POVERTY AND WEALTH: MORAL ISSUES IN THE GLOBAL FINANCIAL CRISIS

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Abstract

Government bailouts and bank failures in the United States and debt crises in Europe have all occurred amidst cries of malfeasance and unethical behavior. Yet, prior to the economic crisis, Europe and the United States both saw good GDP growth. Risks on the part of business and government leaders that could lead to personal gain, but potentially do significant to others and to the economy seem counterintuitive except when considering questions of ethics and morals. One such question is whether or not there is a level of both societal and individual wealth past which individuals potentially modify their own sense of morality and their associated behavior in the marketplace. If a particularly large number of individuals in a population experience such a shift in belief and behavior, then it is possible that a situation could arise in which economic policy that is otherwise sound may lose effectiveness because it exists within an environment with a systemic reduction in morality. It is theoretically possible for this to result from a shift in the philosophy of the general population or even just a few key policymakers or business leaders. Indeed, a reduction in morality among policymakers could reasonably be expected to impact economic policy negatively. For some individuals, however, the paradigm shift may simply reflect their pre-existing ethics, which have merely moved into the mainstream or have gained the support of top policymakers or business leaders. In that case, such individuals simply find themselves in an environment and circumstances that have changed to be more conducive to carrying out unethical behavior. This study investigates these issues and their contribution to the Global Financial Crisis.

Keywords: Global Financial Crisis, Economic Ethics, Morality, Choice Wave, Multipoint Gravitational Model, Religion, Excessive Affluence, Decision Strategy

Introduction

Government bailouts and bank failures in the United States and debt crises in Europe have all occurred amidst cries of malfeasance and unethical behavior. Yet, prior to the economic crisis, Europe and the United States both saw good GDP growth. Nevertheless, even amidst such prosperous times, senior business leaders took risks that were aimed at personal gain, but had the potential to do significant harm to others and to the economy. This suggests an interesting question of what roles environment and wealth may play regarding business ethics and morals. Is there, for example, a level of both societal and individual wealth past which individuals potentially modify their own sense of morality and their associated behavior in the marketplace? That is a condition termed "excessive affluence." Changes in ethics within an economy past a critical point may naturally be contributing factors to an economic crisis. A crisis increase the problem of poverty in society by placing the poor at greater risk and potentially lowering the socio-economic status of others. In a condition of excessive affluence, it is ironic that wealth could contribute to poverty.

The economic environment itself can impact behavior and morals (Tanner, 2010). That is especially the case with government and business leaders (Zemguliene, 2013). One measure of the economic environment, both of an individual and of the economy as a whole is clearly wealth. Human well-being can certainly increase through the increase of wealth per capita (Dasgupta, 2010). On the other hand, wealth may have deleterious effects (Quoidbach et al, 2010). Payne and Marsh (2009) discussed the case of Russia making recent gains in terms of modernization and material wealth, yet being plagued with associated ethical problems. So, if there does indeed exist a level of wealth past which individuals may modify behavior with respect to morals and ethics, how do individuals and society respond to it? In the case of society, there exists the possibility of a level of general affluence in the population as a whole past which a group of individuals or the economy as a whole may experience a general decline in ethics. That may occur due to decisions and actions in the business and finance communities, or by economic policymakers. It may be further impacted by related philosophical shifts in the judiciary (Stephenson, 2009). The sources of the

problems may also be widespread, or they may stem from just a few players. Furthermore, a reduction in morality among policymakers and business leaders is perhaps the most troubling because it has the potential to do the most harm through outcomes such as detrimental changes in economic policy. Alternatively, it may also be the case that some individuals do not experience a change in morality, but rather it is the environment and circumstances that have changed to be more conducive to their carrying out unethical behavior to which they are already predisposed. It is the old question of whether environment or individual character matters more in shaping outcome. Consider that as an individual's wealth increases past a certain level, that individual may possibly trust primarily in the power that comes from that wealth (Gibson, 2011). In terms of causality, one might reasonably be curious as to whether or not the individual's belief system was already present and merely manifested itself in terms of behavior once wealth has reached a certain level that they can express their personality fully with impunity, or was changed in some way as a result of amassing wealth. The old saying that money changes people can be true, but it is also true that it could simply enable them.

