Centre for Research in Applied Economics (CRAE)

Working Paper Series
200804
March

"Delegation or Abrogation: The impossibility of objective social welfare maximisation by government"

By Nick Wills-Johnson

Curtin
University of Technology

Delegation or Abrogation: The impossibility of objective social welfare maximisation by government

Nick Wills-Johnson
Centre for Research into Applied Economics
Curtin University
GPO Box U1987
Perth WA 6845
Tel: +618 92663759
Fax: +618 92663290
email: n.wills-johnson@curtin.edu.au

Abstract

A model widely used for decisions which have a public interest element is delegation of parliamentary authority to a bureaucratic agency, within the confines of a legislative framework which directs the relevant agents how social welfare should be maximised within the context of the issue at hand. This is intended to remove the politicisation of decision-making, and allow for an objective approach. However, except in very limited circumstances, it is unlikely that bureaucratic agents will be able to act in this fashion. Using Arrow's (1950) Impossibility Theorem, this paper outlines why this is the case, and the consequences of delegation.

Introduction

An important role of government in modern society is to maximise aspects of social welfare that are subject to some form of market failure, according to the directions of a parliament within the purview of the government agency concerned. For example, a department for social services might seek to improve the welfare of the poorest in society, whilst an economic regulator might seek to improve economically-efficient allocation of resources by restricting the ability of a monopoly to extract rents from its customers. The approach, in general, is for a parliament to establish the way in which welfare is to be maximised in legislation, which then serves to instruct bureaucratic agents in their task of giving effect to this legislation through their operations. This is intended to remove the politicisation of decision-making, and allow for an objective approach. However, except in very limited circumstances, it is unlikely that bureaucratic agents will be able to act in this fashion. Using Arrow's (1950) Impossibility Theorem, this paper outlines why this will be the case, and the consequences of using the approach.

Section Two of this paper examines some different decision-making frameworks and explores the nature of objectivity in economic regulation. Section Three describes some of the literature surrounding Arrow's Impossibility Theorem, and develops an application of the theorem to delegation of authority by a parliament to bureaucratic agents acting on its behalf. Section Four explores the consequences of this application of Arrow's theorem, and Section Five explores alternate means of allocating resources which do not require such delegation. Section Six concludes.

Delegation of Authority

In the economic paradigm of perfect competition, resource allocation decisions are made in the market, through the private interactions of market participants. In many real-world cases, however, markets are imperfect; property rights are poorly defined, information is neither perfect nor symmetric and market participants do not have equal power. Thus, many resource allocation decisions require some form of communal, or public-choice element. A very simple society, with few non-market choices, might be able to make democratic choices over resource allocation with relative ease. As a society becomes more complex, however, this process of plebiscites becomes far more time-consuming.

One response is for the community to choose a certain subset of its members who will make such decisions as their full-time occupation, with the remaining people periodically choosing the decision-makers. This is representative democracy. However, many societies become sufficiently complex that the number of public-interest resource allocation decisions is too great, even for a full-time parliament. Thus, decision-making is delegated to bureaucratic agents within government. Since there is no electoral check on their behaviour, these agents are restricted by laws passed by parliament which instructs them how to make the relevant decisions, and what aspects of social welfare they should be maximising. One way of viewing this legislation is as a 'resource allocation mechanism', which parliament designs, employing bureaucratic agents to undertake the actual operation of the mechanism in an objective fashion. In many cases, these bureaucratic agents are given wide autonomy in undertaking their task, in order that they might do so without political interference.

The intent of this paper is to show that the assumption that a bureaucratic agent, given a well-designed resource allocation function to optimise, can optimise the function in an objective fashion is simply incorrect. Instead, almost every social welfare maximisation problem addressed by bureaucratic agents requires the use of subjective information, or assumptions, in order to obtain an unequivocal answer to the particular question being addressed. Subjective information means that the decisions made by the bureaucratic agents are a form of social choice, and are thus subject to the restrictions of social choice theory, chiefly Arrow's (1950) Impossibility Theorem. As this paper shows, this has some quite profound consequences for the way in which resource allocation is governed. First, however, it is important to explore in more detail the bureaucratic decision-making process.

