exist. Imagine that both of these people strictly prefer x to y, whereas the other people in the society are indifferent between x and y. For people who only consider welfare as the highest ethical value, x should be evaluated as better than y. However, many people may feel that y is better than x after considering ethical factors other than welfare.

There are many possible moral virtues to consider, but we focus on the moral virtue of altruism in this paper. For pure moral virtue ethics, we propose the criterion of the moral virtue of altruism to be:

Definition The Criterion of the Moral Virtue of Altruism: Given two social states x and y, if at least one person's preference ordering is strictly closer to equal treatment of the self to others in x than in y, and everyone is at least as close to equal treatment of the self to others in x as in y, then x should be evaluated to be better.[4]

In order to combine welfarism with moral virtue, we need to modify the virtue criterion, too. The modified criterion of the virtue of altruism is:

Definition The Modified Criterion of the Moral Virtue of Altruism: Given two social states x and y, if at least one person's preference ordering is strictly closer to

[4]The unit of a person can be one agent with a lifetime utility or one agent in a given period such as the present self and the future self .

equal treatment of the self to others in x than in y, and everyone is at least as close to equal treatment of the self to others in x as in y, then x should be evaluated to be better as long as x is not evaluated to be worse than y in terms of other ethically relevant factors.

In order to illustrate how these criteria can be applied, we develop a simple model of endogenous altruism. In this model, an economic agent could choose to invest resources (say, spending time with a child) to become more altruistic toward his child. The optimizing behavior of the parent is constrained by the tax rate. We also consider an extension of this basic model by adding the decision to invest resources (say, volunteer work) to make oneself feel more altruistic toward strangers.

The rest of the paper is organized as follows. Section 2 provides a brief review of the related literature. Section 3 defines unconditional love and presents a simple model of such love based on endogenous altruism. Section 4 introduces the principle of learning unconditional love, and in Section 5, we illustrate how to use this principle in economic models with endogenous altruism. Section 6 concludes.

II RELATED LITERATURE

In this section we begin by discussing the role played by the weak Pareto criterion in traditional economics. This is followed by a discussion of limitations of this approach in behavioral economics, and an overview of alternative methods for evaluating social states recommended in the literature.

In traditional economics, with stable and exogenous preferences, the weak Pareto criterion is widely accepted for evaluation of different social states. Given two social states x and y, the principle requires that, if everyone strictly prefers x to y, then x should be evaluated to be better than y for society (see, e.g., Sen (1970, p.37). The (strong) Pareto criterion requires that if everyone is indifferent between x and y or prefers x to y, and if at least one agent strictly prefers x to y, then x should be evaluated to be better than y. If the Pareto criterion is satisfied then the weak Pareto criterion is also satisfied. The Bergson-Samuelson social welfare function (SWF) must satisfy the weak Pareto criterion, but need not satisfy the Pareto criterion. The Pareto criterion implies that a change in policy that yields a Pareto improvement should be evaluated to be a good one. This leads to the paradigm of Pareto efficiency as a social goal. On the other hand, evaluation based on the SWF is welfarism. In many cases, the optimal social state in terms of the SWF is also Pareto efficient, even though there are notable exceptions such as the maximin SWF.

In behavioral economics, one criticism of traditional welfare economics emphasizes the importance of the revealed preference principle. According to the revealed preference principle, we can infer individuals' preferences from their observed choices.

As long as preferences satisfy this principle, there is no need to distinguish between behavioral and welfare components of economic decision-making models. We can simply act as proxy for individuals and determine what they would prefer from their observed choices. This greatly simplifies the evaluation of policies, as we can extrapolate individual policy choices using the revealed preference principle and then apply the weak Pareto criterion in evaluating alternative policies (Bernheim and Rangel, 2005). The principle of revealed preference has been seriously challenged by recent developments in behavioral economics. For instance, Beshears et al. (2008) emphasize that equality between revealed preference and normative preferences, as commonly assumed in traditional economics, may not be accurate. They suggest that in many cases choices reflect a combination of normative preferences and decision-making errors caused by myopic impulses, analytical errors, inattention, and misinformation. Similarly, Rabin (1998) and Kőszegi and Rabin (2007, 2008) argue that often the well-being of an individual depends not only on the outcome of the choice but also on the choice set itself. Examples include loss aversion, shame, other-regarding behavior such as altruism, revenge, and fairness. They emphasize that in some cases such choice-set dependence can be strong enough to render welfare analysis based on revealed preferences ineffective. Gul and Pesendorfer (2007) emphasize that individual behavior conflicting with self-interest, such as addiction, necessitates a measure of well-being that is independent of revealed preferences. They suggest that in the presence of mistakes and biases in individual decision making, true utility cannot be inferred via revealed preference.

In this literature on revealed preferences, the criticism is not that the weak Pareto criterion or welfarism is not appropriate in behavioral economics. The criticism is that the true preferences needed for welfare analysis cannot be inferred from actual choices people make. As stated by Bernheim and Rangel (2007),

"The fundamental problem of behavioral welfare economics is to identify appropriate criteria for evaluating alternatives when, due to choice reversals and other behavioral anomalies, the individual's choices fail to provide clear guidance."

One school of thought attempts to incorporate behavioral biases such as temptation and self-control within the revealed preference framework for studying choices. This is accomplished by defining choices over the both allocations and the choice set (Gul and Pesendorfer, 2001). The idea is that if some choices are tempting when available and that distracts an individual from achieving well-being, then an individual may prefer smaller choices sets. With additional assumptions, this allows the tracing of the actual preferences from choice data by applying the principle of revealed preference. This approach has the limitation of ignoring the possibility that an individual may feel shame or humiliation from limiting his or her choice set via commitment (Kőszegi and Rabin, 2008).

