The Philippine Review of Economics
57(1): 101-120. DOI: 10.37907/5ERP0202J

The conditional altruist and the Samaritan's dilemma

Joselito T. Sescon*
Ateneo de Manila University

The Samaritan's dilemma refers to any situation in which an actual or expected altruistic behavior of one actor generates an incentive for exploitation on the recipient, such that the altruist suffers a welfare loss beyond the cost of the originally intended transfer. This study hypothesized that the Samaritan's dilemma condition does (not) apply when the help given is a substitute for (complement to) the effort of the beneficiary to help herself. Using static and sequential game analyses, it is proven that either substitution or complementary condition could arise in the act of giving and receiving help. It is in the substitution condition only that the Samaritan dilemma arises. The players in a sequential game, with the first-mover advantage, can transform the game's payoffs by setting assistance or work effort at the outset that forces the other player to adjust. Thus, Buchanan's Samaritan's dilemma is not a universally strategic outcome in the altruistic acts of giving. The empirical part tested if the Samaritan's dilemma pervades or not in Philippine households by investigating the effects of expenditures of gifts on work hours. Household total transfers (consumption gifts plus remittances) and household members' work effort are found substitutes. Thus, the Samaritan's dilemma equilibrium is implied. However, there is also an implied equilibrium outside that of the Samaritan's dilemma among high-effort workers: for these theoretically "altruist" workers, the gifts and income transfers are complementary to work hours.

JEL classification: D64, D01
Keywords: altruism, games, dilemma

1. Introduction

In his essay entitled "The Samaritan's dilemma", Buchanan [1975] presented a prescriptive diagnosis of social problems which he analyzed as separate symptoms of the same social disease. He was referring to the Samaritan's dilemma which he said is difficult to solve because the source of difficulty may lie in modern man's

* Please address all correspondence to jsescon@ateneo.edu.

own utility function. He said, "We may be simply too compassionate for our well-being or for that of an orderly and productive society." He cited increasing economic affluence as only one among many explanations for the pervasive Samaritan's dilemma in twentieth-century Western society. He hypothesized that modern man has become incapable of making the choices that are required to prevent his exploitation by predators of his species, whether the predation is conscious or unconscious.

Technically, the Samaritan's dilemma derives from the altruistic desire of a "Good Samaritan" to help a person in need but may end up being exploited. The exploitative condition happens when the person denies her capability to help herself because of the Samaritan's action, thus the Samaritan's dilemma. Buchanan [1975] was the first to model this into a two-person strategic game, although he was not the first political economist to raise this problem. Its antecedents lie in the closely related problem of moral hazard [Darst 2003]. In game-theoretic terms, the Samaritan's dilemma refers to any situation in which an actual or expected altruistic behavior on the part of one actor generates an incentive for exploitation on the part of the recipient, such that the altruist suffers a welfare loss beyond the cost of the originally intended transfer (Buchanan [1975]; Darst [2003]; Raschky and Schwindt [2009]; Schmidtchen [1999]). The Samaritan's payoff generated from the utility and "warm glow" of being conditionally altruistic is less than when the beneficiary does not exploit the act of charity.

In practice, there are two parts in the most commonly proposed solution to the Samaritan's dilemma that are not far from what Buchanan prescribed. The first part is public pre-commitment to the application of rules designed to punish and deter exploitative behavior. Such rules are likely to take the form of conditionality: assistance will be forthcoming only if the beneficiary agrees to conform to certain behavioral guidelines, and assistance will be cut off if that agreement is violated. The second part, as Buchanan mentioned in the original essay, is delegating the power of decision to an agent, one who is instructed to act in accordance with the strategic norms that are selected in advance [Darst 2003]. In other words, developing institutions are locked into strategic behavior and delegated with power to make decisions.

This paper attempts to explore theoretically, and only partly empirically, the condition of acts of giving and receiving without the familiar Samaritan's dilemma conditions. A vital instrument of exploration in this study is recognizing one type of potential Samaritan, the conditional altruist, along with several types of recipients (parasites in the words of Buchanan's). Given these types of players in the game, there will be other forms of games without the Samaritan's dilemma conditions. The empirical part explores if the Samaritan's dilemma pervades or not in Philippine society through estimation of the effects of expenditures on gift items by households on work hours.

The distinct contribution of this paper is the determination of the beneficiary's strategy if she is substituting or complementing the giver's act of charity. This turned out to be crucial because the nature of the charity (assistance, aid or gift) becomes the determinant of the beneficiary's strategy (specified here simply whether to "work more" or "work less"). As will be shown, the Samaritan's dilemma game condition is not universal as an outcome among acts of giving but depends on the nature of assistance from the perspective of the beneficiary.

Most relevant studies (Bruce and Waldman [1990]; Dijkstra [2007]; Komar [2014]; Faria and Arce [2018]) analyzed the consequences of the Samaritan's dilemma in a two or multi-period model showing time-inconsistency problems akin to a sequential and dynamic Samaritan's game with a Stackelberg leader and follower. Other studies (Schmidtchen [1999]; Coate [2001]; Lagerlof [2004]) are on iterated Samaritan's dilemma game and delegation of power of decision to an agent; the role of government in providing in-kind transfers; and translated Samaritan's dilemma to a signaling game given incomplete information between players. Empirical studies (Raschky and Schwindt [2016]; Heinecke et. al. [2008]; Gibson et. al. [2005]; Deryugina and Kirwan [2017]) estimated the crowding-out effect of foreign aid to recipient countries and farmers where it is interpreted as the presence of the Samaritan's dilemma. None so far of the theoretical models indicated the substitution-complement nature of the assistance given, although most studies readily assumed substitution conditions with the outright assumption that assistance or aid is fungible. However, assistance can be direct in-kind transfers to ensure its complementary nature to the beneficiary's work effort. The empirical part of this paper is similar to the crowding-out effect, but in particular on household expenditures on gifts and work hours.

