ECONOMICS CANNOT ISOLATE ITSELF FROM POLITICAL THEORY: A MATHEMATICAL DEMONSTRATION

BRENDAN MARKEY-TOWLER

ABSTRACT. The purpose of this paper is to provide a confession of sorts from an economist to political science and philosophy. A confession of the weaknesses of the political position of the economist. It is intended as a guide for political scientists and philosophers to the ostensible policy criteria of economics, and an illustration of an argument that demonstrates logico-mathematically, therefore incontrovertibly, that any policy statement by an economist contains, or is, a political statement. It develops an inescapable compulsion that the absolute primacy and priority of political theory and philosophy in the development of policy criteria must be recognised. Economic policy cannot be divorced from politics as a matter of mathematical fact, and rather, as Amartya Sen has done, it ought embrace political theory and philosophy.

1. THE PLACE AND IMPORTANCE OF PARETO OPTIMALITY IN ECONOMICS

Economics, having pretensions to being a “science”, makes distinctions between “positive” statements about how the economy functions and “normative” statements about how it should function. It is a core attribute, inherited largely from its intellectual heritage in British empiricism and Viennese logical positivism (McCloskey, 1983) that normative statements are to be avoided where possible, and ought contain little by way of political presupposition as possible where they cannot. Political ideology is the realm of the politician and the demagogue.

To that end, the most basic policy decision criterion of Pareto optimality is offered. This criterion is weaker than the extremely strong Hicks-Kaldor criterion. The Hicks-Kaldor criterion presupposes a consequentialist, specifically utilitarian philosophy and states any policy should be adopted which yields net positive utility for society, any compensation for lost utility on the part of one to be arranged by the polity, not the economist, out of the gains to the other. Against such a criterion which clearly washes its hands of the actions of powerful entities in the polity, alongside the standard problems of utilitarianism (Sen, 1973; Fumagalli, 2013), Pareto optimality augurs only that any policy be adopted which leads to an at least indifferent state for all, and an improved state for at least one.

Aside from the presupposition (again) of a consequentialist philosophy, this appears quite a “weak” dictat, requiring not much by way of political presuppositions. It says nothing about who is to “lose” from policy, and only concerns “gain”. And yet such a weak dictat allows the economist to claim that by removing impediments to the perfect market (“market imperfections”), allowing

Key words and phrases. Political theory, political philosophy, economic theory, economic policy, Pareto optimality.
laissez-faire competition in markets free of extra-judicial governmental intervention, yields an “optimal” or “efficient” outcome for society. Because the first and second “welfare theorems” tell us (roughly) that within the strictures of the psychological model of the neoclassical rational agent, market “equilibria” are Pareto optimal (Mas-Collel et al., 1995): no individual can be made “better off” without making some other individual “worse off”.

If we restrict what constitutes a political statement to one which makes statements about when policies should be implemented which will lead to the disimprovement of some individual’s situation. Then economics appears to have made only a value judgement about who ought benefit from a policy (whosoever accrues such benefits). Not (by this restricted definition) a political statement. And yet it has still demonstrated markets free from government intervention, and free from imperfections are “optimal” and “efficient”.

But is the concept of Pareto optimality robust? Does it have any value as a criterion in the “real”, empirical world? Does it offer us a criterion for policy which does not make political statements as defined here, and allow for economics to be divorced from political theory? Indeed assert its priority and primacy therein?

The purpose of this work is to demonstrate logico-mathematically, therefore incontrovertibly that the answer is No. The mathematics of Pareto optimality itself provide an inescapable argument which compels us to recognise that even in the restricted form here, economics cannot but make political statements. Economics must recognise the absolute primacy and priority of political theory and philosophy in the development and implementation of policy.

The author is not a political scientist or philosopher, and offers no pretensions to being esteemed as such or even to being versed in the literature to such an extent as one would be. The author is an economist, neoclassically trained, and is offering a confession of the weakness of the political position held by the economics profession. What is offered is a guide for political scientists and philosophers to the exactitudes of the ostensible policy criterion of the economist, and an illustration, a mathematically rigorous and therefore incontrovertible illustration that this criterion offers no guide in empirical situations. That even political statements of a restricted nature must always be made by economists designing and implementing policy, and thus the concomitant compulsion to embrace political theory and philosophy as prior to any analysis of economic policy.

This confession ought not be read as purely negative. It is as much an affirmation of Professor Sen’s long-time collaboration with Professor Nussbaum, embracing political theory and philosophy as a means for developing a welfare economics with the intellectual richness of its foundation in the same, as it is a critique of economics. It ought be read as encouragement for both economists and political scientists and philosophers to continue the necessary development of Sen and Nussbaum’s endeavour.

The argument proceeds as follows. In the first succeeding section we consider some matters of definition as regards the weakest possible conception of Pareto optimality. In the second section
we relate this weakest form to that actually employed in neoclassical economics for policy analysis (specifically, the defence of \textit{laissez-faire} free markets corrected for “imperfections”). And we show how concerns begin to emerge as this criterion seems to deem as “efficient” or “optimal” extreme situations. Before we demonstrate, in the final substantive section, that in \textit{all} non-extreme empirical situations, \textit{all} states of the world are Pareto optimal, so that \textit{any} policy analysis in empirical reality must necessarily make political statements, \textit{even} in the restricted sense of those adopted here.

Finally, before we begin proper, we might do well to ask (and we will return again to the answer below); so what? Why do we care? Why should we care?

We should care that economics cannot usurp the primacy of political theory and philosophy in policy analysis because the delineation of economic science from political economy, the delineation of that fuzzy boundary between fact and value (Strauss, 1953), the seeking of “objectivity” is essential to a healthy political sphere (Sen, 1993). Something we may all agree is desperately needed given the current political situation in the democracies of the world. Undergraduate economists are still taught the concept of Pareto optimality as the basis for economic policy, professional economists still utilise it in research, it still forms the basis for the “proof” that laissez-faire markets (corrected for “imperfections”) are “efficient” or “optimal”. But there are no “ought” statements to be derived by the economist \textit{qua} economist devoid of political content, political presuppositions. To continue to pretend otherwise, by refusing to embrace political theory and philosophy and acknowledge the primacy and priority of political concerns in policy implementation lends to the pronouncements of the economist a false scientistic authority detrimental, even dangerous, for the process of public reasoning.