A second school of thought emphasizes the use of both choice and non-choice data in conducting welfare analysis in behavioral economics. For instance, Kőszegi and Rabin (2007, 2008) argue that acknowledging mistakes in decision making can improve the efficacy of the revealed preference principle. However, this may need to be complemented by alternative measures of well-being for more reliable welfare analysis in behavioral economics. Bernheim and Rangel (2004) propose a framework for substance use where individuals maximize their utility given true preferences but randomly face conditions that lead to systematic mistakes. Hence, in their case, preferences and choices diverge and such divergence is rationalized using the evidence from neuroscience on the neural processes at work in decision-making. Bernheim and Rangel (2005) suggest identification of true preferences by combining choice data with non-choice data such as self-reported survey measures of preferences and well-being, as well as measures of physical state. Using this approach, Bernheim and Rangel (2007) propose to extend the standard choice-theoretic approach of welfare analysis to behavioral economics. It should be noted that the authors of these papers in behavioral economics are working under the criterion welfarism with regards to true preferences. These approaches are complementary to ours because while we do not abandon welfarism, we add moral virtue considerations to the normative analysis in models with endogenous preferences.

Our paper contributes to this literature by identifying a possible stable basis for normative economic analysis in the class of models where preferences are endogenously determined. The principle we propose, of learning unconditional love, evaluates social states, and policies that promote cultivating moral virtues are deemed to be desirable. When a person gains all possible moral virtues, she unconditionally loves others. Hence, in order to apply the principle to economic analysis, we need to first model unconditional love and then provide a normative economic framework that encompasses promotion of moral virtues along with pure welfarist considerations. We consider unconditional love to be a concept that cannot be precisely defined. Hence, our approach is to identify an appropriate expression in the context of a particular class of models. How we should do this may depend on the particular class of models used for the analysis, and therefore it may be impossible to find a general guideline. In this paper, we focus on models of endogenous altruism model with a simple structure, in order to highlight the mechanics of our proposed framework for ranking social states. We believe that extensions to more general models of endogenous preferences should be possible with relative ease once the basic ideas are developed.

III MODELING UNCONDITIONAL LOVE

In this section, we first discuss how we view unconditional love and relate it to deontology ethics founded by Immanuel Kant (1724-1784). Then we use an endogenous altruism model a ĺa Mulligan (1997) in order to find a mathematical formulation of our idea of unconditional love for this class of economic models.

Unconditional Love

In our view, unconditional love is not just a feeling (such as romantic love), but means to unconditionally will the good of another. The key features of unconditional love are its unchanging nature and wide appeal. Such love is understood to be enduring and constant and is offered to all conscious beings without exception. The idea of unconditional love has been studied and explored in a variety of subjects dealing with the human condition. One of the most important sources comes from religion. For example, in Christianity, we have the concept of *agape*. According to Encyclopedia Britannica:

" Agape in the New Testament, is the fatherly love of God for humans, as well as the human reciprocal love for God. The term necessarily extends to the love of one's fellow man."

Lewis (1960) describes unconditional love to be a Christian virtue and deems it to be the most important of all types of love. In Judaism, the law of human life culminates in the commandment "Thou shalt love thy neighbor as thyself," and this love includes the enemy.[5]. In Islam, the love of Allah for creation can be interpreted as unconditional love. Similarly, in Hinduism, the concept of *Bhakthi* implies unconditional devotion and love for God.

Another source for unconditional love comes from science. In a recent study, Beauregard et al. (2009) investigated whether there is a neural basis for unconditional love. They defined unconditional love to be the love that is extended to all without exception, in an enduring and constant way. Using fMRI techniques they find that unconditional love is mediated by a distinct neural network relative to that mediating other emotions such as romantic love and maternal love. This can be interpreted as evidence for the capacity of human beings to feel unconditional love. Harris (2010) suggests the use of the above mentioned scientific methods in providing an absolute moral value system based on well-being of conscious beings. In particular, he suggests there are moral absolutes that can be agreed upon and then used to form a value system that is conducive to the flourishing of entire societies.

As evident from the above discussion, unconditional love can be sourced from

[5] "love" in *Jewish Encyclopedia*

either religion or science. However, what is important is that it is an absolute idea and in that sense is can be viewed as a duty.[6] By its very definition unconditional love is stable and unchanging and hence can be used to evaluate policies in behavioral economics.

The philosophical inspiration and foundation for unconditional love can be derived from Kant's deontology ethics. In Kant's view, "pure practical reason" excludes any sensible incentives and yields the supreme principle of morality called the categorical imperative. One formulation of the categorical imperative is to act in such a way that one always treat humanity, whether his own person or the person of any other, never simply as a means, but always as an end. In this sense, our principle of unconditional love can be seen as an interpretation of Kant's view of ethics. For our purpose of using this ethical principle for behavioral economics, we propose that a version of the categorical imperative be the imperative to "unconditionally love anyone."

A Simple Model of Unconditional Love

In this section we formalize our conceptualization of unconditional love by presenting a simple framework that is inspired by Mulligan (1997). He proposes a model of

[6]This idea of unconditional love being a duty has been extensively explored by some philosophers. For instance, Kierkegaard(1813-1855) distinguishes the Christian concept of love from preferential love (Cherkasova, 2004). He identifies Christian love as universal and unconditionally devoted to all humanity and ultimately to God.

endogenous altruism within and beyond the family where a decision maker invests in resources to become more altruistic. These resources are typically in terms of time and effort for instance, time spent interacting with a child or doing volunteer work to help other people. We utilize this idea of endogenous altruism and provide a simple mathematical framework that capture unconditional love in this setting.[7]

Imagine an economic environment where the decision maker makes two decisions in two periods. In the first period of his life, he decides how to divide his time endowment, which we normalize to 1, between productive labor (L) and resources devoted to becoming altruistic towards other people $(R_1, R_2, R_3, ...R_N)$. We can think of these resources as increasing in the social distance between the decision maker and the individual i. For instance R_1 could denote resources devoted to become altruistic toward his own child, R_2 for a distant relative, R_3 for a stranger and so on. The choice in this period is subject to the following resource constraint:

(1) $$L + R_1 + R_2 + ...R_N = 1$$

In period two of his life his preferences are defined over own consumption and the weighted sum of the well-being of other individuals:

[7] In appendix A we provide a dynamic model of unconditional love.