Also, when considering ethics and morality, it is useful to include religion in one way or another, because that is the source of ethics for many people (Fitzpatrick and Cheng, 2014). This can be true even among atheists or the non-active members of religion. If they live in an historically religious country, for example, it is difficult to avoid being influenced by the philosophy of that religion at least somewhat. In Italy, for example, it would be virtually impossible not to feel, at least minimally, the centuries of influence of the Catholic Church (Garelli, 2013). It is also the case that, other things being equal, religious feeling tends to decline as individual and societal economic status increases, and religious feelings tend to increase as individual and societal economic status decreases (Pew, 2011). This is merely a trend, however, as exceptions do exist in both directions for a variety of reasons (Wade, 2014). This can also be observed when there is any type of systemic shock to society. For example, following the September 11 terrorist attacks, many people across the United States went to churches, looking for solace, comfort, and answers. However, it did not take terribly long after the attacks, as life adjusted to the new norm, for church attendance returned to its previous levels (Goodstein, 2001). These effects are generally expected to be temporary and disappear as things return to normal (Foster and Just, 1989).

The present study builds on prior work in order to incorporate the concept of excessive affluence as a potential cause of changes in ethical behavior in both individuals and leaders. Given the probabilistic nature of the system, i.e., not everyone responds to wealth in the same way and the critical level for a change in moral belief may reasonably be expected to be different for each person, a Choice Wave model is applied. Also, since the presence of a certain sufficiently large number of persons who have crossed their critical level into excessive affluence may cause a significant shift in societal philosophy, the treatment of individuals within society, and the very determinants of economic outcome, there exists a definite potential for individuals to be influenced by others and by the environment. That may manifest itself as a "herd effect" in which the an increase of those crossing their critical level of wealth may serve as an impetus to others to cross their critical level when they otherwise might not have done so. Therefore, a multipoint gravitational component will be incorporated into the Choice Wave model. The combined model yields a depiction of economic decision behavior that takes into account both the probabilistic nature of ethical shifts and the influence of others on those ethical shifts.

Background

The potential for excessive affluence is not merely a phenomenon of large corporations or the "1%" so often discussed today. Neither is it limited to any particular socio-economic level. Wealth is not just absolute, but also relative. So, different economic strata of society could potentially experience the same outcome as their disposable income increases relative to their previous income level (Sundaresan, 1989; Rabin, 1998). The more widespread excessive affluence is, crossing socio-economic boundaries, the more it can be a contributing factor to prolonging and worsening an economic crisis (Hawtrey and Johnson, 2010). Furthermore, since consumer response to negative stimuli is known to be, in general, relatively fast, while recovery is, in general, relatively slow (e.g., Kinnucan et al. 1997 and Piggott and Marsh 2002), the presence of excessive affluence, especially when spread across different socio-economic levels, could lengthen an economic crisis and hamper recovery efforts.

Classical utility theory suggests that individuals are insatiable. More consumption leads to higher utility. More consumption is enabled by higher income, and so higher income leads to higher utility. Therefore, in that framework, some other force, such as the civil law, social pressure, or religion is needed in order to prevent unethical behavior. However, it is not always so simple and not so deterministic. A classic approach to viewing ethics in the economy

could be to suggest that a lack of ethics, sometimes manifested in the form of crime, is seen more in areas of poverty and less in more affluent areas – and also decreases with increasing wealth (McKeown, 1949). Nevertheless, a work ethic and honesty are traits that readily may be found among those poverty (Kay and Jost, 2003). Such persons are often quite religious (Schieman, 2010). On the other end of the spectrum, scandals such as those of Enron and Madoff provide exemplars of corporate leaders who "have everything" in terms of material wealth, but gained it and/or kept it through unethical and/or illegal means. There undoubtedly exist individuals at all socio-economic levels who are willing to do the unquestionably unethical in order to achieve a goal of wealth and/or power at the expense of others.