2. THE CONCEPT OF PARETO EFFICIENCY IN ITS WEAKEST FORM

The following conceptualisation of Pareto efficiency is a weaker form of the concept used in economic theory (Mas-Collel et al., 1995; Sen, 1970), because individual preferences are defined with respect to arbitrary sets of information contained within the state of society. We assume only that individuals care about Something. Not one particular Thing such as their acquisition of commodities.

We first take the polity:

\textbf{Definition 1.} \textit{N} is the set of all individuals in society.

And that which their politics concerns - the state of society.

\textbf{Definition 2.} \textit{S} is the set of all possible information contained within society, so that a set \(s \in 2^S\) (\(2^S\) being the set of all possible subsets of \(S\)) contains all extant information about a particular iteration of society and will be called the \textit{state of society}. \(S\) is an arbitrary topological space.
And the means by which individuals make judgements about that which their politics concerns. Their preferences over the information contained within the state of society.

**Definition 3.** Each individual \( i \in N \) has a complete and transitive preference relation \( \succeq_i \) defined over a set of preference-information \( S_i \subset S \) such that \( s_i \succeq s'_i \) can be read “individual \( i \) prefers preference information \( s_i \) at least as much as preference-information \( s'_i \).

Any particular set of preference-information \( s_i \subset S_i \) can be thought of as the state of society as viewed by individual \( i \). The set of preference-information for individual \( i \) is a subset of the information contained within a particular iteration of society, so \( s_i \subset s \subset S \).

A particular state of society \( s \) is a Pareto efficient if there is no other state of society \( s' \) for which one individual strictly prefers their preference-information \( s'_i \subset s' \) to that particular state \( s_i \subset s \), and the preference-information \( s'_j \subset s' \) in the other state \( s' \) is at least as preferred by every other individual \( j \neq i \).

**Definition 4.** A state \( s \in S \) is said to be *Pareto efficient* if and only if \( \nexists \ s' \in 2^S \& i \in N : s'_i \succ s_i \& s'_j \succeq s_j \forall j \neq i \in N \).

To put it crudely, a particular state of society is Pareto efficient if no individual can be made “better off” without making another individual “worse off”. A dynamic concept which mirrors this (and we will see provides an alternative definition of Pareto optimality) is the concept of a Pareto improvement - whereby a change in the state of society leaves everyone at least indifferent, and at least one individual in a preferable situation.

**Definition 5.** A movement between two states of society, \( s \rightarrow s' \) is called a *Pareto improvement* if and only if \( \exists i \in N : s'_i \succ s_i \& s'_j \succeq s_j \forall j \neq i \in N \).

Note that this does *not* imply that \( s' \) is a Pareto efficient state, because the same could potentially be said of a movement \( s' \rightarrow s'' \). The state \( s' \) is only a Pareto efficient state if we cannot find yet another state for which the movement to that state is a Pareto improvement. The following Theorem, quite well known, demonstrates this distinction and gives an alternative definition of Pareto efficiency.

**Theorem 1.** A state \( s \in 2^S \) is Pareto efficient if and only if there is no other state \( s' \) for which the movement \( s \rightarrow s' \) is a Pareto improvement.

If one adheres to a consequentialist political doctrine (such as classical utilitarianism) rather than a deontological doctrine (such as liberalism) in which action is guided by some categorical imperative other than consequentialism, the guide offered by Pareto improvement is the least controversial, and least politically committal criterion to decision-making one can find. Indeed if we restrict political statements to those which concern the assignation of *losses*, it is a-political. It makes a value judgement only about who ought *gain* (whosoever stands to).
Unless one holds a strict deontological doctrine in the style, say, of Nozick (1974) (in which the maintenance of individual freedom is the categorical imperative), or Rawls (1971) (in which again individual freedom is the primary categorical imperative and the betterment of the “poorest” the second categorical imperative), it is more difficult to argue against implementing some decision which will cause a change of society which all individuals in society will be at worst indifferent to. Than arguing for some decision rule which will induce a change of society which some individual will find less preferable. To the rationalistic economist it seems almost petty, certainly irrational to argue against this criterion, like those individuals who demand “fairness” in the famous “dictator” experiment rather than accept someone else becoming “better off”, and themselves no “worse off”.

3. The Concept of Pareto Efficiency in Welfare Economics

Now we will turn to the concept of Pareto efficiency employed in its far stronger form in welfare economics. The economic system is a social system in which commodities are exchanged. Sets of these commodities can be represented by vectors \( x \) within a metric space \( X \) contained within the non-negative orthant of an Euclidean space \( \mathbb{R}^{N_x}_+ \) of dimensionality \( N_x \) equal to the number of such commodities.

**Definition 6.** An allocation \( \{x_i\}_{i \in N} \subset X \subset \mathbb{R}^{N_x}_+ \) of commodities in society is a set of vectors \( x_i \) representing the commodities allocated within the economic system to each individual \( i \in N \).

In questions of welfare economics at least in all practical policy matters, the state of society is equated with this allocation, that is, \( s = \{x_i\}_{i \in N} \), and the set of all possible information concerning the economic state of society is \( S = X \). It is typically taken to be the case that the individual’s preference-information is simply their allocation \( x_i, s_i = x_i \). The concept of Pareto efficiency is thus narrowed from that above to what we may call “neoclassical Pareto efficiency” for the school of economic thought in which originates, and to distinguish it from the weaker criterion.

**Definition 7.** An allocation \( \{x_i\}_{i \in N} \) is said to be neoclassical Pareto efficient if and only if \( \exists i \in N : x'_i > x_i \land x'_j \geq x_j \forall j \neq i \in N \).

This is consistent with the definition given by standard economics texts, being a preference-axiomatic form statement of Pareto optimality in Definition 10.B.2 by Mas-Collel et al. (1995, p.313). The concept of Pareto improvement can be narrowed to “neoclassical Pareto improvement” in the same manner.

**Definition 8.** A movement between two allocations, \( \{x_i\}_{i \in N} \rightarrow \{x'_i\}_{i \in N} \) is called a neoclassical Pareto improvement if and only if \( \exists i \in N : x'_i > x_i \land x'_j \geq x_j \forall j \neq i \in N \).

\( ^1 \)For the unindoctrinated, imagine \( N_x \)-many rulers laid out next to each other, \( \mathbb{R}^{N_x}_+ \) are these rulers, \( x \) a set of points marked off on each of them.
For technical reasons it is almost always in practice assumed for simplicity that individual preference relations are monotonically increasing across the space of commodities.

**Definition 9.** If individual preferences are monotonically increasing then \( x'_i \succeq_i x_i \iff x'_i \geq x_i \), and \( x'_i > x_i \iff x_i > x'_i \).