The Process of Making a Decision in a Bureaucracy

Often, the delegation of decision-making from a parliament to a bureaucratic agency takes one of two forms. Firstly, the bureaucratic agency may act as the operator and manager of the service being provided. Alternatively, the bureaucratic agency might act as a regulator, and allow the private sector to undertake the actual task of service delivery. In fact, both of these forms of governance are part of the same continuum. The resource allocation function which parliament encapsulates in legislation to govern the activities of the bureaucratic agency is, in mathematical terms, a mapping. In some cases, the range of the mapping is wide; parliament is satisfied with a great many possible outcomes and merely wishes to prevent some undesirable outcomes from occurring. In these cases, a regulatory approach is more appropriate. In other cases, the mapping is very tight; there are only a few possible outcomes which a parliament is willing to allow, and thus it requires greater involvement in the process by its bureaucratic agents.

Regardless of where on the continuum a given mapping sits, all share one important characteristic; the bureaucratic agents governed by the resource allocation function are expected to take information, process it objectively and then deliver outcomes which optimise some form of social welfare. In effect, they are expected to act in a similar fashion to the 'Walrasian Auctioneer' whom economic theory assumes hypothetically ensures that resource allocation in a perfectly competitive market leads to a maximisation of social welfare. It is this visible hand which this paper contends does not work.

To provide a flavour of how a resource allocation function operates, consider the process of economic regulation, as undertaken by Australia's main economic regulator, the Australian Competition and Consumer Commission (ACCC). Other economic regulators operate in a very similar fashion, and have done for 100 years (see Virtue, 1909). Economic regulation is a useful case-study to examine because of its very formal process. The results of this paper, however, extend to all points on the continuum outlined above.

The resource allocation function that the ACCC has been charged to implement in respect to monopoly infrastructure is set out in Part IIIA of the *Trade Practices Act 1974*. The Act requires the ACCC to endeavour to minimise the extent to which an infrastructure owner can abuse its natural monopoly position through the extraction of monopoly rents from its customers, and hence minimise the negative resource allocation consequences associated with monopoly. Figure One encapsulates the task of an economic regulator like the ACCC.

Figure One: The Task of an Economic Regulator
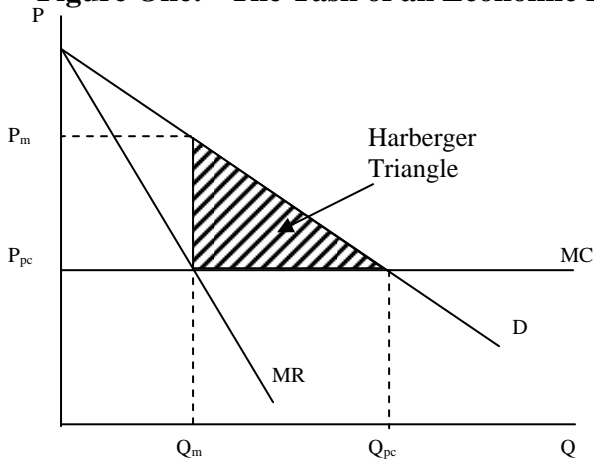
Regulators of monopoly infrastructure endeavour to minimise the size of the Harberger Triangle by bringing the price of the service of the monopolist track infrastructure owner (P_m) closer to the competitive level (P_{pc}) in order that this might induce supply (Q_m) to move out to the competitive level (Q_{pc}). The regulator does this by setting a price cap.