(2) $$U = u(C) + \sum_{i=1}^{N} \theta_i(R_i) u(C_i)$$

where

(3) $$\frac{\partial \theta_i(R_i)}{\partial R_i} > 0$$

Hence, the more resources the decision maker spends, the more altruistic he becomes. Using the above formulation we define unconditional love as follows:

Definition Unconditional Love: $\theta_i(R_i) = 1 \; \forall \; i \;\; = \;\; 1, 2, 3, ...N$

IV THE PRINCIPLE OF LEARNING UNCONDITIONAL LOVE

In this section we seek to achieve two major goals. First, we propose that since most people find it difficult to exhibit unconditional love, we need a learning stage where people can learn to unconditionally love. In the learning stage, we propose to use the principle of learning unconditional love for evaluating social states. This allows us to provide a mathematical expression for the virtue of altruism in the class of models presented in section 3. Second, we relate the modified weak Parerto criterion and the modified criterion of virtue of altruism to Bhatt et al. (2014) framework with a *social objective function* (SOF) that weighs both the *moral evaluation function* (MEF) and the social welfare function (SWF).

Most people, we believe, find it difficult to practice unconditional love. This is not to say that no one can display unconditional love. An example is Mother Teresa, a famous Roman Catholic nun from India, who devoted her lifetime to helping poor people. We believe that she was clearly a practitioner of unconditional love. However, most people cannot behave like her. Unconditional love in that sense is unrealistic for most people to practice. The principle of unconditional love is only useful as an ideal target that we all can aspire to achieve over time.

Given that most people find it difficult to display unconditional love, it may be desirable to promote learning to love unconditionally. One way to achieve this is to introduce a learning stage; this approach is inspired by Sandel (2009), who promotes Aristotle's moral virtue ethics after considering other major alternatives. According to Aristotle, "moral virtue comes about as a result of habit." In his explanation, "the virtues we get by first exercising them, as also happen in the case of the arts as well." In addition, the purpose of politics for Aristotle is not to set up a framework of rights that is neutral among ends; it is to form good citizens and to cultivate good character.[8]

In the context of the model introduced in section 3, we can define the virtue of altruism as follows:

Definition Virtue of Altruism toward person j : $\theta_i(R_j) = 1 \; for \; i \neq j$

According to the above definition, it is possible for person i to achieve the virtue of altruism by devoting resources to this achievement. For instance, this might be done by spending time with a child. Note that the decision maker may achieve this virtue toward his child, but he may not be altruistic toward a stranger. Although the mathematical form of virtue would depend on the virtue in question, in the context of the endogenous altruism model presented in section 3, the above definition can be used to distinguish the concept of unconditional love from moral virtue.[9] One way to think of the unconditional love of the decision maker in this simple model is to regard the welfare of ones own child and that of a stranger as being equivalent to one's own consumption utility. Such a mathematical expression of moral virtue of altruism can help us operationalize the application of learning to love unconditionally in this class of models.

[8]This idea is close to communitarianism in modern times. According to communitarianism, a person's community, family or geographical region plays an important role in shaping his or her beliefs and norms.

[9]Bhatt et al. (2014) study the virtue of diligence, in which they define lack of temptation to consume excessive leisure as a virtue. Similarly, Bhatt et al. (2014) explore the application of this framework in the context of the virtue of patience.

Thus the learning stage is closely related to moral virtue ethics. However, we think that it is also important to give a consideration to welfarism in the learning stage. For example, a public policy of forcing people to adopt orphans from foreign countries might help promote altruism toward foreign people in the long run. However, such an extreme policy is likely to cause many people to feel much disutility. Hence we propose the *principle of learning unconditional love*, which strikes a balance between pure welfarism and pure moral virtue ethics. Here one should note that in order to perform an act of unconditional love, one needs freedom not to do it. Hence, policies should allow free will and only nudge people into making choices.

Just as we typically use the social welfare function to analyze models when we adopt welfarism, we need a mathematical device to analyze models when we adopt the principle of learning unconditional love. Because of the diversity of economic models in behavioral economics, we may need to develop different mathematical devices for different models. In this paper we use an analytical framework that was developed for models of endogenous preferences in Bhatt et al. (2014). Formally, consider an economy with N agents. Let x denote a social state and $U_i(x)$ be a utility function of agent i, and $\psi_i(x)$ be a function that express properties of the endogenous utility function of agent i. Let $SWF(U_1(x), ..., U_N(x))$ be a social welfare function. We define the moral evaluation function (MEF) as a function $MEF(\psi_1(x), ..., \psi_i(x))$

that evaluates deviations of $(\psi_1(x), ..., \psi_i(x))$ from moral virtue. We define the social objective function $SOF(MEF(x), SWF(x))$ as a function that evaluates social states by considering both the moral virtue aspect and the welfarism aspect.

The MEF is an expression of moral virtue ethics, and the SWF is an expression of welfarism. For our model, the MEF should be consistent with the criterion of the virtue of altruism just as the SWF should be consistent the weak Pareto criterion. The SOF is an expression of the principle of learning unconditional love. The SOF is not consistent with the criterion of the virtue of altruism unless the SOF gives zero weight to the SWF. Similarly, the SOF is not consistent with the weak Pareto criterion unless the SOF gives zero weight to the MEF. However, the SOF should be consistent with both the modified criterion of the virtue of altruism and the modified weak Pareto criterion.

In some model economies, it may be feasible to reach a stage in which all the agents perfectly attain all moral virtues. At that stage, all the agents practice unconditional love and the ideal of Kantian deontology theory is attained in the context of such models. In this sense, the principle of learning unconditional love integrates welfarism, moral virtue ethics, and deontology in models with endogenous preferences. An alternative interpretation of the SOF is as follows. We can imagine the SOF as a construct that may incorporate the meta-preferences of a voter who may be the optimizing agent himself. In this case, the SOF recommends the type of voting such an agent should do for the social states after accounting for his meta-preferences.