This is problematic, because a normative economics guided by the principle of implementing a decision if it yields a neoclassical Pareto improvement where individuals have such preference relations above leads to the following situation.

**Theorem 2.** Suppose that individual’s preference-information is their own allocation of commodities, and that their preferences are monotonically increasing. Take one individual \( j \in N \) and an initial allocation \( \{x_i\}_{i \in N} \).
- A series of movements between allocations \( \{x_i\}_{i \in N} \rightarrow \{x'_i\}_{i \in N} \) such that \( x_i \neq j = x'_i \forall t \) and \( x'_i > x_j \forall t \) and therefore that \( x_j - x_i \to \infty \forall i \neq j \in N \), are neoclassical Pareto improvements.
- Furthermore, if these movements are made possible only by the discovery of new commodities, each individual state in the movement is neoclassical Pareto efficient prior to the next discovery if the first allocation was neoclassical Pareto efficient.

Admittedly perhaps not to the economic theorist, but to most this seems a rather dubious outcome. It means that if we are guided by neoclassical Pareto efficiency it is acceptable, indeed desirable, that one individual within society be made increasingly “richer” without end and without increasing the wealth of others. Provided only the wealth of others does not decrease. The same result would hold if instead of an individual, we made a whole group, or indeed the whole of society “better off”, without making anyone else “worse off”.

Even the most devoted disciple of Ayn Rand would find this situation dubious, for there is no requirement that the individual in question be in some sense “deserving” of their riches. But it is perfectly logically consistent with Pareto optimality if individual preferences concern only to their allocation, alone, independent of others. The fact that neoclassical Pareto improvements are distribution-invariant because the polity is supposed to care only about their own individual allocation, alone rather than broader states of society \( s_i \subset s \) as they see it.

To avoid such awkward results, the economist may move from the preference-axiomatic concept of Pareto efficiency to embrace utilitarianism. The policy criterion (actually not immediately representative of Bentham’s surprisingly subtle statement) being the maximisation of some combination \( W(x) = W \left( \{u_i (x_i)\}_{i \in N} \right) \) of individual utilities \( u_i (x_i) \) over allocations. The “social psychic wellbeing” metric known as the Social Welfare Function.

\(^2\)Since \( x_i \) is a vector, \( x_i > x'_i \) acquires the special meaning that each element of \( x_i \) is at least as large as \( x'_i \) and at least one element is strictly greater.
In theory, the maximisation of $W(x)$ would, given the “right” assumptions on the combination method $W(\cdot)$ (sum, multiplication, maximin etc.) and utilities (concavity, monotonicity, independence etc.) fail to condone a distribution of commodities $x$ extreme as that discussed above. By dint of its failure to maximise social welfare $W(x)$. But to obtain this egalitarian sensitivity to the distribution of income, three properties of Social Welfare Functions are introduced. Which prove fatal to the a-politicality of the economist’s policy advice, and introduce presuppositions which must lay naked upon the political passions of the economist, so much more indecently for their hazy concealment under the technicalistic canopy of functional mathematics.

Firstly, it is so famous a result as to be called the “third theorem of welfare economics” that any such function $W(\cdot)$ as has certain “uncontroversially” desirable technical properties\(^3\) will impose upon the polity $N$ the preferences of a dictator $i \in N$ within it. Arrow’s famed “impossibility” theorem (Arrow, 1951; Sen, 1970; Geanakoplos, 2005; Reny, 2001; Man and Takayama, 2013). The preference of one individual $i \in N$ will serve to determine the preference indicated between by society between different states by $W(x)$. In practice, the preferences of the economist, who decides upon the form of $W(\cdot)$ and thus imposes their particular political passions (be they egalitarian or otherwise) upon policy, deeming what is “socially optimal” by the different weightings assigned to individual utilities $u_i(\cdot)$ within the polity. An excellent example of this is Diamond and Saez (2011), who demonstrate the “social optimality” of a 90% top taxation rate by assuming outright that the wellbeing of the wealthiest contributes nothing at the margin to social welfare\(^4\).

But the political presuppositions imported by the economist go deeper in fact than this. Utilitarianism which allows for inter-personal comparisons of utility in the construction of $W(x)$ requires utility functions be “cardinal” - representing “how much” utility one derives from commodities over and above the bare preference between different sets thereof. Utility is an extremely vague concept, because it was constructed to represent a common hedonistic experiential metric where the very existence of such is uncertain in the first place (Fumagalli, 2013). In practice, the economist decides upon, extrapolates, assigns to $i \in N$ a particular utility function which imports yet further assumptions about how any one individual values their commodity allocation, and thus contributes to social psychic wellbeing.

And finally, utilitarianism not only makes political statements about who in the polity is to be assigned a disimproved situation. It makes statements so outlandish and outrageous to the common sensibility as to have provided the impetus for two of the great systems of philosophy of justice in

\(^3\)As Sen (1970) lists them: unrestricted domain in $S$, the “Pareto property” (condoning Pareto improvements), and independence of irrelevant alternatives in preference between any two alternatives in $S$.

\(^4\)It is interesting to note that total confiscation is only not condoned there as “socially optimal” for it does not trade losses from avoidance behaviour against revenues raised as tax rates are increased so as to maximise revenue from this source.
modernity - those of Rawls (1971) and Sen (1999, 2009). Under almost any combination method $W(\cdot)$, the maximisation of $W(\cdot)$ demands allocation to those most able to realise utility from their allocation. It would demand, for instance, redistribution of commodities from sick children to the hedonistic libertine, for the latter can obtain greater “utility” there from. A problem so severe in its political implications it provided the basic impetus for Rawls’ and Sen’s systems. A Theory of Justice is, of course, a direct response to the problematic political content of utilitarianism.

So Pareto optimality stands as the best hope for the economist to make a-political statements about policy, refraining from making statements therein concerning the assignation of disimprovements in the situation of any individual. Yet if applied to preferences over individual allocations alone it condones some extreme situations of dubious political desirability across the spectrum of political theory and philosophy. But how robust a guide is it when we allow the polity to be concerned with states of society in general? Not only their own individual allocation of commodities. As they must be in the process of public reasoning in every political philosophy from Plato to Popper and beyond. We will see now, not at all. In all empirical situations Pareto optimality offers no guide to policy-making, for policymaking must inevitably make value judgements about who is to be assigned disimprovement in their situation.