The objective of this study is to find the game conditions in the acts of giving where there is no Samaritan's dilemma, and this is manifested in the complementary nature of assistance under a given recipient's resource (labor and capital) condition. This is done through the identification of all possible strategies of each player under which the strategic nature of the game still operates. The second objective is to mine empirical evidence of the absence of Samaritan's dilemma using Philippine household data.

To pursue the first objective, the active Samaritan's dilemma game is made into an extended sequential game. In the static active Samaritan's dilemma game, the row player represents the Samaritan, now labeled Giver (G) in this paper, and the column player the Beneficiary (B). Each player faces a choice of two strategies. The Giver's choices are "behave charitably" (C) and "behave non-charitably" (NC) [Buchanan 1975]. In this paper, we will use "work more" (WM) or "work less" (WL) as the two strategies of the Beneficiary. The effort involved with "work more" or "work less" are taken here to be relative to the current work effort of the Beneficiary.

Buchanan presented two forms: active and passive. In the active Samaritan's dilemma, the Giver has already made known his desire to behave altruistically. In the passive version of the game, the prospective Beneficiary acts to stimulate a resource transfer from the Giver. For both the active and passive variants of the Samaritan's dilemma, Buchanan employed a simple 2 × 2 matrix with payoffs "1", "2", "3" and "4", with "4" indicated as the most preferred outcome and "1" the least preferred [Buchanan 1975].

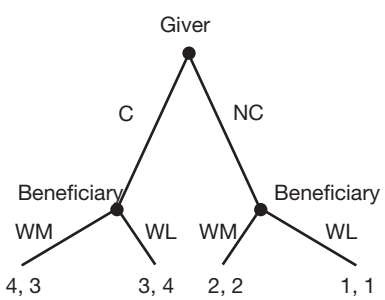
Below are the two extended versions of the active Samaritan's dilemma, where in Case 1a Giver moves first and then Beneficiary follows, and in Case 1b Beneficiary moves first and then Giver follows. In both cases the Nash equilibrium remains the same: the Samaritan (i.e., Giver) is charitable (C), and the Beneficiary works less (WL). Regardless of whether Giver moves first or second, there is no first-move advantage. However, it turns out that the two static forms of Buchanan—active and passive Samaritan's dilemma—are too constricting to depict the set of strategies available to an altruist Samaritan and the beneficiary in a sequential game. Section IV of the paper shows a version of the Samaritan's dilemma where the first mover has an advantage.

The paper proceeds as follows: section two explains when the Giver's assistance and the Beneficiary's work effort may be considered complements or substitutes; section three maps out the set of possible strategies of the two players when the potential games played by them are expanded beyond the static active and passive forms of the Samaritan's dilemma game; section four analyses the utility of the players in one-shot static games and sequential games; section five presents the data and econometric model used and the empirical results.

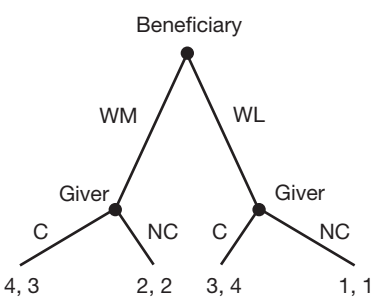
FIGURE 1. Active and passive variants of the Samaritan's dilemma

		Beneficiary	
		WM	WL
Giver	C	4, 3	3, 4
	NC	2, 2	1, 1

Case 1a: Giver moves first



Case 1b: Beneficiary moves first



2. Complementary and substitution conditions and the Samaritan's dilemma game

First, we clarify the economic rationale behind the possible complementarity or substitution between the giver's assistance and the beneficiary's work effort. As a concrete example, consider a farm household that applies its labor on a small piece of land. With only subsistence production, the household then may be deficient in its food consumption. Without external food aid or assistance to cover for the shortfall in their daily calorie and nutrient requirements, the household members will be undernourished or unhealthy. Let us assume further that the farmer optimizes his work effort x^*, equal to four hours, say, given the resource constraint and limited capital. If the external food assistance provided to the household is just enough to offset the shortfall in food and nutrient requirements, then it will have no consequence on current work effort, set at x^*. This outcome, we will call here as a low-complement condition between charitable assistance and work effort. When the food assistance is more than enough to cover the shortfall, then the household may be induced to reduce its work hours by two hours, say, from the current four hours. This outcome, we can call here as a low-substitution condition between charitable assistance and work effort. The same low-substitution outcome will result if the household has optimized work effort and is producing enough food requirements but is given food assistance. Buchanan's Samaritan's dilemma could be more about the low-substitution outcome often noted in welfare states. Schmidtchen [1999] alluded to the rise in the number of those living on transfers in welfare states the widespread belief that the transfers undermine the recipients' incentives to work.

To proceed with our example, now assume the household owns a half a hectare of rain-fed rice farm and four more hectares that can be used for livestock- or poultry-raising and planting seasonal high-value vegetable crops. With a small farm tractor, technical training or technical assistance the household will be able to operate a viable commercial farm. With such assistance, let the household's optimal labor inputs then increase to eight hours. This outcome, we can call here as a high-complement condition between productive assistance and work effort. If the household is provided with a tractor but has no additional farmland, it may opt to rent the tractor out to others and then reduce its work effort. This outcome, we can call here as a high-substitution condition between productive assistance and work effort.