In doing this, regulators face two immediate problems. Firstly, inefficiencies associated with monopoly production may manifest themselves through over-capitalisation or bloated costs, rather than through excess profits. Thus, rather than using the actual cost function of the firm being regulated, regulators use a model of a 'best practice' infrastructure. Secondly, infrastructure commonly has high fixed and sunk costs. Prices based upon short-run marginal costs will be insufficient to cover sunk and fixed costs and hence future investment or maintenance of existing capital assets would become impossible. Thus, regulators endeavour to set prices at a level equal to the minimum of the long run marginal cost curve. This process, in principal at least, is designed to provide incentives for efficient investment.

The regulatory process may be described as follows. Firstly, the regulated firm puts forward a proposal which outlines the proposed prices and terms of access. This proposal is required to form prices through a defined process. Firstly, regulated firms must build revenue projections from 'building blocks' such as the asset base, capital and operation expenditure and the weighted average cost of capital. Each 'building block' must be justified with supporting information. The proposal then becomes a public document, and other stakeholders are invited to comment. Comments also usually become public documents. The regulator then releases a draft decision, outlining its opinions in relation to each of the points in the proposal and inviting the infrastructure owner to revise its proposal accordingly. This is followed by a further round of consultation, a revised proposal and a final decision by the regulator. The infrastructure owner can either accept the final decision, or exercise its right to a court determination. A full description of the process can be found in ACCC (1995).

Is the Process Objective?

The process described above, with its focus on dry economic 'building blocks' such as WACC and asset values, appears at face value to be an objective application of economic

theory and data with a clear social welfare function to be optimised. There may be a great deal of discussion between the regulator, the infrastructure owner and the customers who use the infrastructure, but this is in the character of information gathering by the regulator to inform its decisions, rather than any form of consensus-building process as would occur in a parliamentary setting.

However, is the decision really objective, the optimisation of a resource allocation function set out in the legislation, or does it just appear to be? The answer turns on the issue of forecasts. The regulator, as discussed, builds a model of the 'best practice' infrastructure, which is then forecast forward through the regulatory period in order to provide appropriate revenue or price caps. Forecasts are based upon two things; data and assumptions. The former are objective and the latter are not, a distinction which will be made clearer in the discussion below. It is an important distinction to make, because data alone rarely provide unequivocal results. Rather, some assumptions are usually needed to establish preferred results.

By way of a very simple example, consider the series of numbers 1,3,5,7…. and the set {9,10,11,12}. Which, of the set {9,10,11,12} is the next in the series? Many would suggest that nine is the next number, as the series contains odd numbers, and nine is the next odd number. However, it is possible to construct a valid argument for any of the set {9,10,11,12} as the appropriate next number in the series. This is because a polynomial of order n can be fitted to any series of n numbers. For example, in the above cases, the following formulae hold (where y refers to the result and t to the observation number; for example $t=5$ is the 5th in the series):

$y = \{1,3,5,7,9\}$ $y_i = -1 + 2t$

$y = \{1,3,5,7,10\}$ $y_i = \dfrac{-680}{461} + \dfrac{4697}{1844}t + \dfrac{29}{3688}t^2 - \dfrac{179}{1844}t^3 + \dfrac{63}{3688}t^4$

$y = \{1,3,5,7,11\}$ $y_i = -\dfrac{899}{461} + \dfrac{2853}{922}t + \dfrac{29}{1844}t^2 - \dfrac{179}{922}t^3 + \dfrac{63}{1844}t^4$

$y = \{1,3,5,7,12\}$ $y_i = -\dfrac{1118}{461} + \dfrac{6715}{1844}t + \dfrac{87}{3688}t^2 - \dfrac{537}{1844}t^3 + \dfrac{189}{3688}t^4$

Indeed, even if the series were $y = \{1,3,5,7, 4532187\}$, one could express this by the following fourth-order polynomial:

$$y_i = -\dfrac{992547443}{461} + \dfrac{2286485645}{922}t + \dfrac{65716581}{1844}t^2 - \dfrac{405629931}{922}t^3 + \dfrac{142763607}{1844}t^4$$

Each of the models above is equally correct, which means that each forecast (9,10,11,12 or 4532187) is also correct. The situation an economic regulator faces is much more complex than a series of numbers, but the principle remains the same; economic theory can assist in constructing a model, but if the model produces several results using objective data alone, economic theory cannot assist in determining which is correct. In this case, subjective assumptions will need to be made concerning some of the inputs in order to form a judgement about which is the best answer. A subjective assumption is underpinned by the preferences of those who make it; a preference for simplicity in the above number series causes most people to judge that the model predicting nine is the best model.