4. Under what conditions are Pareto improvements possible in economic decision making about allocation?

Let us now broaden our view to a weaker conception of Pareto one in which we no longer restrict ourselves to assume that individuals care only about their own allocation of goods and resources. Any economic decision making is ultimately a decision to implement a movement between two allocations $\{x_n\}_{n \in N} \rightarrow \{x'_n\}_{n \in N}$, the question whether the associated movement between two states of society $s \rightarrow s'$ associated with this movement between two allocations is a Pareto improvement.

Because we are focussed on problems of economic decision making at the societal level, let us suppose that the set of commodities $X \subset \mathbb{R}^N_+$ is contained within the set of information about society $X$ (so that $X \subset S$), and that the allocation $\{x_n\}_{n \in N}$ is contained within the set of information for any particular state of $s$ (so that $\{x_n\}_{n \in N} \subset s$). It seems reasonable to suppose that $s$ will contain also any number of transformations of this allocation $\{x_n\}_{n \in N}$. For instance, the statistical transformations which produce the summary statistics of the allocation.

Let us now hold society outside of the economy constant so that we may restrict ourselves to scenarios in which the preference-information of individuals contains only some single-valued, individual-specific transformation $f_i : \{\{x_n\}_{n \in N}\} \rightarrow \mathbb{R}$ of the possible allocations $\{\{x_n\}_{n \in N}\} \subset X$ of society. We might think of $f_i$ as representing something like the process of reasoning applied by $i$ to the allocation $\{x_n\}_{n \in N}$ of commodities in the economic system in order to arrive at that

5The system of Dworkin (1981a,b), like that of Sen (1999, 2009), being developed as a constructive response to Rawls (1971) too could be construed as a reaction to the (to the common sensibility) outlandish policies condoned by utilitarianism.
information $f_i \left( \{x_n\}_{n \in N} \right)$ on whose basis they will form their preferences about the state of society. Let us also suppose without great loss of generality that individual preferences over that preference-information is monotonically increasing.

Hence for what follows we may effectively restrict our attention to scenarios in which $\succeq_i$ is defined for $s_i = f_i \left( \{x_n\}_{n \in N} \right)$ and monotonically increasing over the same.

**Definition 10.** If preferences are increasing over individual-specific transformations of allocations of commodities $f_i$, and the non-economic state of society is held constant (and thus effectively irrelevant), then $f_i \left( \{x_n\}_{n \in N} \right) \succeq f_i \left( \{x'_n\}_{n \in N} \right)$ if and only if $f_i \left( \{x_n\}_{N} \right) \geq f_i \left( \{x'_n\}_{n \in N} \right)$, and $f_i \left( \{x_n\}_{n \in N} \right) \succeq f_i \left( \{x'_n\}_{n \in N} \right)$ if and only if $f_i \left( \{x_n\}_{n \in N} \right) > f_i \left( \{x'_n\}_{n \in N} \right)$.

We can restate the definition of Pareto improvement for this class of situations accordingly.

**Definition 11.** A movement between two states of society, $s \rightarrow s'$ is called a Pareto improvement if and only if $\exists i \in N : f_i \left( \{x'_n\}_{n \in N} \right) \succ f_i \left( \{x_n\}_{n \in N} \right) \& f_j \left( \{x'_n\}_{n \in N} \right) \geq f_j \left( \{x_n\}_{n \in N} \right) \forall j \neq i \in N$.

Neoclassical Pareto improvements are a special case of this definition, specifically that special case where $x_i = f_i \left( \{x_n\}_{n \in N} \right) \forall \{x_n\}_{n \in N} \subset X$. While we are restricting our analysis here to changes in the economic state of society, this restriction still models a relatively general set of situations with respect to the individual preferences upon which Pareto efficiency is predicated.

For instance, it is widely accepted in behavioural economics, and has been for known for over a century (Veblen, 1899; Duesenberry, 1949; Hirsch, 1977; Kahneman and Tversky, 1979; Easterlin, 2001; Ariely, 2008; Clark et al., 2008; Frank, 2011; Layard, 2011; Barberis, 2013), that individual preferences are not defined for absolute allocation of commodities, but rather allocation relative to some reference point or “anchor”. Often, this reference point or anchor is other’s consumption patterns, in which case we have, for instance

$$f_i \left( \{x_n\}_{n \in N} \right) = \frac{x_i}{x^*}$$

The reference point $x^*$ may be the arithmetic mean of population consumption, $\frac{1}{|N|} \sum_{n \in N} x_n$, or alternatively the arithmetic mean over that portion of the population which is in the “neighbourhood” of the individual in question.

We may now establish when a movement between two states of society constitutes a Pareto improvement in this context.

**Theorem 3.** Suppose that we have a movement between two states of society $\{x_n\}_{n \in N} \rightarrow \{x'_n\}_{n \in N}$ such that $\exists \{i\} \subset N : x'_i > x_i$ and $x'_j \leq x_j \forall j \in N \setminus \{i\}$, and that individuals have monotonic preferences $\{\succeq_i\}_{i \in N}$ over the individual-specific preference-information $f_i \left( \{x'_n\}_{n \in N} \right)$. The movement is a Pareto improvement if and only if

---

6Technically speaking of course, if $x \in \mathbb{R}_+^N : N > 1$ we really ought write this in linear algebraic form: $f_i \left( \{x_n\}_{n \in N} \right) = x_i [x^*]^{-1}$. The reference point expression would remain unchanged if it is the arithmetic mean.
\[
\frac{f_k \left( \{x_n\}_{n \in N} \right) - f_k \left( \{x_n\}_{n \in N} \right)}{x_i' - x_i} \geq 0 \quad \forall k \in N, \; i \in \{i\} \subset N
\]

and

\[
\frac{f_k \left( \{x_n\}_{n \in N} \right) - f_k \left( \{x_n\}_{n \in N} \right)}{x_j' - x_j} \leq 0 \quad \forall k \in N, \; j \in N \setminus \{i\}
\]

with strict inequality in either case for at least one \(k' \in N\).

The conditions as sufficient are somewhat less interesting than they are as necessary. If the conditions are not met, the movement between two states of society is not a Pareto improvement. If they are not met for every possible movement between two states of society, then every state of the world is a Pareto optimal state.

**Corollary 1.** If within the confines of the conditions to which Theorem 3 applies, the necessary and sufficient conditions for Pareto improvement fail to hold for every movement \( \{x_n\}_{n \in N} \rightarrow \{x_n'\}_{n \in N} \) between two states of society, then every state of society \( \{x_n\}_{n \in N} \) is Pareto optimal.