V APPLICATION OF THE PRINCIPLE OF LEARNING UNCONDITIONAL LOVE

In this section we illustrate the application of the principle of learning to unconditionally love in the evaluation of social states. For this purpose we present two example models of endogenous altruism. The endogenous altruism aspects of these two models are special cases of the model presented in Section 3 in the following way. In the first model the decision maker allocates his time endowment in the first period between productive labor and the resources needed to become altruistic toward his own child. In the second model we further expand his decision to include resources needed to become altruistic toward a stranger. In both of these examples, we specify the production function and add the government in order to perform policy evaluation. In each case we define the appropriate moral virtue and highlight the importance of accounting for deviation from such a virtue in the evaluation process of the social states.

A Model of Endogenous Altruism toward Own Child

Consider a two period economy with three agents: a representative decision maker, a representative child, and the government. In the first period, the decision maker starts with a fixed endowment of time, which we normalize to one. The choice is to allocate this time between labor (L) and resource (R_K). We interpret L to denote human capital and R_K to denote resources needed (e.g., time spent with the child) to become altruistic. The decision maker's input of L generates an output which we denote by Y:

$$Y = F(L) \text{ where } F' > 0 \text{ and } F'' \leq 0 \tag{4}$$

The time constraint for the decision maker is given by:

$$R_K + L = 1 \tag{5}$$

In the second period, the decision maker chooses to spend his income Y between consumption C_A and transfer to the child (T). We denote child's consumption by

C_K and for simplicity assume that the child simply consumes all the transfers:

$$C_K = T$$

The preferences of the decision maker in period 2 are given by,

$$u(C_A, C_K | R_K^*) = u_A(C_A) + \theta(R_K^*) u_K(C_K) \tag{6}$$

where $\theta(R_K)$ denotes the altruism function, which, similar in spirit to Mulligan (1997), is assumed to be an increasing function of the resources spent by the decision maker in learning to be altruistic (R_K). An alternative interpretation can be derived if we think of $\theta(R_K)$ as an endogenous intergenerational discount factor. Bhatt (2014) proposes zero intergenerational discounting as a moral virtue and provides a discussion of the ethical foundation for such a view, based on a literature review from both economics and philosophy.[10] With this interpretation, using the definition in Section IV, we define the moral virtue of family altruism to be achieved when $\theta(R_K) = 1$. Moral virtue is defined as a mean of two extremes. If $\theta(R_K) < 1$ in the second sub-period, the decision maker is deficiently altruistic toward his child,

[10]Bhatt (2014) also provides a rationale for zero discounting as a moral virtue even for intertemporal choices involving a single individual. This conceptualization of virtue of patience is studied by Bhatt et al. (2014) in the context of an endogenous time preference model.

whereas if $\theta(R_K) > 1$ he exhibits excessive altruism. According to our definition the parent achieves the moral virtue if he imparts equal concern to his own utility and the child's utility.

We assume that the government collects income tax at a rate of τ and provides a lump-sum subsidy of z. Hence, the choice of C_A and T is constrained by:

$$(1-\tau) \times F(1-R_K) + z = C_A + T \tag{7}$$

We assume that the lump-sum subsidy is given such that the government budget is balanced, implying $z = \tau \times F(1-R_K)$. For a given government policy, τ and optimal resources from period 1 (R_K^*), the decision-maker solves the following maximization problem in period 2:

$$\max_{C_A,T}[u_A(C_A) + \theta(R_K^*)u_K(T)] \tag{8}$$

$$s.t. \tag{9}$$

$$(1-\tau) \times F(1-R_K^*) + z = C_A + T$$

We solve the above problem by backward induction. The decision maker first takes the value of R_K as given and optimally chooses C_A^* and T^*. Then, given the optimal level of consumption and transfers, the decision maker solves the first period problem of choosing R_K^* and L^*. The details of our solution algorithm are provided in appendix B.

V.1.1 Evaluation of Social States Using SOF

In this section our objective is to illustrate that evaluation of social states based on SOF may yield different optimal tax policies than those recommended using the standard welfare maximization criterion. For this problem we numerically solve the optimization problem faced by the decision maker in our model. We assume the following parametrization:

$$u_A(x) = u_K(x) = \frac{x^{1-\sigma}}{1-\sigma} \tag{10}$$

$$F(L) = \delta_0 + \delta_1 \times L^{\delta_2} \tag{11}$$

$$\theta(R_K) = \phi_0 \times (1 - e^{-\phi_1 \times R_K}) \tag{12}$$

We now define the social welfare function (SWF), the moral evaluation function (MEF), and the social objective function (SOF) for our example model. We consider the following formulation for the SWF:

$$SWF \ = \ u_A(C_A) + u_K(C_K) \tag{13}$$

Such a specification assumes that the interpersonal comparisons of utilities is possible. An alternative formulation is suggested by Kaneko and Nakamura (1979), which they called the Nash SWF. Their formulation does not require interpersonal comparisons in the sense that the affine transformations of each person's utility does not change the ranking based on the SWF. In Appendix C, Table 1a, we present simulation results using Nash SWF for robustness, and observe qualitatively similar predictions.

Next, we define the MEF used to rank alternatives in terms of moral virtues. The MEF is given by:

$$MEF = -\ (\theta(R_K) - 1)^2 \tag{14}$$

such that larger deviations from the virtue of altruism (as defined in the last section) are evaluated to be morally undesirable.