Individuals cannot always be conceptualized as maximizing a stable, coherent, and accurately perceived utility function. One way to approach that problem is to consider that individuals have a tendency to employ a short-run strategy in pursuit of immediate gratification, which may or may not be in accord with their long-run utility maximization goals (Rabin 1998). Alternatively, utility maximizing decision strategies themselves may be conceptualized as probabilistic over time, yielding different outcomes at different decision points that nevertheless maximize utility of the individual at that moment according to the individual's decision strategy (Johnson, 2012; Johnson, 2016).

Some individuals respond to an increase in wealth by pursuing utility maximization in a manner that reduces moral responsibility to others. That may be either strengthening existing strategies, or it may be a shift from one strategy to another. The reduction in moral responsibility may be consistent or inconsistent with long-run utility maximization. For such individuals, morality is, insofar as it is observed at all, simply a form of "good business" (Nash, 1990; Jaffe and Tsimerman, 2011). Because ethics are known to be good for business and society as a whole typically has an expectation of ethics, such individuals may feign moral responsibility when it is in the best interests of their true utility-maximizing goals. However, even for such individuals, it may be the case that a level of wealth, power, etc. is reached at which the individual may peel back the mask of moral responsibility and more openly pursue utility according to the true philosophy that underlies their decision strategy.

Those with greater amounts of wealth typically have greater power in a society that is based on money. Money can yield a state of self-actualization and provide greater security and ease of life. However, it also has the potential, due to the power associated with it, to cause a turn from morality. This is not to say that all persons of low income are inherently moral. There are persons with ethical issues at all socio-economic strata. What is being considered here, though, is the situation in which a person moves higher in wealth category and either experiences a modification in ethical belief or becomes enabled to act based on a pre-existing set of low ethical standards (Halligan, 1995; Johnson, 2013). That certainly does not necessarily happen in all cases of increasing wealth, but the potential nevertheless exists. The more it happens, through environmental influence, i.e., the influence of others, the more potential there is for it to spread and become more of a societal norm, contributing to or exacerbating a financial crisis.

The application of a Choice Wave is one particular way to include morality into the utility maximization problem is through the approach of probabilistic decision-making. An individual, for example, that ordinarily places value on moral responsibility may gain wealth sufficient to shift decision strategy to one that is less focused on moral responsibility. There is, then, a probability that the individual will make any given decision consistent with moral responsibility or against moral responsibility. In each case the individual maximizes utility at the decision point. Any issue of short-run vs. long-run utility maximization is inherently removed and instead the individual maximizes *lifetime* utility at every decision point by maximizing *local* utility at each decision point. Potential lifetime utility may, therefore, change over time. However, by maximizing utility at each decision point, the individual necessarily maximizes lifetime utility, for it is simply the sum of all local utility values over time.

Within the entire population as a whole, individuals both affect and are affected by their environment. Even small changes in the economic condition can cause large and dramatic changes in behavior of a group (Durlauf and Young 2001; Barrett 2005). A population may very well always include at least a few individuals who are greedy or even sociopathic. It is quite possible that such individuals may not have much of an impact on the population as a whole at every time period. There would still be those who are wealthy and those living in poverty. Yet, consider what shifts in society might occur as the attitudes of individuals change to be more oriented towards greed. There may be an increasing wealth shift in the form of a transfer such that poverty also increases and the number of those facing poverty may increase. A psychological effect may also result in which those of increasing wealth may begin to be more oriented towards that wealth, creating a blind spot to social responsibility and responsibility to those in poverty. The become insatiable and shift in priority from altruistic spending towards their own perceived needs and wants

(Briers et al. 2006). There will likely always be persons of such a philosophy in a population. However, consider the possibility of a level of societal affluence in which a significant segment of the population shifts in attitude from one that is beneficial to society as a whole to one that is purely self-centered and detrimental to society and to the economy. Such an occurrence can reach a point at which it grows more rapidly through human herd-like behavior (Ottaviani and Sorenson 2000; Rook 2006). That herd-like behavior can result in those who might ordinarily be oriented towards altruism being swept up in the moment, not correctly processing and applying information related to correct ethics and morals (Rabin 1998; Kahneman and Tversky 1972; Griffin and Tversky 1992; Baumann, Deber, and Thompson 1991). The herd mentality is one that humans, as sophisticated beings, would surely like to pretend does not exist. Yet, it does. The advertising industry knows that very well, and so do politicians. Individual preferences are affected by the behavior, motivations, and intentions as demonstrated by other individuals and social organizations (Moussaïd et al., 2013). This reciprocity implies that one is more likely to treat another individual in the way in which one is treated by the other individual, whether that treatment is good or bad (Rabin, 1998).