Now let us consider what the necessary and sufficient conditions of theorem 3 demand of each individual’s process of reasoning \( f_k (\cdot) \) about the economic state of society \( \{x_n\}_{n \in N} \). When \( k \in \{i\} \subset N \) and the individual is within the set of those who face an increased allocation of commodities, they are fairly obvious, fairly reasonable conditions. The first inequation states simply that the individual \( k \) form an assessment \( f_k \left( \{x_n'\}_{n \in N} \right) \) of the economic state of society \( \{x_n'\}_{n \in N} \) which is increasingly preferable or indifferent “in” (with respect to, as a result of) the increase of their own increased allocation of commodities, and those of their peers within the set \( \{i\} \subset N \) of those who face an increased allocation of commodities. The second inequation requires that the individual \( k \) form an assessment \( f_k \left( \{x_n'\}_{n \in N} \right) \) of the economic state of society \( \{x_n'\}_{n \in N} \) which is indifferent or decreasingly preferable “in” (with respect to, as a result of) the increase of the increased allocation of commodities to those within the set \( k \in N \setminus \{i\} \) of those who face decreased allocation of commodities. Which is essentially (and rather crudely) to say that they must find the increase of their own commodities desirable, and find indifferent or preferable the increase or decrease of commodities to others as necessity for Pareto improvement has it.

On the other hand, when we consider \( k \in N \setminus \{i\} \) and the individual is within the set of those who face an decreased allocation of commodities, these conditions become both far more interesting, and also rather far-fetched. The first inequation requires that the individual \( k \) form assessment \( f_k \left( \{x_n'\}_{n \in N} \right) \) of the economic state of society \( \{x_n'\}_{n \in N} \) which is increasingly preferable or indifferent “in” (with respect to, as a result of) the increase of allocation to those of the individuals within the set \( \{i\} \subset N \) of those who face decreased allocation of commodities. Which is essentially (and rather crudely) to say that they must find the increase of their own commodities desirable, and find indifferent or preferable the increase or decrease of commodities to others as necessity for Pareto improvement has it.

\[\text{Corollary 1.} \] If within the confines of the conditions to which Theorem 3 applies, the necessary and sufficient conditions for Pareto improvement fail to hold for every movement \( \{x_n\}_{n \in N} \rightarrow \{x_n'\}_{n \in N} \) between two states of society, then every state of society \( \{x_n\}_{n \in N} \) is Pareto optimal.

\[\text{Though, as we will discuss below, this latter requirement even is somewhat dubious}\]
\( \{x_n\}_{n \in N} \) which is increasingly preferable or indifferent “in” (with respect to, as a result of) the increase of their own decreased allocation of commodities, and those of their peers within the set \( N \setminus \{\{i\}\} \) of those who face an weakly decreased allocation of commodities.

Now we see that these conditions are quite strong, to the extent that we might humorously refer to them as the “Kumbaya”, the “hakuna matata” or “blissful ignorance” conditions. A polity characterised by these conditions would be a utopian society. Literally. In the sense that utopia stems from the ancient Greek for “no-place”. Or, more seriously, we might call them the “universal, unconditional altruism/ignorance”, or in a more sinister nomenclature the “Brave New World/concealment” condition. They require, essentially, that every individual in society find it preferable, at least indifferent to see some other individual acquire a increased commodity allocation - become “better off” - if that is what is happening to that other individual. Hence the necessity of “universal, unconditional altruism”, or “ignorance”. But they also require at the same time that every individual in society find it preferable, or at least indifferent that they themselves or some other individual acquire a decreased commodity allocation - become “worse off” - if that is what is happening to themselves or that other individual. Hence “Brave New World” or “concealment”, if the decreased allocation is to be concealed from the necessary individuals to enforce by default their indifference. Such a polity is at once the most “Christian” and the least “Christian” of nations (in the naive old fashioned sense of that word), for as the necessity for Pareto optimality requires it, the movement of society either inspires charitable feelings, pleasure at the dispossession of others, or ignorance.

These conditions would outlaw the holding to by any in the polity of the whole of Leftist politics (Judt, 2010), which most definitely calls for not for a universal altruism, rather either an altruism of the “rich” toward the “poor”, or the coercion of the “rich” by the “poor” on the basis that the “poor” do not find increased commodity allocation to one group preferable. One is reminded of the final few lines of Marx and Engels (1848):

“Let the ruling classes tremble at a Communistic revolution. The proleterians have nothing to lose but their chains. They have a world to win. WORKING MEN OF ALL COUNTRIES, UNITE!”

They would also outlaw the holding to by any in the polity of the whole of Rightist as well as the stronger liberal politics (Mill, 1859; Strauss, 1953; Lucas, 1965; Nozick, 1974), which would resist

---

8Recall the exquisitely disturbing conditioning spoken to genetically engineered children grown in a test-tube as they sleep in Brave New World:

“Alpha children wear grey. They work much harder than we do, because they’re so frighteningly clever. I’m really awfully glad I’m Beta, because I don’t work so hard. And then we are much better than the Gammas and the Deltas. Gammas are stupid. They all wear green, and Delta children wear khaki. Oh no, I don’t want to play with Delta children. And Epsilons are too stupid to be able to read or write. Besides, they wear black, which is such a beastly colour. I’m so glad I’m a Beta”.

Aldous Huxley, Brave New World, pp.24-25 (Flamingo Huxley Centenary edition)
the wholesale coercion of the “rich” (or otherwise “deserving”) in a redistribution of commodities away from them toward the “poor”. And most certainly anarchism, which would reject as at all desirable any coercion in the allocation of resources [Marshall, 1992].

It is an empirical fact, already discussed, that assessments of the economic state of society take a form similar to

\[ f_k \left( \{x_n\}_{n \in N} \right) = \frac{x_k}{x^*} \]

indicating relativity of individual assessments of society to some reference point. The reference point \( x^* \) being, for instance, the arithmetic mean of population consumption, \( \frac{1}{|N|} \sum_{n \in N} x_n \). Such that if there is some movement in which \( \exists i \in N : x'_i - x_i > 0 \)

\[ \frac{f_k \left( \{x'_n\}_{n \in N} \right) - f_k \left( \{x_n\}_{n \in N} \right)}{x'_i - x_i} < 0 \]

As others in society are allocated more by way of commodities, the reference point rises, the relative standing of the individual deteriorates, their assessment of society constitutes a disimprovement.