We now define the SOF in our model. An important practical difficulty in defining such a function is that the MEF and SWF are in different units and hence not directly comparable. To overcome this we adapt Kaneko and Nakamura (1979) and first define the two functions for the worst case scenario:

$$\overline{SWF} \; = \; u_A(C_{A,0}) + u_K(C_{K,0}) \tag{15}$$

$$\overline{MEF} = -\ (\theta(R_K = 0) - 1)^2 \tag{16}$$

In the above definition, we evaluate the welfare of the decision maker using his allocation at the worst possible scenario and denote it by $\overline{SWF}$.[11] We assume that the worst possible value for the moral evaluation function is obtained when the decision maker devotes zero resources toward becoming altruistic. Using the above functions, we next define the SOF as follows:

[11]In our simulations we use $C_{A,0} = C_{K,0} = 0.0$.

$$SOF = (MEF - \overline{MEF})^{\alpha}(SWF - \overline{SWF})^{(1-\alpha)} \tag{17}$$

The above social objective function combines the concepts of welfarism and moral virtue. Under welfarism the objective is to maximize the SWF. Hence, if $\alpha = 0$, maximizing the SOF is an expression of welfarism. If the objective is to achieve moral virtue, then MEF is the relevant objective function. Hence, if $\alpha = 1$, maximizing the SOF is an expression of moral virtue ethics. Hence, for $0 < \alpha < 1$, then maximizing the SOF is an expression of the principle of unconditional love.

V.1.2 Simulation Results

For the purpose of illustrating an application of the principle of learning unconditional love, we consider a model economy with a set of specific model parameter values. These parameter values are listed as global parameters in Table 1. In this model economy, we consider different policies. For this purpose, we solve our model numerically for $\tau \in \{-0.5, 0.5\}$ with an increment of 0.05. We assume that the government is politically constrained to choose the tax rate from this set. In our solution algorithm we impose the government's budget constraint: $z = \tau \times F(1 - R_K)$.

In Table 1 we present four policy scenarios for a given set of parameters. Panel A reports the optimal consumption stream of the decision maker and the stranger (C and C_S) as well as the optimal level of altruism toward the stranger ($\theta(R)$). Panel B reports the evaluation of the optimal consumption streams under each policy alternative based on maximizing the SOF. Note that the maximum value is represented in bold face.

Table 1: SOF vs SWF

Global Parameters

$\delta_0 = 1.1$; $\delta_1 = 4$; $\delta_2 = 0.7$; $\phi_0 = 1.8$; $\phi_1 = 1$; $\sigma = 0.7$

Panel A: Optimal Consumption Stream and Altruism

τ	C_A^*	C_K^*	$\theta(R_K^*)$
-0.2	1.6100	1.3362	0.8777
0	1.4508	1.2939	0.9230
0.1	1.3681	1.2645	0.9464
0.3	1.1935	1.1842	0.9946

Panel B: Evaluating Alternative Tax Policies

τ	$SOF(\alpha = 0)$	$SOF(\alpha = 0.01)$	$SOF(\alpha = 0.4)$	$SOF(\alpha = 0.6)$	$SOF(\alpha = 1)$
-0.2	**10.6727**	**10.4214**	4.1148	2.5549	0.9850
0	10.6523	10.4026	**4.1251**	2.5670	0.9941
0.1	10.6230	10.3746	4.1233	**2.5689**	0.9971
0.3	10.5094	10.2651	4.1015	2.5623	**1.0000**

There are several important predictions. First, if the government completely ignores moral virtue ethics, it sets policy to maximize $SOF(\alpha = 0)$. Such a policy in general will not be consistent with the libertarian outlook that requires a zero tax rate. From Table 1 we observe that the optimal policy that maximizes the $SOF(\alpha = 0)$ is to set a negative tax rate of $\tau = -0.2$. This is because the utilitarian SWF, based on each persons utility of his own consumption, is different from the objective function of the parent, which gives less weight to the childs utility than to his own. In our model this would imply that the parent will choose a higher amount of labor, implying a lower level of R, and hence will be less altruistic to his child. Hence, setting a non-zero tax based purely on welfare maximization is affecting the preferences of the parent in that model. Given this, people who take welfare as the highest value needs to abandon the laissez faire policy. Our second finding is that the policy that maximizes $SOF(\alpha = 0.01)$ is identical to the one obtained by maximizing $SOF(\alpha = 0.0)$. Hence, for small enough weight the optimal policy that combines welfare and moral virtue may be identical to the one that solely focuses on the welfare aspect.

Third, we find that for a large enough weight on the moral virtue ethics, the optimal policy may differ significantly from the one that is obtained by only maximizing welfare. For instance, for $\alpha = 0.6$, we find that the optimal tax policy is to set $\tau = 0.1$.

Fourth, when alpha=1, we observe that maximizing $SOF(\alpha = 1)$ leads to an optimal $\theta = 0.9946$. Hence, with the entire weight of the government policy on moral virtue ethics, it is possible to approximately achieve the virtue of family altruism. For achieving the virtue perfectly we require that the tax rate can be changed without any constraint. In our example, τ is changed with an increment of 5%.

Finally, from the first fundamental theorem of welfare economics, some economists tend to equate welfare maximization with libertarianism. In the example model, a libertarian policy would entail setting the tax rate to be zero. In general, a policy that only focuses on maximizing welfare, $SOF(\alpha = 0)$, is not consistent with libertarianism, as we showed in Table 1. However, in our model, adding a moral consideration in addition to welfarism leads to a policy combination that is consistent with libertarianism. For instance, maximizing $SOF(\alpha = 0.4)$ leads to an optimal tax policy of $\tau = 0$.

Altruism Toward a Stranger

We now extend the model of the previous section by including the well-being a stranger in the objective function of the parent. Our goal is to provide a framework that can explain many real world attempts at helping others through voluntary time effort by individuals. For instance, Habitat for Humanity is an organization with branches all over the world and that sends volunteers to poor countries to build houses. It can be argued that from a pure efficiency point of view this not a good strategy, as there are alternative cost-efficient ways of building houses in poor countries. One way to understand such a practice is to think of it as an exercise in building the moral virtue of altruism: volunteers engaged in these activities may learn to become more altruistic. This idea is directly related to our framework based on the principle of learning unconditional love. We now present a model where the parent devotes resources to become altruistic toward a stranger.