If an economic regulator, or indeed any bureaucratic agent, cannot use objective information alone, then he or she faces great difficulty in maximising social welfare in the fashion dictated by the resource allocation function drafter by parliament. Subjectivity in the process means that the bureaucratic agent finds themselves part of a social choice mechanism, which is quite different from the intent of the resource allocation mechanism encapsulated in legislation. In effect, the social choice has shifted from parliament to the bureaucratic agent, without necessarily changing its character. The consequences of this are discussed below, in a model which forms the centre of this paper. First, however, it is useful to examine some general results for social choice mechanisms.

Social Choice Mechanisms

This section describes two results pertaining to social choice mechanisms. The first of these, Arrow's Impossibility Theorem, is a general result, pertaining to the class of all social choice mechanisms. The second, the model at the centre of this paper, is an application of Arrow's Impossibility Theorem to the case of authority delegated by a parliament to a bureaucratic agent via a legislative resource allocation function.

Arrow's Impossibility Theorem

Arrow's (1950) 'Impossibility Theorem' is perhaps the most pervasive theory in the social choice literature, and the original paper has generated thousands of responses in the literature. Starting from the position that a social choice mechanism should be judged by its consequences for individuals, Arrow endeavoured to discover whether there is some way in which one can aggregate rational individual preferences into a rational social preference function. His now famous 'Impossibility Theorem' shows that there is not. The theorem is based upon a number of conditions, which Arrow shoed cannot be simultaneously satisfied. These, as summarised in Arrow (1998) are as follows:

- **Universality:** the social choice mechanism is defined and transitive over all logically possible profiles of preference orderings over the set of alternatives.
- **Monotonicity:** If $A \prec B$ in some social preference ordering, and A is raised in an individual preference profile, $A \prec B$ holds in the new social preference profile.
- **Independence of Irrelevant Alternatives:** If all individuals have the same preference ordering for some set of alternatives, then the social preference ordering of these alternatives will be the same, regardless of preferences over other (irrelevant) alternatives.
- **Non Imposition:** A social preference mechanism is not imposed. That is, there is not some pair of alternatives for which the social choice is the same, regardless of individual preference orderings.
- **Non-Dictatorship:** The social preference schedule is not imposed by an individual's preferences, regardless of the preferences of other individuals.

One can replace monotonicity and the independence of irrelevant alternatives with the Pareto principle; that is every individual has the relation $A \prec B$, then $A \prec B$ holds in the social preference relation as well. The results are almost identical; imposition of the Pareto principle merely removes the possibility of negative dictatorship, where the social choice is never the outcome the dictator wants. The result of the theorem is that a social choice mechanism results in either a social choice which is completely unreflective of the individual preferences which exist in the relevant group, or a dictatorship by a single individual.

Arrow's theorem has generated thousands of papers in response. Most of these seek to prove it is untrue, or to describe conditions in which impossibility can be overcome. Broadly speaking, the literature may be divided into two parts. Firstly, there are the papers which examine the very fundamental notions underpinning Arrow's theory. Secondly, there are the papers which endeavour to relax or change one or other of the conditions, to examine the results of doing so. It would be impossible in this paper to do justice to the literature. However, below I summarise some of the results in each field, where they pertain to the central task of this paper.