It is quite easy to rationalise this empirical fact. It is well known, and has been well known since Hirsch (1977) that economic outcomes depend on relative standing in the distribution of acquired commodities. The obtention of a job, the ability to obtain certain commodities such as education at an elite school, indeed the obtention of any commodity which is finite, all depend on the ability of the individual to “outbid” others, and this in turn depends on their relative standing in the distribution of commodities acquired. The more others gain in their allocation, the more the individual’s position in the distribution deteriorates, and with it, their ability to obtain commodities.

It is also a well known characteristic that the acquisition of commodities reflects the selection within the evolutionary process in economies of an increasingly (in the absence of any intervention or response by competitors) dominant entity [Nelson and Winter, 1982; ?], whose economic dominance of other entities under certain conditions only increases the more they are selected (?). And it is not mere conspiracy theory, but fact that concentration of commodities to certain entities in the polity endows them with political power as well as economic predominance (Cardinale and Coffman, 2014; Cardinale, 2015). As the evolutionary process increasingly allocates commodities to an increasingly dominant entity, the ability of this entity to dominate the polity through politics and economics increases at the expense of the individual.

We can fairly safely conclude therefore that in empirical reality, there is no movement between economic states of society which constitutes a Pareto improvement. Unless all members of the polity are indifferent to the movement (highly unlikely), there will always be at least one individual who arrives, through their process of reasoning, at an assessment of the movement as yielding a disimprovement.

9Because if \( f_k \left( \{x_n\}_{n \in N} \right) = \frac{x_k}{x^*} \), then \( f_k \left( \{x'_n\}_{n \in N} \right) - f_k \left( \{x_n\}_{n \in N} \right) \leq 0 \), and if \( x^* = \frac{1}{|N|} \sum_{n \in N} x_n \) then \( \frac{x^* - x'}{x'_i - x_i} \geq 0 \) and so

\[ \frac{f_k \left( \{x'_n\}_{n \in N} \right) - f_k \left( \{x_n\}_{n \in N} \right)}{x^* - x'} \times \frac{x^* - x'}{x'_i - x_i} \]
less preferable state of society. And thus, by corollary[1] all states of the world in empirical reality are Pareto optimal.

If every state of society is Pareto optimal, no policy can be implemented which does not either leave all in the polity indifferent, or at least one facing a disimprovement in their assessment of the state of society. Policies which cause a movement between economic states of society, if they are to change anything at all with respect to preferability, will necessarily dispossess some individual of a preferable assessment of the state of society. Economic policy must therefore always statements about the assignation of disimprovements to this individual or that. Even if we restrict what constitutes a political statement to statements which augur the deprivation of some individual, assign to them disimprovements, the formulation and implementation of economic policy cannot therefore avoid making political statements.

5. THE PROPER PLACE OF ECONOMICS, AND WHY IT MATTERS

Is the concept of Pareto optimality robust? Does it have any value as a criterion in the “real” empirical world? Does it offer us a criterion for policy which does not make political statements, and allow for economics to be divorced from political theory, and even assert its priority and primacy therein?

The present work has demonstrated logico-mathematically, incontrovertibly, that the answer is No. We are compelled inescapably by the mathematics of Pareto optimality itself to recognise that in all empirical situations economics cannot not even make political statements of a restricted nature - about the assignation of “losses” - let alone of an unrestricted nature - making value judgements about the assignation of “gains”. This conclusion we arrived at by recognising that when we allow the polity to form their assessments of the desirability of social states, the empirical reality of those assessments means that all states of the world are Pareto optimal. There is no policy to be implemented which affects a non-neutral change in the economic states of society which does not assign disimprovement to some individual’s assessment of the economic state of society. Economics cannot be divorced from politics, and it the absolute primacy of political theory and philosophy in the development and implementation of policy must be recognised. We cannot escape the compulsion to embrace political theory and philosophy as prior to any analysis of economic policy.

So what? Why should we care? We should care because separating what is economic science from what is political economy, firming as far as possible the fuzzy boundary between fact and value (Strauss, 1953), seeking thereby “objectivity” is essential to a healthy political sphere (Sen, 1993). The process of public reasoning is predicated on there being some degree of objectivity in the views put forth therein Sen (2009).

The democracies of the world sorely need a basic restoration of health to their processes thereof, being in (and having been for some time - see Habermas (1962)) a crisis of superficial and corrosive
public discourse constituted by competing demagoguery on the part of human mouthpieces for powerful and moneyed elements of the polity. Demagoguery which will use whatever tools it can in desperation to occupy a privileged place in the prejudices of the public, including a false scientistic, faux objective authority such as offered by economic policy analysis proceeding on the basis of “a-political”, scientific economics guided by the search for Pareto optimality.

The fact that such authority is assumed by statements which are yet political of necessity while appearing ostensibly not so is corrosive to the public debate by obscuring what is fact and what is value, and thereby usurping the authority which is due to political theory and philosophy in the public debate. We have shown there are no “ought” statements to be derived by the economist devoid of political presuppositions. Yet undergraduate economists are still taught the concept of Pareto optimality as the basis for economic policy, professional economists still utilise it in research, it still forms the basis for the “proof” that laissez-faire markets (corrected for “imperfections”) are “efficient” or “optimal”.

Still yet the argument we have made ought not be seen as purely negative. It is as much an affirmation of the collaboration of Professors Sen and Nussbaum, placing political theory and philosophy at the foundation of welfare economics and thus obtaining the intellectual richness contained within for economics, as it is a critique of economics. It ought be read as encouragement for both economists and political scientists and philosophers.

Far better for the sake of the process of public reasoning that economists recognise the absolute primacy and priority of political theory and philosophy in the formulation and implementation of policy. As was stated at the outset of this work, to continue to pretend otherwise lends to the pronouncements of the economist a false scientistic authority detrimental, even dangerous, for the process of public reasoning. Far better for economists to engage fully with political theory and philosophy in the manner of Sen (1999, 2009) in developing a new welfare economics. Expanding on the efforts of Professors Sen and Nussbaum in particular to integrate into a system a set of an intellectually rich, reasoned positions regarding the political theory, and political philosophy of economics.

6. Appendix: Proofs of Theorems

6.1. Proof of Theorem 1

Proof. (Necessity): Suppose, by way of contradiction, that there exists another state \( s' \) for which the movement \( s \rightarrow s' \) is a Pareto improvement. Then, by definition \( \exists i \in N : s'_i \succ s_i \& s'_j \succeq s_j \ \forall j \neq i \in N \), and so \( \exists s' \in 2^S \& i \in N : s'_i \succ s_i \& s'_j \succeq s_j \ \forall j \neq i \in N \). But then \( s \) could not be Pareto efficient. Hence a state \( s \in 2^S \) is Pareto efficient only if there is no other state \( s' \) for which the movement \( s \rightarrow s' \) is a Pareto improvement.