One important note to take in the aforementioned discussion is that the optimal work effort $x^*(y)$ is a function of assistance y. The beneficiary will adjust work effort x to the optimal value $x^*(y)$ attainable. The example above clearly shows that the nature of the Giver's charity (gift) influences the strategic behavior of the Beneficiary. This is the important insight here in our theoretical framework that disagrees with Buchanan's. The hypothesis is that the Samaritan's dilemma is applicable to substitutes, but not to complementary conditions of assistance. The table below provides a summary.

TABLE 1. Charity and work effort: complementary and substitution conditions

Assistance	Current optimum work hours (x^*)	Outcome
A. Without assistance	4 hours	Subsistence w/ shortfall and undernourished
B. Provided with food just enough for the shortfall	4 hours – complementing current work effort with food aid	Subsistence produce + food aid = no shortfall with enough nourishment (low-complement)
C. Provided with food more than the shortfall	2 hours - substituting excess food aid more than the shortfall to 2 hours of subsistence work	Enough nourishment but reduced work hours from optimum (low-substitution)
D. Provided with additional resource capital and technical assistance	8 hours – complementing the provided assistance with skilled labor	Surplus commercial production (high-complement)
E. Provided with inadequate resource capital (tractor)	Reduced work hours – substituting income of new resource (tractor)	Subsistence production with probably enough nourishment (high-substitution)

Buchanan's active Samaritan's dilemma where the Giver plays C and the Beneficiary plays WL in equilibrium is equivalent to the low-substitution condition depicted by letter C in the table. The Giver has a payoff less than when the Beneficiary does not reduce work hours. This is where the altruist suffers a welfare loss beyond the cost of the originally intended transfer. However, as we will show below in a sequential Samaritan's dilemma game, if the Giver moves first, she can set assistance y such that the Beneficiary will set $x^*(y)$ without reduced work hours. This outcome corresponds to the low-complement condition depicted by letter *B* in the table.

3. Mapping the different players' strategies

We can depict a set of strategies of players in the game between the Giver (*G*) and the Beneficiary (*B*). Stated game strategies here are derived with one-to-one correspondence with the payoffs matrix. For example, Case 1 below depicts the game between a Giver who is always charitable (C), and a Beneficiary who reduces work effort (WL) if G is charitable (C). Note that this is the same as Buchanan's [1975] active Samaritan's dilemma where the Nash equilibrium is at (C, WL).

Case 1: *G* is always Charitable (C)
B works less (WL) if *G* is Charitable (C)

		Beneficiary	
		Work more (WM)	Work less (WL)
Giver	Charitable (C)	4, 3	3, 4
	Not-charitable (NC)	2, 2	1, 1

We can map out all possible players' strategies and the resulting outcomes, either with a pure-strategy Nash equilibrium (PNE) or none. Following the tradition of a Good Samaritan, we preserve the behavior of the Giver's willingness to help. The other principle in the mapping exercise is that we are only interested in those cases where at least one player is affected by the behavior of the other player to maintain the strategic nature of the game. Finally, in the interest of study, we identify the combination of the two players' sets of strategies where the dilemma still operates or not.

Before the actual mapping below, there should be an economic rationale of some specific players' behavior (the type of player). The tables below list the potential strategies of the two players. A player's strategy is positively stated first relative to a given strategy of the other player, and then as an equivalent strategy where the first player adopts her other strategy relative to a switch in the other player's strategy. The remarks identify the type of player who will correspond most likely to the stated strategies.

TABLE 2. Giver and Beneficiary sets of game strategies

Giver's Strategy	**Equivalent strategy**	**Remark**
Always C	Always C	*G* is an altruist no matter what *B*'s strategy is
C if *B* is WM	NC if *B* is WL	*G* recognizes complementary condition but is a conditional altruist as she is NC if *B* is WL
C if *B* is WL	NC if *B* is WM	*G* is idle by not signaling, not giving while *B* is WM, but altruistic behavior is triggered by *B*
Beneficiary's Strategy	**Equivalent strategy**	**Remark**
Always WM	Always WM	*B* is an altruist worker no matter what *G* is
Always WL	Always WL	*B* is a lazy worker no matter what *G* is. (Disutility of work is always greater than benefits.)
WM if *G* is C	WL if *G* is NC	*B* recognizes complementary condition and chooses best response to *G*'s strategies
WM if *G* is NC	WL if *G* is C	*B* recognizes substitutability between her work effort and the *G*'s assistance

We now proceed to map out the possible interactions between the players. Instead of writing out all potential interesting cases into normal form as above, the table below maps out all the players' strategies and the outcomes. Again, the general rule is that at least one player's behavior is being affected by the other player's behavior, and the Giver's willingness to help (or altruistic behavior) is preserved. All the players' strategies are stated in positive sense; but note of their equivalent statement when player's strategies are reversed.

TABLE 3. Mapping of players' set of game strategies

Cases	Condition	Giver (*G*)	Beneficiary (*B*)	Outcome
Case 1: Active Samaritan's dilemma	Substitutes	Always C	WM if *G* is NC	PNE (C, WL)
Case 2: No dilemma	Complements	Always C	WM if *G* is C	PNE (C, WM)
Case 3: No dilemma*	Complements	Always C	Always WM	PNE (C, WM)
Case 4: No dilemma*	Uncertain	Always C	Always WL	PNE (C, WL)
Case 5: No dilemma but coordination problem arises	Complements	C if *B* is WM	WM if *G* is C	Two PNEs (C, WM) and (NC, WL)
Case 6:	Uncertain	C if *B* is WM	WM if *G* is NC	No PNE
Case 7: No dilemma	Complements	C if *B* is WM	Always WM	PNE (C, WM)
Case 8: No dilemma	Complements	C if *B* is WM	Always WL	PNE (NC, WL)
Case 9:	Uncertain	C if *B* is WL	WM if *G* is C	No PNE
Case 10: Passive Samaritan's dilemma	Substitutes	C if *B* is WL	WM if *G* is NC	Two PNEs (NC, WM) and (C, WL)
Case 11: No dilemma	Substitutes	C if *B* is WL	Always WM	PNE (NC, WM)
Case 12: No dilemma	Substitutes	C if *B* is WL	Always WL	PNE (C, WL)

*Case 3 and 4 are for purposes of comparison although the cases do not have a strategic game condition.