The main setup of this model is identical to the one presented in the previous section. We only present the additional features that capture the main idea of this section. In the first period the decision maker chooses to divide his time endowment between productive labor, resources used to become altruistic to the child, and resources to become altruistic to a stranger (R_S). The time constraint for the decision maker is given by:

$$R_K + R_S + L = 1 \tag{18}$$

In the second period, the decision maker chooses to spend his income Y generated from period one productive labor (see equation (4)) between consumption C_A, transfers to the child (T), and donations to the stranger (D). We denote stranger's consumption by C_S and for simplicity assume that:

$$C_S = D$$

The preferences of the decision maker in period 2 are given by:

$$u(C_A, C_K, C_S | R_K^*, R^* S) = u_A(C_A) + \theta(R_K^*) u_K(C_K) + \theta(R_S^*) u_S(C_S) \tag{19}$$

Using the definition in Section IV, we define the moral virtue of non-family altruism to be achieved when $\theta(R_S) = 1$. We use the same definition as in the previous model for the moral virtue of family altruism.

We assume that the government collects income tax at a rate of τ and provides a lump-sum subsidy of z. Hence, the choice of C_A, T, and D is constrained by:

$$(1-\tau) \times F(1 - R_K - R_S) + z = C_A + T + D \tag{20}$$

We assume that the lump-sum subsidy is given such that the government budget is balanced, implying $z = \tau \times F(1 - R_K - R_S)$. For a given government policy, τ and optimal resources from period 1 (R_K^*, R_S^*), the decision-maker solves the following maximization problem in period 2:

$$\max_{C_A,T,D}[u_A(C_A) + \theta(R_K^*)u_K(T) + \theta(R_S^*)u_S(D)] \tag{21}$$

$$s.t. \tag{22}$$

$$(1-\tau) \times F(1 - R_K^* - R_S^*) + z = C_A + T + D$$

As discussed in the previous section, we solve the above problem by backward induction. We use the same parametrization and assume that:

$$\theta(R_S) = \gamma_0 \times (1 - e^{-\gamma_1 \times R_S}) \tag{23}$$

We now define the three evaluation functions for ranking social states:

$$SWF = u_A(C_A) + u_K(C_K) + U_S(C_S) \tag{24}$$

$$MEF = -[(\theta(R_K) - 1)^2 + (\theta(R_S) - 1)^2] \tag{25}$$

$$SOF = (MEF - \overline{MEF})^{\alpha}(SWF - \overline{SWF})^{(1-\alpha)} \tag{26}$$

where,

$$\overline{SWF} = u_A(C_{A,0}) + u_K(C_{K,0}) + U_S(C_{S,0}) \tag{27}$$

$$\overline{MEF} = -[(\theta(R_k = 0) - 1)^2 + (\theta(R_S = 0) - 1)^2] \tag{28}$$

In the above definition of MEF, large deviations from the virtue of altruism toward both the child and the stranger are deemed to be morally undesirable.

V.2.1 Simulation Results

We follow the same procedure as described in the previous section and illustrate the principle of learning unconditional love. For a given value of model parameters, we solve our model numerically for $\tau \in \{-0.5, 0.5\}$ with an increment of 0.05. Table 2 present four policy scenarios. Panel A presents the optimal consumption levels for the three agents and the optimal levels of altruism toward the child and the stranger. Panel B presents evaluation of these using the SOF. The welfare maximizing policy is to set the tax rate at $\tau = -0.25$. However, for a non-zero weight on moral virtue ethics of $\alpha = 0.4$ we find that the optimal policy is $\tau = 0.1$. As before for small enough α ($\alpha = 0.01$) the optimal policy may be identical to the one with no weight on virtue ethics and for $\alpha = 0.2$ we achieve the optimal tax of $\tau = 0$. Hence, the main findings of the previous section are robust to the addition of altruistic preferences toward a stranger.

Table 2: SOF vs SWF

Global Parameters

$\delta_0 = 1.1$; $\delta_1 = 4$; $\delta_2 = 0.5$; $\phi_0 = \gamma_0 = 1.8$; $\phi_1 = 1.055$; $\gamma_1 = 1.05$; $\sigma = 0.7$

Panel A: Optimal Consumption Stream and Altruism

τ	C_A^*	C_K^*	C_S^*	$\theta(R_K^*)$	$\theta(R_S^*)$
-0.3	1.5693	0.7848	0.7047	0.6157	0.5710
0	1.3859	0.7366	0.6916	0.6424	0.6147
0.25	1.2217	0.6880	0.6573	0.6690	0.6480
0.5	1.0391	0.6205	0.5989	0.6970	0.6800

Panel B: Evaluating Alternative Tax Policies

τ	$SOF(\alpha = 0)$	$SOF(\alpha = 0.01)$	$SOF(\alpha = 0.2)$	$SOF(\alpha = 0.4)$	$SOF(\alpha = 1)$
-0.3	**13.5385**	**13.2580**	8.9065	5.8593	1.6682
0	13.4899	13.2152	**8.9392**	5.9237	1.7237
0.25	13.3562	13.0888	8.9119	**5.9465**	1.7665
0.5	13.0759	12.8195	8.8006	5.9231	**1.8058**

VI CONCLUSION

In normative economics, economists use ethical values that are widely accepted by people in order to evaluate social states, in order to make recommendations about what should be done given such ethical values. In the ethical evaluation system of standard traditional economics, welfare is taken as the highest ethical value, welfarism is used as the corresponding ethical theory, and the weak Pareto criterion is applied to an economic model as the criterion for making normative recommendations. This system is especially appealing when preferences in the model are unchanging and exogenous to the economic system.

In behavioral economics, there are some important difficulties with this ethical evaluation system, because preferences change endogenouslyin most models. There are many possible preferences for each individual in these models, and some preferences may be viewed as ethically better than others. This causes difficulties in taking welfare as the highest value. This paper proposed to use a different ethical evaluation system in which unconditional love is taken as the highest value. We discussed how the principle of learning unconditional love combines the ethical theories of welfarism and moral virtue, while deontology defines the ideal. We proposed the modified weak Pareto criterion and the modified criterion of the virtue of altruism as two criteria.