Buchanan (1954) attacks the link between individual preferences and social preferences, suggesting that the link from individual to social rationality is in error, and that social rationality cannot be compared with the rationality of individuals in the group; one is in effect talking about two different things and just because individual preferences do not provide a 'measuring stick' does not mean that one does not exist. The problem with an approach whereby social welfare is divorced from individual preferences is that it becomes, as Feldman (1980) suggests, a rather barren and empty concept. Moreover, as Plott (1976) notes, it is not just whether individual and social welfare are connected that is the issue; any social choice mechanism that requires some form of internal consistency is likely to face problems of impossibility.[1]

Sen (1995) suggests that a better approach might be to look not at consequences and outcomes, but rather at procedures and institutions; what kind of outcomes do our institutions give us, and are they appropriate. This, as he notes, is completely different to the standard economic analysis where procedures and institutions are a side issue; a means by which we get to the heart of the analysis, social welfare. Some of the conclusions of this paper can be interpreted in the context of looking to procedures and institutions, rather than welfare maximisation, in order to address issues associated with delegation of authority to bureaucratic agents.

Plott (1976) provides a comprehensive account of attempts to overcome Arrovian impossibility by altering or weakening the conditions which underpin it. One might, for example, define a social choice mechanism over only some preference relations, or leave some preference relations undefined. Leaving aside the question of how one might decide which preference relations to ignore, the end result of doing this is that dictatorship is defined over 'free triples'; groups of three outcomes which are not restricted by having a preference relation ignored. This provides a little extra freedom, but the fact that the free triples might overlap limits the freedom substantially. Moreover, as the number of players in the game, and their heterogeneity of preferences increases it becomes progressively more difficult to find cases where impossibility does not influence results.

One could also relax transitivity,[2] and either make it weakly transitive, or replace it with the condition that there is no cyclicality. However, the former results in Arrow's dictator being replaced by an oligarchy, and the latter results in numerous 'collegiates' forming,

---

[1] Buchanan (1954) is not particularly concerned with consistency, arguing that the ability of majority vote legislatures to experiment with outcomes and then reverse decisions later is precisely their strength. This strength, however, is a product of a lack of information about outcomes, and it does not seem unreasonable to require some consistency over outcomes which are known.
[2] Plott (1976) does not define monotonicity as a separate item, as Arrow does. Rather, it is implied by the way in which transitivity is defined.

any two of which can impose their will on the remainder of society. This is an improvement, but not a very substantial one.

One could also relax the independence of irrelevant alternatives condition, and allow preferences to change as the set of possible outcomes changes. As Plott (1976) notes, this is akin to replacing preferences with standards; things one will accept rather than things one likes. It also shifts the focus from outcomes to behavioural patterns and constraints. However, as soon as one endeavours to impose some form of constraint on the consistency of choices in the sets, impossibility begins to become an issue.

Before moving to the model which lies at the centre of this paper, it should be noted that it is possible to relax one final assumption of Arrow. Arrow was looking for the most general results he could, and so he made no explicit assumptions about utility. Specifically, he did not assume that it was cardinal and comparable. The utility theory of 19th Century economics had been underpinned by cardinal and transferable utility, but this had fallen from favour as a means of describing utility by the mid-20th Century, because, as Sen (1995) notes, there is no scientific basis for interpersonal comparisons of utility. However, if one assumes cardinal, transferable and comparable utility, then the problem of impossible preferences vanishes, as one can compare the preferences of each party and maximise their sum. Note that utility must be both cardinal and comparable in order for this to occur.

A Model of Bureaucratic Decisions as Social Choice

This section formalises the notion that the actions of bureaucratic agents are a form of social choice, and shows how Arrow's theorem applies in this context. Note first that the activities of bureaucratic agents involve the collation of information and views from various stakeholders. In the example above of economic regulation, the process has a formal structure, but it is not atypical of the general process. Note also that, unlike the pure Arrovian framework, utility is not entirely ordinal and non-comparable. For example, profits and environmental emissions are both aspects of utility which can be counted and compared (though not necessarily with each other).