It must still be remembered, though, that greater wealth not only comes with greater capacity for unethical behavior, but also with greater capacity for doing good. Those who obtain wealth legitimately may very well use it to do immense amounts of good through charitable contributions and sustainable efforts. They may engage in business practices that seek to empower others and have positive impacts on the economy as a whole, thereby working to prevent a financial crisis. What marks a situation as "excessive affluence" is the turn from ethical behavior towards that which is harmful to society and to the common good. It becomes a situation of individualism, which is just as harmful as the collectivist mentalities of communism. It is through, however, a collective concern for both the individual and the common good that both society and individuals are most protected.

This study first investigates the response of individuals to changes in wealth and whether an increase in wealth may result in a decline in morality. How do the utility function and the decision-making strategy change at different levels of wealth? How are such changes consistent with morality and ethics? In a money-based society, money brings power to accomplish and to consume. Such power may be used for good and charitable purposes or legitimate financial gain, or else it may be used to exploit and seek other forms of dishonest profit. It is possible that an otherwise ethical person may, upon reaching a certain level of affluence, replace morality and religious belief on which that morality may be based with a type of money-based power. Money may become the individual's new "moral compass" in which financial interests guide decision making more than or even to the exclusion of ethical principles. The use of and acquisition of money may itself become an addiction (Lea and Webley 2006). These problems may contribute to an economic crisis and hamper recovery. That has the potential to weaken the condition of the extant poor and increase the number of persons in poverty even at the same time that some individuals or businesses may be significantly growing in wealth. In this study, these issues will be considered by developing a Choice Wave Probabilistic Demand model that captures probabilistic choice of a bundle that is a mix of consumer and altruistic goods. That model will also incorporate a multipoint gravitational model to capture effects of environment and influence of others.

Review of Utility Models Incorporating Altruism and Greed

Following Johnson (2013), a series of utility functions may be employed to observe potential effects of wealth on decision-making regarding altruism and greed. Eqn. 1 gives a standard Cobb-Douglas-type utility function from classical economics and therefore represents a classical economic strawman. Eqns. 2-4 are utility functions representing three different types of individuals. A "moral" individual could be represented by Eqn. 2. The functional form for that individual is such that, beyond a certain critical level of consumption, X_C, utility decreases. Such an individual is assumed to be less likely to contribute to a financial crisis because there is an inherent limitation to utility from consumption. Eqns. 3 & 4 are proposed to represent two forms of "greedy" or "irresponsible" individuals.

$$(1)\ U = \alpha X_1^{1/2} X_2^{\xi}$$

$$(2)\ U = \alpha_0 X_1^{1/2} X_2^{1/2} + \beta_0 X_1^2 + \delta_0 X_2^2$$

$$(3)\ U = \alpha_1 X_1^2 + \alpha_2 X_2^2 + \beta_1 X_1 + \beta_2 X_2 + \gamma$$

$$(4)\ U = \alpha_1 X_1^2 + \alpha_2 X_2^2 + \beta_1 X_1 + \beta_2 X_2 + \gamma + \delta_1 e^{(X_1)^\mu} + \delta_2 e^{(X_2)^\gamma}$$

Fig. 1 – Four Utility Functions (Johnson, 2013)

In Eqn. 1-4, which are depicted in Fig. 1, X_1 is the bundle of general consumption of goods and activities, while X_2 is a bundle of charitable, societally beneficial, or altruistic goods and activities. The other terms on the right-hand side of the equation are coefficients and exponents. As stated, the individual following Eqn. 2 will gain in utility by increasing consumption overall until the critical level of consumption is reached, at which point utility will decrease. Note that Eqn. 2 is a Cobb-Douglas function, like Eqn. 1, but with terms added to it that cause utility to decrease after a certain critical level of consumption rather than continue to increase as in the Cobb-Douglas function. Consumers following Eqns. 3 and 4 gain utility at an increasing rate by increasing consumption. The key difference is that Eqn. 4 represents an individual whose insatiability is more strongly stimulated by consumption itself. For individual consumers, the specific form they follow may also change over time, as may the specific terms and coefficients of the equations. In Eqn. 2, the exact location of X_C may also shift over time.