To illustrate how the principle of learning unconditional love can be applied to economic models, we developed a simple model of endogenous altruism. In this model an economic agent could choose to invest resources (say, spending time with a child) to become more altruistic toward his child. The optimizing behavior of the parent is constrained by the tax rate. We also considered an extension of this basic model by adding the decision to invest resources (say, volunteer work) to become more altruistic toward a stranger.

We used the Bhatt et al. (2014) formulation of the MEF and SOF in order to apply the principle of learning unconditional love to the above two models. Such a framework recommends maximization of the SOF, which weighs both the MEF and the SWF in the evaluation of social states. In these models, we use simulations to show that a policy of setting the tax rate to be zero is not welfare maximizing. The welfare maximizing policy involves a nonzero tax, which in our setting implies that the government is affecting the preferences of the decision maker. For instance, a lower tax rate would induce greater productive labor in our model, generating lower resources toward becoming altruistic, and hence leading to a lower level of the altruism parameter. Thus, the welfare maximizing and laissez faire policies do not coincide in general for these models. We show that a small weight to the MEF may lead to no change in the optimum policy. However, for a large enough weight, the optimum policy from our framework that encompasses both welfarism and moral virtue ethics considerations can be quite different. An extreme case is when the government ignores welfarism and puts the entire weight on the MEF. This corresponds to the exclusive use of moral virtue ethics. Even in this case, we show that the virtue of altruism may not be achievable. Finally, we show that our framework may generate an optimal policy of zero tax for a certain weight on the

MEF, in which case the government policy does not affect the preferences of the decision maker. Based on this result we wish to make an important distinction. The idea of incorporating moral virtue ethics into policy making and the libertarian value judgment of no government role in influencing preferences may not always be mutually exclusive. Depending on the economic environment, endogeneity of preferences, and the kind of moral virtue the policy wishes to promote, we may find that these two principles yield same optimum policy predictions.

In our simple example models, the government chooses the decision maker's preferences, and so any deviation from libertarianism is paternalistic. On the other hand, if we introduce heterogeneous decision makers, then the government cannot be paternalistic unless it has as many policy tools as the number of different types of people. If the government does not have enough policy tools, then it can only guide people in the direction of moral virtue, but each agent can opt out. In such models, we have something akin to Sunstein and Thaler's (2003) libertarian paternalism.

We can find real-world examples that can be interpreted as libertarian paternalist policies that relate to the models presented in this paper[12] For instance, the US Department of Education (2005) provides guidelines to parents for helping their children do their homework. These guidelines include setting goals, encouraging

[12]Here, we are interpreting public statements made by the government as policies in the sense of setting goals for the general public.

good habits, reducing distractions, and providing feedback to the child. One of the objectives of these guidelines is to help parents learn more about what their children are learning in schools, and enhance parental interaction with children. In the context of our endogenous altruism model this relates to the parent investing in resources to become more altruistic to his own child, because knowing more about his child is part of becoming more altruistic toward her. Another example of libertarian paternalism can be found from Singapore. In a recent news article, a member of the Parliament is reported to have suggested a policy that entails at least two homework-free days a week to promote family bonding (Heng, 2014).

An important caveat to this idea of promoting altruism via increased parental involvement with the child comes from the sociology literature. Many studies have found that parental socioeconomic status is an important factor determining a childs success. For instance, Downey (2002) cites evidence that supports the view that an important factor for the relatively poor performance of children from lower socioeconomic status when compared to their more advantaged counterparts is because their parents interaction style less successfully prepares them for success in school. This can have important policy implications in terms of intergenerational mobility of economic status. For example, the government may need to offer more help to relatively poor parents as it promotes more time spent with children.

This paper develops methods to perform normative economic analyses by deviating from the pure form of welfarism and introducing an element of moral virtue in the evaluation of social states. An important class of models in which we believe our framework has significant application is the class of models with endogenous preferences. Hence, it is important to obtain empirical evidence on how preferences change. Mulligan (1997) presents evidence supporting the predictions of the endogenous altruism model. For example, consistent with this model's predictions, consumption, wealth, and earnings data for the US exhibits regression to mean across generations. He also cites evidence from other disciplines that lend support to the predictions of the endogenous altruism model. In the field of Biology, researchers have shown that altruism should respond to circumstances, and hence supports the idea of endogenizing altruism. For the tough love altruism model, Akkemik et al. (2013) and Kubota et al. (2013ab) provide empirical evidence from surveys and Akabayashi et al. (2014) from experiments, regarding the main characteristics of the preference formulation assumed in the model.

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APPENDIX A: A DYNAMIC MODEL OF UNCONDITIONAL LOVE

The model for unconditional love specified in Section III abstracts away from the dynamic aspect of utility maximization and hence is silent on discounting of future generations. We now present a dynamic framework that allows for intertemporal discounting by agents. Imagine an economy with three generations: a parent, his child, and his grandchild. Let P denotes parent, K the child, and t the grandchild. We also include a stranger, S, who is assumed to be a peer of the parent. The stranger's welfare is also assumed to be affected by the utilities of his own child, SK, and his grandchild, SG. In such a setting, the objective function of the parent consist of three components and can be expressed as follows:

(A-1) $$W = U_{Own} + \theta_F(R_F)\widetilde{\beta}(R_t)U_{Family} + \theta_S(R_S)U_{Stranger}$$

where,

(A-2) $$U_{Own} = u(C_2^P) + \widetilde{\beta}(R_t)u(C_3^P)$$

(A-3) $$U_{Family} = \left[u(C_1^K) + \widetilde{\beta}(R_t)u(C_2^K) + \widetilde{\beta}(R_t)^2 u(C_3^K)\right]$$

$$+\widetilde{\beta}(R_t)\left[u(C_1^G) + \widetilde{\beta}(R_t)u(C_2^G) + \widetilde{\beta}(R_t)^2 u(C_3^G)\right]$$

(A-4) $$U_{Stranger} = \left(u(C_2^S) + \widetilde{\beta}(R_t)u(C_3^S)\right)$$

$$+\theta_F(R_F)\widetilde{\beta}(R_t)\left[u(C_1^{SK}) + \widetilde{\beta}(R_t)u(C_2^{SK}) + \widetilde{\beta}(R_t)^2 u(c_3^{SK})\right]$$

$$+\theta_F(R_F)\widetilde{\beta}(R_t)^2\left[u(C_1^{SG}) + \widetilde{\beta}(R_t)u(C_2^{SG}) + \widetilde{\beta}(R_t)^2 u(C_3^{SG})\right]$$

$\widetilde{\beta}(R_t)$ denotes endogenous discount factor where R_t denotes the resources spent by the parent to become patient. Following the human capital approach of Becker and Mulligan (1997) we assume that $\frac{\partial \widetilde{\beta}(.)}{\partial R_t} > 0$.[13] $\theta_F(R_F)$ and $\theta_S(R_S)$ are endogenous altruism functions as defined earlier.