To formalise the model, assume the bureaucratic agent is an economic regulator, and that the other two players are the regulated firm and a representative customer. Assume there are n possible outcomes of the regulatory process, each of which is discreet and mutually exclusive. Each player forms a preference schedule, consisting of an ordering of the n outcomes. Assume that these individual preference schedules follow Arrow's (1950) axioms, namely universality and monotonicity in preferences and independence to alternatives irrelevant to a given preference choice.

The process of economic regulation is a formally structured representation of the general case where bureaucratic agents and their constituents interact in order to achieve a given outcome by which they hope to maximise social welfare. During the process, each party reveals information to the others in a public fashion regarding the outcomes it prefers. Reflecting the nature of utility in the game (described above), there are two types of information, between which each party can distinguish:

- Objective information: which can be objectively assessed, quantified and compared between all players in the regulatory game.
- Subjective information: which is either private to a player or, if public, can neither be meaningfully compared between players, nor objectively assessed by them.

Profit streams are an example of the former, whilst differing views on the social impacts of an infrastructure expansion are likely to be an example of the latter. Note that there is no requirement for any party to reveal all of its objective or subjective information. All that is required is that each party is able to develop an understanding of the preference schedule of the other two.

The mapping of the utility associated with each outcome into the information set is one-to-one. In other words, the two concepts are synonymous; information is merely a way of describing utility. The difference between the two types of information is the mapping; the objective information mapping is one-to-one and common knowledge, whilst the subjective information mapping is one-to-one and private. One consequence of this is that the revealed objective information is always truthful, whilst revealed subjective information need not be; it could include lies and ambit claims.

Through the information revelation process, each party comes to understand the preference schedules of the remaining two. Moreover, each party understands how those preference schedules are described; whether by objective information, subjective information or a mixture of both. This leads to the following result:

- If the preference schedule of each party can be described only by objective information, or if there is only one binary ordering (per party) where subjective information is decisive and this is not the binary ordering between the first and second favoured outcome, then the resource allocation function is not impossible.
- If subjective information is decisive for more than one binary ordering or it determines the order of the first and second outcome for any party, then the resource allocation function is impossible in the Arrovian sense.

In the latter case, it is impossible for the bureaucratic agent (or indeed, anyone else) to optimise social welfare in an objective fashion, based upon the (revealed) preferences of the players, because it becomes impossible to compare utility between players in the game. Some explanation is required. Decisive subjective information is defined as follows: if one had only objective information about one party's choice, and this lead to $A \succ B \succ C$, but the party concerned reports $A \succ C \succ B$ based on a combination of objective and subjective information, then this subjective information is decisive in the binary choice between B and C.

The presence of a small amount of subjective information need not render a resource allocation function impossible unless it is decisive for the choice between the first and second outcome because, even though the subjective information cannot be precisely quantified, it can be roughly estimated. For example, if, as previously, objective information about one party's choice leads to $A \succ B \succ C$, but the party concerned reports $A \succ C \succ B$ based on a combination of objective and subjective information, then one knows that the value of the subjective information is greater than the difference in the value of objective information for B and C, but less than the difference in the value of objective information between A and C. However, if the party reports $C \succ A \succ B$ based on subjective information being decisive, there is no longer an upper limit, and it becomes impossible to compare individual welfare and thus to establish a maximisation of social welfare.

The key question is the relative frequency of each outcome above. Since it requires only very little subjective information for welfare comparisons to be rendered impossible and hence for social welfare maximisation to be similarly rendered impossible, it seems that the actual applicability of a resource allocation function by parliament to a set of decisions made by bureaucratic agents may be rather limited. Since the use of such functions is widespread, it is worthwhile to explore their likely consequences, which is the topic of the following section.