The indifference curves shown in Fig. 2 represent an individual following the utility function as given in Eqn. 4. As wealth increases, thereby allowing greater consumption and higher utility, the indifference curves flatten, suggesting an increased preference for the consumer good (X_1) relative to the altruistic good (X_2). As wealth increases, there is little trade-off possible between the consumer good and the altruistic good. That is, no matter what the level of consumption of X_1, the level of consumption of X_2 is relatively constant. Eqn. 4, then, may represent an individual that experiences a decrease in the level of ethics/social responsibility at an increasing rate as wealth increases.

Fig. 2. Indifference Curves (Johnson, 2013)
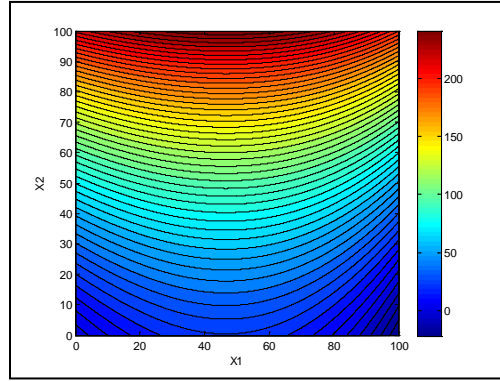
Gravitational Choice Wave Model

The specific functional forms of utility and the percent composition of the economy comprised by individuals following different decision strategies is assumed to be inherently probabilistic. This should be a reasonable assumption since humans tend to behave in a probabilistic manner overall (Busemeyer and Wang, 2015). One does not know what someone else will do with complete certainty at any given moment in time, for humans are not robots subject to the deterministic algorithms of a program. Therefore it is reasonable to state that there exists a probability that each individual in the economy will follow a specific decision strategy to maximize utility by choosing a bundle with a given mixture of consumer goods and altruistic goods. The consumption model, then, can be represented by the matrix in Eqn. 5, where x represents the bundle of consumer goods and a represents the bundle of altruistic goods. Bundle a may be thought of as including the ethical decisions and choices that can be made in conjunction with choices of x or, as appropriate, instead of certain constituent items of x.

$$(5) \qquad \mathbf{X} = \begin{bmatrix} x \\ a \end{bmatrix}$$

For each individual in the economy, for each level of income, Y, there is a probability associated with each level of x and a that the individual will choose that level. This may be represented by a Choice Wave as in Eqn. 6 (Johnson, 2012; Johnson 2015). The complete set of such possible choices represents the complete set of utility-maximizing levels of x and a for that individual.

$$(6) \qquad \psi\left(\mathbf{X}\right)_{Y,t} = \begin{cases} P\left(\mathbf{X}|Y,t\right), & \textit{at the decision point}; \\ P\left(\mathbf{X},Y,t\right), & \textit{otherwise}. \end{cases}$$

There is a probability that an individual will choose in a manner that is inconsistent with ethics, but still maximize utility. That is permitted by a Choice Wave. Indeed, even those with low probability of choosing an unethical outcome may still do so. Also, although Choice Waves usually only incorporate income through the Market Potential Function (the budget constraint in Choice Wave mathematics), the Choice Wave in this instance is expressed with a specific wealth component to permit the existence of a critical level of Y that causes a shift in the probability of the relative consumption mix in $\mathbf{X}$ such that x is preferred significantly to a. So, there is not merely a probability of choice of an ethical vs. an unethical mixture within $\mathbf{X}$, but, as expressed in the equation, that probability itself is dependent in some way on the level of wealth at the time of the decision.