The cases above marked as "No dilemma" refer to those where the Giver faces no dilemma in her choice of strategy. As defined by Buchanan [1975], the dilemma arises when the Giver helps based on her pragmatic interest (altruistic motive), and the Beneficiary changes strategy and works less. What stands out in the mapping of the different types of players is that Buchanan's outcome corresponds to only two versions where the Giver is in a "dilemma", namely in Case 1 (active) and Case 10 (passive). In Cases 12 and 4 where the Beneficiary works less, she does so regardless of what the Giver does, and therefore the Beneficiary cannot be said to exploit the latter.

There are two rules in determining the complementary and substitution conditions. One condition is when each player actively pursues a strategy that is substituting or complementing the other player's strategy. The other condition is when at least one player is substituting or complementing the strategy of the other player, who is indifferent.

Case 5 is the Stag-Hunt version where both the Beneficiary and Giver recognize the complementary condition. In this version, the Giver is not facing a dilemma. However, the problem facing the players now is one of coordination to achieve a Pareto optimal equilibrium. Stag-Hunt games capture strategic interdependence when coordinated cooperation between players yields a superior equilibrium, but a safer equilibrium exists in which players pursue their independent interests [Wydick 2008]. This game condition is reflected in letter D in Table 1.

There is a challenge to explain case 6 where the Beneficiary chooses to work less if the Giver is charitable despite the latter recognizing a potential complementarity condition. This behavior is difficult to explain, and the only reason this could happen is either the Beneficiary lacks information regarding the complementarity condition or has other information that negates the potential benefits of working more. This could arise when the Beneficiary mistrusts the Giver whom she believes, by pretending to be an altruist now, will exploit her eventually in the future. This shows that games with no pure Nash equilibrium are interesting social phenomena.

Case 10 is the passive version of Buchanan's Samaritan's Dilemma game and it turns out to be an analog version to the Hawk-Dove game. In coordination games like Stag-Hunt, the more people engage in a certain behavior, the more attractive that behavior becomes to the individual player. Hawk-Dove games depict the opposite case. The more other players are devoted to a given type of behavior, the more the individual player wants to do something else [Wydick 2008]. Hawk-Dove games are used to depict social conflicts. How could a good Samaritan become engaged in a conflict situation? As in Buchanan [1975], the good Samaritan is put in a ransom-like situation. If she does not help people in dire need, she is bothered by her conscience for letting others succumb to their probable destruction. On the other hand, if she believes nothing worse will befall them, she will not find the need to be charitable to them.

Case 9 is depicts the situation where the Beneficiary works more if the Giver is charitable, or works less if the Giver is not charitable. The only reason that the Beneficiary exhibits this behavior is that she recognizes the complementarity condition of the Giver's assistance to her own work effort. If the Beneficiary recognizes the complementary condition however, why would the Giver fail to recognize the same rather than treat them as substitutes? The only reason this could happen is that the Beneficiary may have additional information that can turn the condition in the opposite direction.

4. Static and sequential utility analyses of the Samaritan's dilemma game

The players' strategies above are further analyzed below through static and sequential game utility analysis. The additional insights gain in this exercise is the determination of the Beneficiary's strategy if she is substituting or complementing the Giver's act of charity. This turned out to be crucial because the nature of the charity (assistance, aid or gift) becomes the determinant of the Beneficiary's strategy to work more or to work less. As will be shown, the traditional outcome in the Samaritan's dilemma game is not universal, other outcomes are possible under different natures of assistance.

The analysis below only considers the utilities of the conditional altruist Giver and a normal Beneficiary worker. As discussed in the mapping exercises summarized in Table 2, both "altruist" and lazy workers are possible. However,

those types will not be included in the analysis in this section, but will be considered again in the empirical tests. With regards to the Giver, we shall assume always that she is an altruist, albeit in some cases she does not signal her altruism.

Let the utilities of the Giver, U^G, and Beneficiary, U^B, be as represented below. As an altruist, the Giver derives pleasure in helping people in need. Thus, the utility function U^B enters U^G following that of Dijkstra [2007]. Charity y is a disutility to the Giver but it is compensated by her altruistic desire to help. The Giver also knows that her charity y directly affects the work effort x of the Beneficiary, and she values x positively as x increases relative to current effort. Since x enters the U^G, the Giver then is said to be a conditional altruist, because some altruists may not be concerned at all of the Beneficiary's effort x. For the Beneficiary, work effort x is a function of the Giver's charity y. There is an optimal effort x for every charity y. Other than this, charity y has an independent positive effect on U^B.

$$U^G(-y, x(y), U^B(x(y), y))$$

where, y is the value of the gift/aid/help of the G.
x is the work effort of beneficiary B and is a function of charity y.
U^B is the utility of B where it is a function of x and y.
U^G is the utility of G where it is a function of y, x, and U^B.

The following characteristics describe the utility functions, U^B and U^G.

$\frac{\partial U^B}{\partial x} > [<]\ 0, \textit{for}\ x < [>]\ x^*(y)$

where $x^*(y) > 0$

Given the G's y, there is an optimal effort $x^*(y)$ for the B, where the marginal payoff of the extra value of y earned equals the marginal payoff of leisure.