Consequences of Impossibility

Arrow's Impossibility Theorem suggests two possible outcomes: either one player becomes the dictator or the social choice function is unreflective of individual preferences. If the operation of a legislative resource allocation function by ostensibly objective bureaucratic agents is impossible, then the actual result of delegation by a parliament will be one of these two outcomes. The questions are then 'which one?' and 'what are the consequences?'. It is difficult to provide a general answer to the first question, but it is possible to explore the consequences of each potential outcome.

If the outcome is Arrovian dictatorship, Arrow's theorem provides no guidance as to who might become the dictator. However, Selten (1975) in discussing the outcome of games where many outcomes are possible suggests that a small perturbation, or 'trembling hand' is often sufficient to direct the game towards a certain outcome. Here, the trembling hand appears likely to be the power mismatch between the bureaucratic agent and other players in the game; even if the mismatch is small, it seems likely to ensure the bureaucratic agent will become the Arrovian dictator.

Bureaucratic agents are generally chosen on the basis of their professional ability; economic regulatory agencies are staffed with economists, social workers staff social service agencies and so on. The result, then, might be termed a 'dictatorship by professionals'. Some might suggest that this is an ideal outcome; a modern realisation of the Platonic ideal of philosopher kings. However, whilst professional skills are based upon the development of objective knowledge, the dictatorial status of these professionals is based upon their use of subjective judgement. This is somewhat ironic.

It is not necessarily the case that a bureaucratic agent in the position of an Arrovian dictator would make poor choices. In fact, the relevant professional might make choices which later transpire to have been very beneficial to society. The problems associated with this approach stem from the consequences of the process, not from the outcomes of decisions. The first of these consequences pertains to engagement with the bureaucratic agent. Many resource allocation functions either rely partially upon external support, or are designed to further goals external to the decision itself. For example, economic regulation of monopoly infrastructure is designed not only to ensure monopoly infrastructure assets do not earn monopoly rents, but that competition can develop in potentially competitive upstream and downstream markets. Likewise, the provision of social services to disadvantaged communities is designed not only to ensure they have access to adequate food, clothing and shelter, but also to provide incentives to improve their situation. However, if a bureaucratic agent is an Arrovian dictator then by definition, any party engaging with the bureaucratic agent who disagrees with him or her knows that they will not prevail. The incentives to engage are thereby dulled; firms are less likely to enter the industries policymakers hope they might and disadvantaged people are more likely to drift away from the processes designed to help them.

A second consequence occurs over time. When a bureaucratic agent first begins his or her task, they are likely to have only limited information about the industry or sector with which they deal. Over time, that information set becomes better. In a formal sense, by learning on the job, subjective information is supplanted by objective information. Industry or sectoral participants may also assist this process by releasing more of their private information, where doing so assists their cause. Ultimately, if enough objective information is collected, subjective information may no longer be decisive. However, if it does not (or until it does) a catch 22 exists; if the bureaucratic agent does not have access to objective information, decisions made on the basis of subjective information may be incorrect. However, the more objective information the bureaucratic agent has, the more decisions he or she is able to make concerning the industry. The industry/sector may face the choice between regulatory creep and poor-quality decisions.

The design of the resource allocation function or the personality of the bureaucratic agent may be able to resist regulatory creep, but the historical record is not particularly bright. Hoogenboom & Hoogenboom (1976) chart the history of the Interstate Commerce Commission (ICC) in the US which, over the hundred years of its history prior to the *Staggers Act* reforms of 1980, saw gradual increases in regulatory oversight until it effectively ran the rail industry in the postwar period, giving railways almost no freedom to react to changing circumstances. The solution in the US case was to radically wind back regulation, and to make it very difficult for the ICC (and its successor after 1996, the Surface Transportation Board) to impose regulation. In the closing years of the 19th Century and early years of the 20th Century in the UK, the Railway Commissioners Court and its successors (see McWilliams, 1923) faced a similar expansion in role, but the eventual solution was the other logical conclusion, the nationalisation of the British rail system in 1948.