Because those who are choosing in a manner inconsistent with ethics are still maximizing their utility at that moment in time based on their utility maximization strategy, society is faced with a problem when a sufficient number of individuals have decision strategies that yield an individual utility maximizing outcome, but are inconsistent with the best interests of society and the economy as a whole. Following a Pareto-style approach, utility gain for such individuals may perhaps be greater than the collective utility loss to society, yielding a net gain in utility to society. However, even if that happens, it is nevertheless likely to be harmful because it represents a significant shift in utility from a large group to a small group. That is, a large group is harmed by the massive windfall gains of a few. That is

even more particularly troubling when the windfall gains to a few involves the efforts of others who suffer through not reaping just rewards for their labor. Such is a potential outcome when the means of production are vested in a small group of individuals, whether a government or private industry. In the case of government control, it is socialism or communism. In the case of control by small portions of private industry, it is extreme capitalism. Those are all quite different systems from a capitalist variety such as distribuitism, in which the means of production are spread out as widely as possible to give as many people as possible control over their own labor and their own financial destiny. In a distributist framework, it is likely that there would be more balance in $\mathbf{X}$ overall, not necessarily purely through "human kindness," but also due to systemic constraints. However, systemic constraints, as a form of environmental influence, may cause changes in individual decision strategies, behavior, and beliefs.

Also, since individuals in an economy are inherently interacting with each other and are not doing business in a vacuum, it is rational to expect that the actions of individuals may be influenced by the actions of other individuals. As a state of excessive affluence occurs, it is possible that the herd effect may cause a shift in individuals' decision strategies and hence a shift in the functional form or parameters of their Choice Wave such that they are more likely to choose x over a. Conversely, a positive shift in society as a whole could have the opposite effect, influencing individuals towards ethical decision strategies (Harris, 1995).

The multipoint gravitational model for the interaction between two individuals is given as:

$$(7) \quad \mathbf{F}_{ij} = \frac{An_i n_j}{f(r)} \, \boldsymbol{\mu}_{ji}$$

where n_i and n_j are the magnitudes of influence of the ith and j^{th} individuals and $f(r)$ is some function representing the effective "distance" between the two individuals, which may or may not be a literal physical distance. Through the internet, television, social media, and other means, for example, one can increase or decrease effective distance with respect to influence no matter the physical distance. The other terms in Eqn. 7 are a constant, A, and a direction vector $\boldsymbol{\mu}_{ji}$, which is in the direction from j towards i, since Eqn. 7 is expressed in terms of the influence of the ith individual on the jth individual (Johnson, 2015).

In the conceptual framework of the present study, the n terms are based on income (since the concept of a critical level of wealth termed "excessive affluence" is included) and the beliefs of the individual (which may be represented by a term B). The influence may also vary over time, both in general and because of the potential for income and belief to change over time. Additionally, B may also vary not just over time, but as a function of income. Therefore, Eqn. 7 may be re-written as Eqn. 8.

$$(8) \quad \mathbf{F}_{ij} = \frac{An_i(Y_{i,t}, B_{i,t|Y}) n_j(Y_{j,t}, B_{j,t|Y})}{f(r)} \, \boldsymbol{\mu}_{ji}$$

In Eqn. 8, the influence terms are expressed as functions of the individual's income, which may vary over time and relates to their being or not being in a state of excessive affluence, and their beliefs, which are given as time variable and conditional on the current level of income. Given the gravitational equation as expressed in Eqn. 8, the individual's utility maximization problem for the choice of both consumer and altruistic goods is given in Eqn. 9.

$$(9) \quad Max \left| U\left(\mathbf{X}\right) \right| = g\left(\mathbf{X}\right) \ s.t. \ h\left(Y_t, B_{t|Y}, N_t\right)$$

In Eqn. 9, g is some decision equation related to the choice of $\mathbf{X}$, which is conditional on some function of time-variable income, time-variable beliefs conditional on income, and N_t, the time-variable influence of others. The effect of the ith individual on the jth individual is given as an "acceleration" term in Eqn. 10, where p and q are some general functions. Acceleration in this context refers to the rate of change of the speed at which one individual or society as a whole "moves" towards or away from an idea or other influence.

$$(10) \quad \mathbf{e}_{ji} = \frac{q\left(\mathbf{F}_{ij}\right)}{p\left(n_j\right)} \, \boldsymbol{\mu}_{ji}$$

For a population comprised of multiple individuals, the net effect of the influence of others on the jth individual is given as Eqn. 11 (Johnson, 2015; Johnson 2016).