$\frac{\partial^2 U^B}{\partial x^2} < [>]\ 0$

B's marginal utility of x is positive (negative) and decreasing (increasing) depending on $\frac{\partial U^B}{\partial x} > [<]\ 0$, for $x < \{>\}\ x^*(y)$.

$\frac{dU^B}{dy} = \frac{\partial U^B}{\partial y} + \frac{\partial U^B}{\partial x}\frac{\partial x}{\partial y} > 0$, and $\frac{d^2U^B}{dy^2} < 0$

B's marginal utility of y is positive and decreasing.

$\frac{\partial x}{\partial y} < 0, \frac{\partial x}{\partial y} > 0$

Assuming that x and y are substitutes or complements respectively.

$\frac{\partial U^G}{\partial U^B} > 0$, and $\frac{\partial^2 U^G}{\partial U^{B^2}} < 0$, G's marginal utility of U^B is positive and decreasing.

$$\frac{dU^G}{dy} = -\frac{\partial U^G}{\partial y} + \frac{\partial U^G}{\partial x}\frac{\partial x}{\partial y} + \frac{\partial U^G}{\partial U^B}\frac{\partial U^B}{\partial x}\frac{\partial x}{\partial y} + \frac{\partial U^G}{\partial U^B}\frac{\partial U^B}{\partial y} > [<]\ 0, \text{ for } y < [>] y^*,$$

and $\frac{d^2 U^G}{dy^2} < [>]\ y^*$

In words, G's marginal utility of y is positive (negative) and decreasing (increasing) if $y < [>] y^*$. G suffers a disutility proportionate to the value of y she gives, but since she is an altruist the increase in utility of B as y increases more than compensates the disutility. G's overall utility increases as y increases if $y < y^*$. The more she gives, the higher the utility but with diminishing returns. But at $y > y^*$, the disutility of y is more than the increase in utility of B.

$$\frac{dU^G}{dx} = \frac{\partial U^G}{\partial x} + \frac{\partial U^G}{\partial U^B}\frac{\partial U^B}{\partial x} > [<]0, \text{ and } \frac{d^2 U^G}{dx^2} < [>]0$$

In words, G's marginal utility of x is positive or negative, depending on $(\partial U^B/\partial x) > [<]0$, for $x < [>] x^*(y)$. Being a conditional altruist, G's utility also increases as work effort x of B increases. This is the same when x is complementary or substitute to G's y. In the complementary case, G finds an increase in B's effort x will increase U^B which then increases U^G. In the substitution case, G finds an increase in B's effort x will decrease U^B (given that y is a substitute, there is no incentive to increase x, thus increasing x leads to more disutility of work to B) which then decreases U^G.

$\frac{\partial x}{\partial y} < 0$, $\frac{\partial x}{\partial y} > 0$ Assuming that x and y are substitutes or complements respectively.

4.1. Static Game Utility Analysis

Solving for the first-order condition for attaining maxima for both Giver and Beneficiary,

Giver: $U^G(y, x(y), U^B(x(y), y))$:

$$\frac{dU^G}{dy} = -\frac{\partial U^G}{\partial y} + \frac{\partial U^G}{\partial x}\frac{\partial x}{\partial y} + \frac{\partial U^G}{\partial U^B}\left[\frac{\partial U^B}{\partial x}\frac{\partial x}{\partial y} + \frac{\partial U^B}{\partial y}\right] = 0 \qquad (1)$$

Beneficiary: $U^B(x(y), y)$:

$$\frac{dU^B}{dy} = \frac{\partial U^B}{\partial x}\frac{\partial x}{\partial y} + \frac{\partial U^B}{\partial y} = 0 \qquad (2)$$

$$\frac{\partial U^B}{\partial x} = 0 \quad \text{The beneficiary maximizes } x \text{ given } y. \qquad (3)$$

Substitute equation (2) in equation (1),

$$-\frac{\partial U^G}{\partial y} + \frac{\partial U^G}{\partial x}\frac{\partial x}{\partial y} = 0 \quad \text{where} \quad \frac{\partial U^G}{\partial y} < 0 \qquad (4)$$

In equation (4), if $\frac{\partial U^G}{\partial x} > [<]0$, then $\frac{\partial x}{\partial y} > [<]0$ or x is complementary (substitute) to y.

In summary, *B*'s exploitation of *G*'s charity happens only in the substitution case. The complementary case invalidates the Samaritan's dilemma following that in Table 3.

4.2. Sequential Game Utility Analysis

Is there a first-mover advantage like the Stackelberg model of competition? To show this, we take the total derivative of U^B and U^G.

Given $U^G(-y, x(y), U^B(x(y), y))$:

$$dU^B = \frac{\partial U^B}{\partial x}dx + \frac{\partial U^B}{\partial y}dy + \frac{\partial U^B}{\partial x}\frac{\partial x}{\partial y}dy \qquad (5)$$

$$dU^G = -\frac{\partial U^G}{\partial y}dy + \frac{\partial U^G}{\partial x}\frac{\partial x}{\partial y}dy + \frac{\partial U^G}{\partial U^B}\frac{\partial U^B}{\partial y}dy + \frac{\partial U^G}{\partial x}dx + \frac{\partial U^G}{\partial U^B}\frac{\partial U^B}{\partial x}dx \qquad (6)$$

4.3. The Samaritan moves first

If *G* moves first, then *B* as the second mover takes *y* as given. Then *G* expects *B* to maximize her effort *x*, and sets *y* to influence $x^*(y)$ and U^B to maximize her own utility U^G in equation (1). Given *y* is set, then from equation (5), $(dU^B/dx) = (\partial U^B/\partial x)$. The only way for *B* way to maximize her utility U^B is to set *x* such that $\partial U^B/\partial x = 0$. Thus *G* has the *first-mover advantage* to influence *B*'s behavior not to reduce work by setting *y* accordingly. This situation is depicted in letters *B* and D in Table 1 above where the *G* carefully sets her assistance to *B* so that the latter will not reduce her work effort (letter *B* with low-complement condition) or increase work effort (letter D with high-complement condition).