Using the formulation of the parent's objective in (A-1) we can define the virtue

[13] In this model we only focus on the human capital approach toward endogenous time discounting. Bhatt and Ogaki (2012) proposed an alternative formulation of endogenous discounting based on tough love altruism. In their model the child's discount factor is endogenously determined as a decreasing function of her childhood consumption. We can easily extend the model presented here to incorporate tough love by adding inter-vivos transfers as a choice variable for the parent. Then, we will have $\widetilde{\beta}(R_t, T_{-1})$ as the discount function where T_{-1} denotes the level of transfers received by the parent during his own childhood. We can then capture the idea of tough love altruism by assuming that $\frac{\partial \widetilde{\beta}(.)}{\partial T_{-1}} < 0$.

of patience as follows:

Definition Virtue of Patience: $\widetilde{\beta}(R_t) = 1$

Combining this virtue with the virtues of altruism within and beyond the family, we capture our idea of unconditional love as follows:

Definition Unconditional Love: $\widetilde{\beta}(.) = \theta_F(.) = \theta_S(.) = 1$

Hence, the ideal of unconditional love is attained when the parent attaches identical weights to his present, his future self, his child, and the stranger.

APPENDIX B: SOLUTION ALGORITHM

In this appendix we explain the numerical optimization method we used to solve the optimization problem outlined in the benchmark model with the parent and the child. The parent faces a two stage optimization problem. In the first stage, he takes C_A and T as given, and chooses R_K and L to maximize the objective function. In stage two, having observed the optimal value of R_K and T, the parent chooses C_A and T to optimize his stage two objective function. We solve this two-stage optimization using backward induction as follows:

Step 1: Given R_K, we solve the following optimization problem:

$$\max_{(C_A,T)} \frac{C_A^{1-\sigma}}{1-\sigma}\theta(R_K)\frac{T^{1-\sigma}}{1-\sigma} \tag{B-1}$$

$$s.t. \tag{B-2}$$

$$C_A + T = F(1-R_K)(1-\tau) + z$$

The above optimization problem gives us a closed form solutions for the optimal values:

$$C_A^* = \frac{F(1-R)(1-\tau)+z}{1+\theta(R_K)^{\frac{-1}{\sigma}}} \tag{B-3}$$

$$T^* = F(1-R)(1-\tau)+z-C_A^* \tag{B-4}$$

Step 2: We substitute the above optimal values in the parent's objective function and solve the following optimization problem:

$$\max_{R_K} \frac{C*_A^{1-\sigma}}{1-\sigma}\theta(R_K)\frac{T*_A^{1-\sigma}}{1-\sigma} \tag{B-5}$$

The step 2 optimization problem has no closed form solution for R_K and hence we use numerical method for find a solution to the above function. For this purpose we define a grid for R_K and choose a baseline for model parameters. Given these we choose the value of R_K that yields the maximum value for the objective function defined above. To implement such a search we need to initialize values of two key variables: R_K and the level of subsidy, i.e., z. For a given policy (τ) we adopt the following structure to choose initial values:

1. For a given τ_i, we set:

$$R_{0i} = R^*(z_{i-1}^*; \tau_{i-1})$$

2. For choosing the initial level of subsidy we use:

$$z_{0i} = \tau_i F(1 - R^*(z^*_{i-1}; \tau_{i-1})$$

We initialize the above process by first solving for the libertarian outlook of $\tau = 0$.

APPENDIX C: SIMULATIONS FOR THE BENCHMARK MODEL WITH NASH SWF

Here we present the simulation results using Nash SWF in the evaluation of social states for the benchmark model with only parent and child. For this purpose we define:

(B-6) $$Nash\ SWF = [u_A(C_A) - u_A(C_{A,0})] \times [u_K(C_K) - u_K(C_{K,0})]$$

(B-7) $$SOF = (MEF - \overline{MEF})^{\alpha}(Nash\ SWF)^{(1-\alpha)}$$

where MEF and $\overline{MEF}$ are defined by equations (14) and (16).

Table 1a below present the simulation results.

Table 1a: SOF vs NASH SWF

Global Parameters

$\delta_0 = 1.1$; $\delta_1 = 4$; $\delta_2 = 0.7$; $\phi_0 = 1.8$; $\phi_1 = 1$; $\sigma = 0.7$

Panel A: Optimal Consumption Stream and Altruism

τ	C_A^*	C_K^*	$\theta(R_K^*)$
-0.3	1.6100	1.3362	0.8777
0	1.4508	1.2939	0.9230
0.1	1.3681	1.2645	0.9464
0.3	1.1935	1.1842	0.9946

Panel B: Evaluating Alternative Tax Policies

τ	$SOF(\alpha = 0)$	$SOF(\alpha = 0.01)$	$SOF(\alpha = 0.6)$	$SOF(\alpha = 0.75)$	$SOF(\alpha = 1)$
-0.5	**25.6077**	**24.7854**	3.6130	2.2143	0.9792
0	25.3925	24.5828	**3.6336**	2.2348	0.9941
0.25	25.2014	24.4005	3.6293	**2.2357**	0.9971
0.5	24.5565	23.7829	3.5980	2.2260	**1.0000**