$$(11) \quad \mathbf{e}_{net} = \frac{j\mathbf{F}_{net}}{n_j}$$

For the jth individual, the utility maximization may be expressed by substituting Eqn. 11 into Eqn. 9 to yield Eqn. 12.

$$(12) \quad Max\left|U\left(\mathbf{X}\right)\right| = g\left(\mathbf{X}\right) \ s.t. \ h\left(Y_t, B_{t|Y}, \frac{j\mathbf{F}_{net}}{n_j}\right)$$

In society there may exist several consumer types, or sub-groups, relative to the issue of ethical behavior and belief. Such sub-groups are obviously comprised of individuals, and therefore the sub-group behavior is some sort of function of the individual behavior of their constituents. Sub-groups, however, may very well not only influence their constituents, but also individuals from other sub-groups. Over time and due to the conditions given in the h term in Eqn. 12, individuals may move from one sub-group into another any number of times. The net effect of any given sub-group may be due to the number of its constituents, or it may simply be due to "strength of message." That is, the herd effect can come from a large group to which people wish to adhere simply because it is a large group, regardless of the underlying belief, or it may come from a small group that has a particularly persuasive message. Expressing Eqn. 11 in terms of sub-groups, then, yields Eqn. 13, the net effect of all the sub-groups on the jth individual.

$$(13) \quad \mathbf{e}_{net} = \sum_{\lambda=1}^{\beta} \frac{j\mathbf{F}_{net,\lambda}}{n_j}$$

For the population as a whole, the net effect of all influence of sub-groups is given as:

$$(14) \quad \mathbf{e}_{net,pop} = \sum_{\lambda=1}^{\beta} \left\{ \sum_{j=1}^{\delta_\varepsilon} \frac{j\mathbf{F}_{net}}{n_j} \right\}$$

Eqn. 14 expresses the overall "movement" of the entire population due to the influence of each sub-group, which is a function of the income and belief terms of each of the individuals in the sub-group. Now, considering that the specific choice of the bundle containing the consumer good x and the altruistic good a has been proposed to be probabilistic and able to be represented by a Choice Wave, Eqn. 13 may be used to create a condition in Eqn. 6, which is given as Eqn. 15 (Johnson 2016).

$$(15) \quad \psi\left(\mathbf{X}\right)_{Y,t} = \begin{cases} P\left(\mathbf{X}|Y,t\right), \ s.t. \ h\left(Y, \sum_{\lambda=1}^{\beta} \frac{j\mathbf{F}_{net,\lambda}}{n_j}, B\big|_{t,Y}\right) & at \ the \ decision \ point; \\ P\left(\mathbf{X},Y,t\right), \ s.t. \ h\left(Y_t, \sum_{\lambda=1}^{\beta} \frac{j\mathbf{F}_{net,\lambda}}{n_j}, B_{t|Y}\right) & otherwise. \end{cases}$$

Eqn. 15 expresses the probabilistic decision strategy of an individual for the choice of bundle $\mathbf{X}$ containing a particular mixture of the consumer good x and the altruistic good a such that the individual's choice always maximizes utility at the decision point. The probability function, i.e., the specific functional form of the Choice Wave itself, is not only also a function of income, Y, it is also subject to individual beliefs, which are time dependent and income dependent, and also the net influence of the various sub-groups in the population. The conditions given in Eqn. 15 could just as easily be expressed in terms of the net influence of every other individual in society or in terms of the total effect of influence on society, i.e., Eqn. 14. However, in this instance, as it is a key assumption that sub-groups exist that have distinct views and resulting actions with respect to ethical behavior in the economy, and

that those sub-groups capture the effects of the collective influence of their constituents, expressing the condition in terms of sub-groups is more logical and useful.

The critical level of income, Y_{crit}, is the level of income such that the expenditure on the consumer good x is $\geq \alpha a$, i.e., it is sufficiently larger than expenditure on a by some factor α. That factor is admittedly subjective, but it represents a level at which there is a significant negative shift in decision strategies relative to ethical considerations.