4.4. The Beneficiary moves first

If *B* moves first, then *G* as the second mover takes *x* as given. Then equation (6) becomes

$$\frac{dU^G}{dy} = -\frac{\partial U^G}{\partial y} + \frac{\partial U^G}{\partial x}\frac{\partial x}{\partial y} + \frac{\partial U^G}{\partial U^B}\frac{\partial U^B}{\partial y} = 0 \text{ (assuming optimization by } G\text{)} \quad (7)$$

Substituting equation (4) in (7),

$$\frac{dU^G}{dy} = \frac{\partial U^G}{\partial U^B}\frac{\partial U^B}{\partial y} = 0$$

Substituting equation (2) for $\frac{\partial U^B}{\partial y}$,

$$\frac{\partial U^G}{\partial U^B}\frac{\partial U^B}{\partial x}\frac{\partial x}{\partial y} = 0 \quad (8)$$

where $\partial U^G/\partial U^B > 0$ and $\partial U^B/\partial x = 0$ and $\partial x/\partial y < 0, \partial x/\partial y > 0$ whether x is a substitute or complementary to y.

Thus player *B* maximizes her utility with respect to *x* given *y* regardless of whether *x* and *y* are substitutes or complements of each other. She has the *first-mover advantage*. This is intuitive since *B* faces the dual opportunity to exploit the good Samaritan by working less if *x* and *y* are substitutes, and by working more or at least by not working less if *x* and *y* are complements.

The implication of the sequential game utility analysis with regard to the mapping of players' strategies in active and passive form of the Samaritan's Dilemma game is that now the player, with the first-mover advantage, can transform the game's payoffs. By setting *y* in the case of *G* or *x* in the case *B* at the outset, the first-mover can force the other player to adjust. The players in a sequential game, with the first-mover advantage, can thus transform the game's payoffs by setting *y* or *x* at the outset that forces the other player to adjust. If *G* moves first, she will force the game payoffs to resemble case 3 in Table 3. (Since it appears that in sequential and signaling games between a conditional altruist and a normal beneficiary, the cases in Table 3 are all possible, this should be the subject of another paper.)

In a related study, Komar [2014] reviewed theoretical models which analyze the consequences of the Samaritan's dilemma for foreign aid and its possible solutions. Komar has shown similar results above in a two-period model of an economy that whenever the recipient does some savings in equilibrium, the strategic motive induces it to under-save in comparison to what would be optimal if the aid had been exogenously fixed. With time-inconsistency problems arising

particular to the expectations of the beneficiary, the donor (giver) cannot also adhere to a fixed amount of aid committed in advance as *Stackelberg leader*. In relation to the cases shown in Table 1, this is a case where the giver commits (stage 1) to provide a fixed amount of food aid enough to cover for the shortfall, but as the beneficiary anticipates aid she reduces (stage 2) her work hours. In the last stage when the donor disburses the aid, the question is whether the donor will stick to the aid level or policy announced in the first stage after the recipient already chose to reduce work hours. The answer is no because withholding additional aid or punishing the recipient reduces the welfare of both the recipient and the donor. Thus, a donor starting as a Stackelberg leader *ex-ante* will end up being a Stackelberg follower *ex-post*. But this will not be true in the case of letter D in Table 1 because reducing work effort in the complementary condition is not optimal for the beneficiary.

5. Empirical Test

The second and third parts of the theoretical framework above, mapping of players' strategies and static utility analysis, have the following implications on the empirical tests of the study:

1. The mapping of players' strategies directs us to find out empirically if the players are in a game of Samaritan's dilemma or not.
2. The static and sequential game utility analysis directs us to find empirically if the Beneficiary's strategy is complementing or substituting the charity she received.

To purse the two interesting implications, ideally we should have data for the different charities (or gifts) given to and recieved by different beneficiaries, each with different potential work efforts. Unfortunately, the available data that we are able to use here have some limitations. In particular the Family Income and Expenditure Survey (FIES) reports just one type of charity ("gift") per household in the sample. To see how this type of giving affects work efforts of the recipients, we merge the results of the 2003 round of the FIES with the results of Labor Force Survey (LFS) for the same year. The merged FIES-LFS 2003 dataset is used here to test the following hypotheses:

Hypothesis #1: The share of the total gifts in total income of the household affects the work effort of the beneficiary.

Hypothesis #2: How the gifts affects work efforts depends on whether the beneficiary work efforts substitute or complement the gift received.

5.1. The empirical model

The empirical model will test the effect of the Giver's gift *x* on the Beneficiary's work effort *y*. In the regression model below, the dependent variable y_i represents the *i*th beneficiary's work effort and x_i the value of the gifts received (from some giver).

$$y_i = \beta_0 + \beta_1 x_{i1} + \boldsymbol{\gamma x}_{i2} + \varepsilon_i$$

The proxy indicator the for dependent variable *y* is "household total hours of work per capita". The independent variable x_{i1} is "percentage share of household total value of consumption gifts (plus receipts received from local and abroad) in the households' total income". We are mainly interested in β_1 or the coefficient of the total value of gifts/transfers as a percentage of income. The variable $\boldsymbol{x}_{i2}$ is a vector of control variables representing characteristics of the beneficiary that affects her work effort. These are household per capita income and the number of family members according to classes of workers they belong. The additional paremeters to be estimated are β_0 and $\boldsymbol{\gamma}$, while ε_i is the error term.