(Sufficiency): If we can find no state \( s' \) for which the movement \( s \rightarrow s' \) is a Pareto improvement, there exists no state \( s' \) for which \( \exists i \in N : s'_i \succ s_i \& s'_j \succeq s_j \ \forall j \neq i \in N \). Therefore \( \not\exists s' \in 2^S \ & i \in N : \)
there is no state

\[ s_i' > s_i \\ & s_j' \geq s_j \ \forall \ j \neq i \in N, \] and so \( s \) is a Pareto efficient state. Hence a state \( s \) is Pareto efficient if there is no state \( s' \) for which the movement \( s \rightarrow s' \) would be a Pareto improvement. \hfill \Box

6.2. Proof of Theorem 2

Proof. The movement between two allocations, \( \{x_i\}_{i \in N} \rightarrow \{x'_i\}_{i \in N} \) is a neoclassical Pareto improvement if and only if \( \exists i \in N: x'_i > x_i \& x'_j \geq x_j \ \forall \ j \neq i \in N \). Let us allocate more commodities to \( j \) in a movement \( \{x_i\}_{i \in N} \rightarrow \{x'_i\}_{i \in N} \) such that \( x'_j > x_j \) while holding all other allocations constant, so that \( x_i = x'_i \ \forall \ i \neq j \in N \). Since individuals have monotonically increasing preferences over only their own allocation, \( x'_j \succ j x_j \), while \( x_i \succeq x_i \ \forall \ i \neq j \in N \). Hence the movement in question is a neoclassical Pareto improvement. We can repeat the argument again to verify that another such movement between allocations is a neoclassical Pareto improvement. This can continue ad infinitum, and the first argument is established.

Now suppose that the first allocation was neoclassical Pareto efficient. If we now discover new commodities and allocate them entirely to individual \( j \), by the argument above we implement a neoclassical Pareto improvement. But if we have now allocated the new commodities entirely to individual \( j \), the only movement between allocations in the absence of any discovery of new commodities can be to redistribute the existing allocation. Any such redistribution will entail a movement \( \{x_i\}_{i \in N} \rightarrow \{x'_i\}_{i \in N} \) between allocations whereby \( x'_j > x_j \) for at least one \( j \) and \( x'_i < x_i \) for at least one \( i \). Since preferences are monotonically increasing this means that \( x'_j > j x_j \) and \( x'_i \prec i x_i \), hence \( x'_i \not\equiv x_i \), in which case this movement is not a neoclassical Pareto improvement. Since this applies to any redistribution of the existing allocation, no movement is a neoclassical Pareto improvement, and by Theorem 1 the allocation arrived at by allocating all newly discovered commodities to \( j \) is neoclassical Pareto efficient prior to any further discovery. This establishes the second argument. \hfill \Box

6.3. Proof of Theorem 3

Proof. The movement \( \{x_n\}_{n \in N} \rightarrow \{x'_n\}_{n \in N} \) such that \( \exists \{i\} \subset N: x'_i > x_i \) and \( x'_j \leq x_j \ \forall \ j \in N \setminus \{i\} \) is a Pareto improvement if and only if

\[
 f_k \left( \{x'_n\}_{n \in N} \right) \geq f_k \left( \{x_n\}_{n \in N} \right) \ \forall \ k \in N \\
\& \exists k' \in N : f_{k'} \left( \{x'_n\}_{n \in N} \right) > f_{k'} \left( \{x_n\}_{n \in N} \right)
\]

Now if preferences are monotonically increasing over individual-specific preference-information then we can say in fact that the movement will be Pareto optimal if and only if

\[
 f_k \left( \{x'_n\}_{n \in N} \right) - f_k \left( \{x_n\}_{n \in N} \right) \geq 0 \ \forall \ k \in N \\
\& \exists k' \in N : f_{k'} \left( \{x'_n\}_{n \in N} \right) - f_{k'} \left( \{x_n\}_{n \in N} \right) > 0
\]

This in hand we can demonstrate the necessary and sufficient conditions:
(Necessity): Suppose, by way of contradiction that

\[ \exists k \in n, i \in \{i\} \subset N : \frac{f_k (\{x'_n\}_{n \in N}) - f_k (\{x_n\}_{n \in N})}{x'_i - x_i} < 0 \]

or

\[ \exists k \in n, j \in N \setminus \{i\} : \frac{f_k (\{x'_n\}_{n \in N}) - f_k (\{x_n\}_{n \in N})}{x'_j - x_j} > 0 \]

or there is no strict inequality in either case for at least one \( k' \in N \). Take each case in turn. First, if

\[ \exists k \in n, i \in \{i\} \subset N : \frac{f_k (\{x'_n\}_{n \in N}) - f_k (\{x_n\}_{n \in N})}{x'_i - x_i} < 0 \]

Then as \( \{i\} \subset N : x'_i > x_i \implies x'_i - x_i > 0 \) we must have that \( f_k (\{x'_n\}_{n \in N}) - f_k (\{x_n\}_{n \in N}) < 0 \), which contradicts the movement \( \{x_n\}_{n \in N} \to \{x'_n\}_{n \in N} \) being a Pareto improvement. Second, if

\[ \exists k \in n, j \in N \setminus \{i\} : \frac{f_k (\{x'_n\}_{n \in N}) - f_k (\{x_n\}_{n \in N})}{x'_j - x_j} > 0 \]

Then as \( x'_j \leq x_j \forall j \in N \setminus \{i\} \implies x'_j - x_j \leq 0 \) we have must that \( f_k (\{x'_n\}_{n \in N}) - f_k (\{x_n\}_{n \in N}) < 0 \), which contradicts the movement \( \{x_n\}_{n \in N} \to \{x'_n\}_{n \in N} \) being a Pareto improvement. Finally, suppose there is no strict inequality in either case for at least one \( k' \in N \), so that

\[ \frac{f_k (\{x'_n\}_{n \in N}) - f_k (\{x_n\}_{n \in N})}{x'_i - x_i} = 0 \forall k \in N, i \in \{i\} \subset N \]

and

\[ \frac{f_k (\{x'_n\}_{n \in N}) - f_k (\{x_n\}_{n \in N})}{x'_j - x_j} = 0 \forall k \in N, j \in N \setminus \{i\} \]

Or, collapsing these to one expression:

\[ \frac{f_k (\{x'_n\}_{n \in N}) - f_k (\{x_n\}_{n \in N})}{x'_{k} - x_n} = 0 \forall k, n \in N \]

But then \( f_k (\{x'_n\}_{n \in N}) - f_k (\{x_n\}_{n \in N}) = 0 \forall k, n \in N \), which contradicts the necessity of there being at least one \( k' \in N : f_{k'} (\{x'_n\}_{n \in N}) - f_{k'} (\{x_n\}_{n \in N}) > 0 \) for the movement \( \{x_n\}_{n \in N} \to \{x'_n\}_{n \in N} \) to be a Pareto improvement.