Relating the Choice Wave multipoint gravitational equation conceptually to the utility exemplars in Eqns. 2-4, recall that Eqn. 2 is a modified Cobb-Douglas utility function such that there is a point of consumption past which utility decreases. In Eqn. 3, utility from increased consumption increases more rapidly than in a Cobb-Douglas function. In Eqn. 4, utility increases from consumption at an increasing rate because the rate of increase itself is stimulated by the level of consumption. In that framework, if Eqn. 2 is assumed to be the utility function of a representative consumer who is ethical, then the level of Y_{crit} is the point past which utility decreases, i.e., it is the maximum in Eqn. 2. Any consumption levels above that permitted by Y_{crit} by any consumer would be above the level associated with ethical decision strategies. That approach is inherently deterministic and also independent of interaction between individuals. The Choice Wave gravitational model, on the other hand, acknowledges that there exists some level of Y_{crit} that may be different for each individual or each sub-group (as an average of the constituents of that sub-group). Similar to the deterministic approach, the Choice Wave model allows for individual utility maximization at each decision point, even if that choice is not an ethical outcome. The Choice Wave approach does not impose a rigid functional form on the individual or sub-group. It is possible, however, that the expectation value predicted by the Choice Wave model may be equivalent to a standard utility functional form. A key difference in such a case is that the Choice Wave model permits possibility of choices other than that given by the deterministic form that is equivalent to the expectation value while still maximizing utility.

Discussion and Conclusions

This study developed a Choice Wave multipoint gravitational model of the scenario in which income and related consumption passed a certain critical level may cause an individual to shift behavior and decision strategies in an unethical direction. The gravitation component permitted the modeling of the effects of individual belief and the influence of others on both decision strategy and the functional form of the probabilistic decision equation. The decision equation itself was modeled as a Choice Wave, permitting individuals to make a variety of choices in a probabilistic way, each of which maximize utility at the decision point. Additionally, the gravitational component was also given in terms of sub-groups, each of which are statistically independent of each other regarding at least ethics, and each of which may as an entity influence other individuals. The effects of influence of others was then expressed for the economy as a whole as a means of modeling the overall societal trend regarding economic ethics.

Applied to empirical analysis, first α, the maximum acceptable ratio of consumption of the consumer good vs. the altruistic good, should be determined. That is admittedly a subjective consideration. The critical level of income is that at which it is found from a data set that the aforementioned ratio is met or exceeded. Sub-groups may be identified by determining, based on the data, if such potential sub-groups may be modeled by a Choice Wave such that each sub-group is statistically independent in an *n*-dimensional Hilbert space.

The Choice Wave gravitational model permits the modeling of an economy with respect to economic ethics in such a way that individuals are free to make various decisions, each with a certain probability, such that they always maximize utility at the decision point. It also accounts for the influence of other individuals and for the herd effect, in which a change in the probabilistic decision strategy of an individual may be influenced by the population as a whole and/or various sub-groups of the population. In this framework, the point past which an individual will choose to become unethical is not only individual but probabilistic. Although the effects of influence of others, including the herd effect, may result in society as a whole moving in a certain direction regarding ethics, it is still entirely possible for some individuals to continue to follow an ethical decision strategy. The case in which society as a whole is moving in an unethical direction marks a condition of excessive affluence in which society turns from ethical behavior towards behavior that is harmful to society and to the common good. Those who continue to follow an ethical decision strategy are in increased danger of modifying their own decision strategies in an unethical direction, as the probabilistic function that underlies their choice of decision strategy is both a function of the influence of others and their own beliefs. The condition of excessive affluence can be a contributing factor to prolonging and worsening an economic crisis. That in turn has a detrimental effect on the extant poor and may exacerbate the

poverty problem by moving some individuals from higher to lower socio-economic strata. In the context of the concept of excessive affluence, it is indeed ironic that too much wealth in some individuals or in society as a whole can lead to poverty or reduced financial well-being for many.

Biography

Rutherford Cd. Johnson is an economics lecturer at the University of Minnesota Crookston specializing in consumer behavior and economic geography. As a consultant, he has provided marketing, economic, media, and design services for various businesses and non-profits around the world. His research includes work on ethics in business, finance, and economics; regional geographical economic analysis incorporating GIS; and improving economic analysis through the inclusion of cultural analysis and consumer behavioral components.

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