Estimation Model:

$$whrprcap = \beta_0 + \beta_1 pgfabdm1 + \beta_3 pcapita + \beta_4 dwclass0 + \beta_5 dwclass1 + \beta_6\ dwclass2 + \beta_7 dwclass3 + \beta_8 dwclass4 + \beta_9 dwclass5 + \beta_{10} dwclass6 + u$$

Dependent variable:
whrprcap – household hours of work per capita in a week

Independent variables:
pgfabdm1 – percent share of the total value of gifts received to household income
pcapita – family per capita income
dwclass0 – number of family members who work for a private household
dwclass1 – number of family members who work for a private establishment
dwclass2 – number of family members who work for the government or government corporations
dwclass3 – number of family members who are self-employed without paid employee
dwclass4 – number of family members who are employers in family-operated farm or business
dwclass5 – number of family members who work with pay in own family-operated farm or business
dwclass6 – number of family members who work without pay in own family-operated farm or business

5.2. Source of data and limitations

As mentioned above, we use the merged dataset from the Philippines' 2003 Family Income and Expenditure Survey (FIES) and Labor Force Survey (LFS). Note that while the LFS dataset also includes the results of the Survey on Overseas Filipinos (SOF) conducted in the same year, the SOF data is not used or needed in this study. The survey data for 2003 is the only officially merged dataset that contains household income and expenditure (including "gifts"), and household labor information (including total hours of work) in the Philippines.

The FIES is a nationally-representative survey conducted every three years, which provides socio-economic information on Philippine households. The LFS is conducted quarterly each year. It contains information about the employment status, age, educational attainment and other work indicators of each household member. The FIES has expenditure data on food, fuel and utilities, transport and communication, household operations, house repairs and maintenance, personal care, clothing, education, medical, durable and non-durable furnishings, and other expenses. For each of these consumption items, the respondents also provide the amount of "gifts" received. The total value of these gifts is used in this study as the proxy of the Giver's gift plus the total cash receipts of assistance from domestic and abroad.

Like most empirical studies, the limitation of this study is critically defined by the data set used and described above. The most critical limitation of the study is that it did not include family members who do not have work (unemployed) and therefore were not asked in the survey about their numbers of work hours. By excluding these family members, it would appear then the study consequently excluded the poor households without work or are unemployed. However, most poor households have work or they cannot afford not to be employed. In the Philippines, poverty is correlated not with unemployment but with underemployment in the informal sectors and the agriculture sector. The other limitation is that the data set does not have data on the "Givers" as they are just proxy indicated by the value of gifts that beneficiaries received.

5.3. Empirical Data and Tests Results

The empirical model is estimated using the national sample (i.e, all beneficiary workers), and sub-samples of different groups of beneficiary workers. The first group comprises workers with per capita work hours per week less than 24 hours. The second group of workers comprises those who work between 24 and 40 hours per person per week ($24 \leq x \leq 40$). The third group of workers pertain to those who work more than 40 hours but less than 56 hours per person per week ($40<x<56$). The fourth and last group of workers comprises those who work for 56 hours or more per person per week ($x \geq 56$). We used weighted least squares method to address possible heteroskedasticity [Wooldridge 2009].

As shown in Table 4, the overall effect between hours of work with the total value of transfers received is negative except when workers work for more than 56 hours per week. This amounts to the equivalent of interpreting that we have captured the group of workers who are "altruist" workers as discussed in the theoretical framework. They work more hours sacrificing themselves for the greater good. We can identify a complementary condition since the correlation is positive: as the value of consumption gifts increases, the work hours per capita per week also increase. A potential conjecture is that the more hardworking, the more consumption gifts are received.

TABLE 4. Description of beneficiary workers according to work hours per week

	< 24 hours	24 ≤ *x* ≤ 40	40 < *x* < 56	*x* ≥ 56	Total
Frequency of workers	5,914	11,958	12,169	10,510	40,551
Frequency of workers who received transfers less than or equal to 10 percent of their income	2,935	7,941	8,685	6,407	25,968
Frequency of workers who received transfers greater than 10 percent of their income	2,979	4,017	3,484	4,103	14,583
Frequency of workers in national per capita income below 5th decile.	3,327	6,004	4,746	3,976	18,053

Source: Family Income and Expenditure Survey 2003, Labor Force Survey 2003

There are 40,551 observations in the FIES-LFS 2003 dataset. Of these, there are 5,914 who worked less than 24 hours/week on average, 24,127 who worked for more between 24 hours and 56 hours per week, and there are 10,510 who worked for at least 56 hours/week. (Table 4)

The substitution condition or negative correlation (Table 5) between work hours and total gifts and transfers in workers working normally at 40 hours per week or lesser merits an explanation. Do they work less because they receive more gifts, or do they received more gifts because they work less? The substitution condition as shown in letter C in Table 1 in letter C is that it is not particular of the direction of causation. If the donor provided more than the shortfall in food requirements, then the beneficiary reduces work effort. On the other hand, the recipient can reduce work effort to generate the altruist action to increase food aid more than the shortfall in food requirements. Thus, the substitution condition means that some workers in the data worked less because they received more gifts, but some others received more gifts because they worked less. This is added explanation to the opportunity to exploit altruistic giving under conditions of substitution between the nature of assistance given and the beneficiary's effort.

TABLE 5. Test of workers in different work hours per week per capita

Dependent Variable *Work hours per week per capita*	Key Independent Variable**	Coefficient	t-value	Obs.
workers with per capita work hours per week < 24	*pgfabdm1* (% total transfers to total income)	-0.037501*	-10.45	5,914
workers with per capita work hours per week at 24 ≤ y ≤ 40	*pgfabdm1* (% total transfers to total income)	-.0273723*	-8.59	11,958
workers with per capita work hours per week at 40 < y < 56	*pgfabdm1* (% total transfers to total income)	-0.006080*	-2.31	12,169
workers with per capita work hours per week > 56 hours	*pgfabdm1* (% total transfers to total income)	.0504096*	2.12	10,362

*$p<0.10$
**Other control variables are included. Full detailed results are available from the author upon request.