(Sufficiency): Suppose we have

\[ \frac{f_k (\{x'_n\}_{n \in N}) - f_k (\{x_n\}_{n \in N})}{x'_i - x_i} \geq 0 \forall k \in N, i \in \{i\} \subset N \]

and
\[
\frac{f_k \left( \{x'_n\}_{n \in N} \right) - f_k \left( \{x_n\}_{n \in N} \right)}{x'_j - x_j} \leq 0 \forall k \in N, j \in N \setminus \{i\}
\]

with strict inequality in either case for at least one \(k' \in N\). Then as \(\{i\} \subset N : x'_i > x_i \implies x'_i - x_i > 0\) we have that

\[
f_k \left( \{x'_n\}_{n \in N} \right) - f_k \left( \{x_n\}_{n \in N} \right) \geq 0 \forall k \in N, i \in \{i\} \subset N
\]

And as we have \(x'_j \leq x_j \forall j \in N \setminus \{i\} \implies x'_j - x_j \leq 0\) we have that

\[
f_k \left( \{x'_n\}_{n \in N} \right) - f_k \left( \{x_n\}_{n \in N} \right) \geq 0 \forall k \in N, j \in N \setminus \{i\}
\]

and with strict inequality in either case for at least one \(k' \in N\). Which confirms the sufficient conditions for the movement \(\{x_n\}_{n \in N} \rightarrow \{x'_n\}_{n \in N}\) to be a Pareto improvement. \(\square\)

6.4. **Proof of corollary**

*Proof.* If the conditions to which Theorem \(\square\) are the case, and the necessary and sufficient conditions identified by that theorem for Pareto improvement fail to hold then by that theorem, because they are necessary, there is no Pareto improvement in that movement. If those conditions fail to hold for every movement between two states of the world \(\{x_n\}_{n \in N} \rightarrow \{x'_n\}_{n \in N}\), then there is no Pareto improvement to be made by movement from any and every state of the world \(\{x_n\}_{n \in N}\). Thus by theorem \(\square\) this is sufficient (and necessary) for every state of the world \(\{x_n\}_{n \in N}\) to be Pareto optimal. \(\square\)

**REFERENCES**

Ariely, D., 2008. Predictably Irrational. Harper Perennial, New York.

Arrow, K., 1951. Social choice and individual values. Wiley, New York.

Barberis, N., 2013. Thirty years of prospect theory in economics. Journal of Economic Perspectives 27 (1), 173–196.

Cardinale, I., 2015. Resources, Production and Structural Dynamics. Cambridge University Press, Cambridge, Ch. Towards a political economy of resources, pp. 198–210.

Cardinale, I., Coffman, D., 2014. Economic interdependencies and political conflict: The political economy of taxation in eighteenth century Britain. Economia Politica XXXI (3), 277–300.

Clark, A., Frijters, P., Shields, M., 2008. Relative income, happiness and utility: An explanation for the Easterlin paradox and other puzzles. Journal of Economic Literature 46 (1), 95–144.

Diamond, P., Saez, E., 2011. The case for a progressive tax: From basic research to policy recommendations. Journal of Economic Perspectives 25 (4), 165–190.

Duesenberry, J., 1949. Income, Saving, and the Theory of Consumer Behavior. Harvard University Press, Cambridge, Massachusetts.

Dworkin, R., 1981a. What is equality? part 1: Equality of welfare. Philosophy and Public Affairs 10 (3), 185–246.
Dworkin, R., 1981b. What is equality? part 2: Equality of resources. Philosophy and Public Affairs 10 (4), 283–345.
Easterlin, R., 2001. Income and happiness: Toward a unified theory. Economic Journal 111, 465–484.
Frank, R., 2011. The Darwin Economy. Princeton University Press, Princeton.
Geanakoplos, J., 2005. Three brief proofs of Arrow’s impossibility theorem. Economic Theory 26 (1), 211–215.
Habermas, J., 1962. The Structural Transformation of the Public Sphere. Polity, Cambridge.
Hirsch, F., 1977. The Social Limits to Growth. Routledge, London.
Layard, R., 2011. Happiness, revised Edition. Penguin, New York.
Lucas, J., 1965. Against equality. Philosophy 40 (154), 296–307.
Man, P., Takayama, S., 2013. A unifying impossibility theorem. Economic Theory 54 (2), 249–271.
Marshall, P., 1992. Demanding the Impossible, A History of Anarchism. Harper Perennial, London.
Marx, K., Engels, F., 1848. The Communist Manifesto. Penguin, London.
McCloskey, D., 1983. The rhetoric of economics. Journal of Economic Literature 21 (2), 481–517.
Mill, J., 1859. On Liberty. Penguin, London.
Nelson, R., Winter, S., 1982. An Evolutionary Theory of Economic Change. Belknap Harvard University Press, Cambridge, Massachusetts.
Nozick, R., 1974. Anarchy, State and Utopia. Basic Books, New York.
Rawls, J., 1971. A Theory of Justice. Belknap Harvard University Press, Cambridge, Massachusetts.
Reny, P., 2001. Arrow’s theorem and the Gibbard-Satterthwaite theorem: a unified approach. Economics Letters 70, 99–105.
Sen, A., 1970. Collective Choice and Social Welfare. North-Holland, Amsterdam.
Sen, A., 1973. On Economic Inequality. Oxford University Press, Oxford.
Sen, A., 1993. Positional objectivity. Philosophy and Public Affairs 22 (2), 126–145.
Sen, A., 1999. Commodities and Capabilities. Oxford University Press, Oxford.
Sen, A., 2009. The Idea of Justice. Harvard University Press, Cambridge, Massachusetts.
Strauss, L., 1953. Natural Right and History. University of Chicago Press, Chicago.
Veblen, T., 1899. The Theory of the Leisure Class. Oxford University Press, Oxford World’s Classics.

School of Economics, University of Queensland, Australia

E-mail address: brendan.markeytowler@uqconnect.edu.au