We can conclude from the summary results that household total transfers (consumption gifts plus remittances) and household members' work effort are substitutes (Table 6). Thus, the Samaritan's dilemma equilibrium is implied. The charitable act of giving here involved household consumption gifts and cash receipts from domestic and abroad in a representative sample of the whole Philippine population. We have empirically shown results consistent with equilibrium outcomes different from the traditional Samaritan's dilemma. In particular, we find, evidence of high-effort workers (or "altruist" workers), an implied equilibrium outside that of the Samaritan's dilemma among high effort workers or theoretically we called as the "altruist" workers.

TABLE 6. Summary of test results

Work hours	Effects of total transfers	Complementary	Substitutes
< 24 hours	Significant	No	Yes
$24 \leq x \leq 40$	Significant	No	Yes
$40 < x < 56$	Significant	No	Yes
$x \geq 56$	Significant	Yes	No

6. Conclusion

There are two parts of the conclusion, one on theory and the other on the empirical tests. Numbers 1-2 are rom the theoretical part, and numbers 3-4 are from the empirical test.

1. On the mapping of different types of players, Buchanan's passive and active versions of the Samaritan's dilemma are confirmed. But with additional types of players, mostly among the beneficiaries, there are potential equilibria other than Buchanan's dilemma.

2. A mathematical proof in utility analysis had shown that the dilemma occurs under conditions that Samaritan's help is a substitute to the work effort of the beneficiary. The dilemma does not necessarily occur under the condition that the help given is complementary to work effort.
3. Household income transfers (consumption gifts plus remittances) are substitutes to work effort. The implied equilibrium from the empirical test is the Samaritan's dilemma of Buchanan's.
4. The Samaritan's dilemma does not occur when the beneficiary is an "altruist" worker. They are assumed to be represented by a very high effort of work in the empirical test.

This research study started with an inspiration to find an exception to the Samaritan's dilemma or moral hazard problem. In other words, the study presented a model and then sought empirical evidence that sow acts of charity inspire workers to work more. The theoretical model aptly showed that there is such a practical condition in the complementary sense. The empirical test showed that as far as income transfers or acts of charity involving household consumption items, the substitution conditions manifest the presence of a Samaritan's dilemma. High-effort workers, however, are the exception. The challenge of a follow-up study is to find data sets where the nature of charity assistance is more complementary to work effort.

Acknowledgments: I would like to thank my thesis adviser at the University of the Philippines School of Economics, Romeo Matthew T. Balanquit, Ph.D. and thesis reader, Ma. Joy V. Abrenica, Ph.D. My colleagues at the Department of Economics, ADMU: Noel P. de Guzman, Ph.D., for reviewing the manuscript, and Philip Arnold P. Tuaño, Ph.D., for encouragement and support. I also would like to thank the two anonymous referees who reviewed my work and gave valuable comments.

References

Bruce, N. and M. Waldman [1990] "The Rotten Kid theorem meets the Samaritan's dilemma", *The Quarterly Economic Journal of Economics 105(1):155-165.*

Buchanan, J. M. [1975] "The Samaritan's dilemma", in E.S. Phelps (ed.), *Altruism, morality, and economic theory.* New York: Sage Foundation. 71-85.

Coate, S. [2001] "Altruism, the Samaritan's dilemma, and government transfer policy", *American Economic Review 85(1):46-57.*

Darst, R. G. [2003] "The Samaritan's dilemma in international environmental politics: lessons for the climate change regime", Portland, Oregon: Annual Meeting of the International Studies Association.

Deryugina, T. and B. Kirwan [2017] "Does the Samaritan's Dilemma matter? Evidence from US agriculture", *Working Paper 22845*. Cambridge, MA: NBER.

Dijkstra, B. R. [2007] "Samaritan versus rotten kid: another look*", Journal of Economic Behavior and Organization* 64(1): 91-110.

Faria, R.J. and D. Arce [2018] "On the Samaritan's dilemma, foreign aid, and freedom", *Economies 2018* 6(53). Available from: doi:10.3390/economies6040053, MDPI.

Gibson, C. C. et. al. [2005] "The Samaritan's dilemma: the political economy of development aid", University of Oxford: Oxford University Press.

Heinecke D., et.al. [2008] "The Samaritan's dilemma: the effectiveness of Australian foreign aid to Papua New Guinea", *Australian Journal of International Affairs* 62(1): 53-71.

Komar, A. [2014] "Samaritan's Dilemma, time-inconsistency and foreign aid: a review of theoretical models", *Department Discussion Paper DDP1405*, Department of Economics, University of Victoria.

Logerlöf, J. [2004] "Efficiency-enhancing signaling in the Samaritan's dilemma", *The Economic Journal* 114:55-68. Royal Economic Society.

Raschky, P. A. and M. Schwindt [2016] "Aid, catastrophes and the Samaritan's dilemma", *The World Economica* 83(332): 624–645.

Schmidtchen, D. [1999] "To help or not to help: the Samaritan's dilemma revisited", *CSLE Discussion Paper No. 99-09*. Saarbrücken: Universität des Saarlandes, Center for the Study of Law and Economics (CSLE),

Wooldridge, J. M. [2009] *Introductory econometrics: a modern approach*. Canada: South-Western Cengage Learning.

Wydick, B. [2008] *Games in economic development.* Cambridge. UK: Cambridge University Press.