If the second of Arrow's outcomes obtains, then the social preference will be unrelated to any individual preference, or indeed any combination of individual preferences. It is not clear a priori how the social preference schedule will be formed, but it seems most likely that it will be formed through a process of negotiation between the three parties in the regulatory process, each of whom will have to move from their preferred situation in order to achieve an outcome. This seems relatively mild, and is indeed what one might expect in a bargaining situation. However, it results in two important consequences.

The first of these is that unreflective social preferences mean that the parties to the regulatory process cannot ascertain its outcome even with full knowledge of the information sets of the other parties, let alone when some are acting strategically. The outcome will only be seen once negotiations are all complete. For some players, this may represent an unacceptable risk, leading to a similar lack of engagement as described above for regulatory dictatorship. Moreover, one cannot simply suggest that this be alleviated by designing a better negotiation framework; Arrow's Impossibility Theorem makes it clear that it is impossible to predict the social outcome from individual preferences, not that it is difficult to do so.

If one has unreflective social preferences and a system of negotiation for determining outcomes, it seems likely that, over time, participants in the negotiation process might attempt to alter it to suit their needs. One means of doing this might be to release private information strategically into the negotiation process. Stigler (1971) describes this

strategic process of seeking to influence the bureaucratic agent as 'regulatory capture'. However, this process of regulatory capture is something of a double-edged sword. As objective information is brought into the public domain, it may be used to make more decisions pertaining to the operations of the industry (or other stakeholders) concerned than was possible when this information was private. Such collective decision-making may not be in the best interests of those originally holding the private information. For example, a firm subject to economic regulation may find that more of its investment decisions are made in the public sphere than was formerly the case. Alternatively, welfare recipients may find that the conditions of their payments change as government learns more about their spending patterns, and that spending on 'inappropriate' goods (such as drugs or alcohol) might be curtailed.

Options for Successful Governance of Social Choice Issues

This paper began by tracing how social choice is aggregated and delegated as a society becomes more complex. It shows that the end point of this process is one where social choice is not so much delegated as abrogated. In order to find a solution to this problem, one must therefore go back to the starting point of the process of aggregation and delegation and ascertain whether a different path might be followed.

In his original paper, Arrow (1950) suggested four ways in which resource allocation decisions in a society might be made:
- By the market.
- By a dictator.
- By voting.
- By convention.

Choice made by a dictator seems an undesirable option, leaving three possibilities. The resource allocation function approach discussed in this paper is one form of governance by convention. As has been shown, it seems unlikely to work particularly well. This, however, does not necessarily mean that other means of governance by convention will suffer the same fate.

First, consider governance through market mechanisms. If resource allocation decisions sit outside the market due to some form of market failure, the solution could be to change the design of the market, such that it can accommodate the resource allocation decisions with no market failure. The creation of tradeable emissions rights to address pollution externalities is an example of this. However, in many instances, this may be very difficult. For example, economic regulation exists precisely because the monopoly being regulated is 'natural', and competition is so hard to introduce. Also, addressing issues such as externalities or information asymmetries involves designing better property rights regimes. The designers face the same problems as the regulators and public managers described in this paper; if parliament charges them to design a set of market rules, they seem unlikely to be able to act solely in an objective fashion in the same way that regulators and public managers cannot. Thus, there may be some, but limited scope for designing a market. There is, however, still a great deal of utility to be gained from using the market as a benchmark. Sonnenschein (1974) provides an axiomatic treatment of a competitive market as a choice mechanism. Thus, if a choice process is designed and described in terms of its axioms, one can compare it with the competitive market benchmark and examine whether the two are axiomatically equivalent. If they are, then

the resource allocation choices of the process will replicate the choices a competitive market would make, thus maximising social welfare.

The second possibility could be to put issues to the vote; either by plebiscite or via a parliament. This removes the delegation step which has been the subject of this paper. In principle, this is an appropriate option; the issues associated with the resource allocation function are removed. However, in practice, the approach is unlikely to work because it would rapidly fill the parliament with decisions, and may render it inoperable in a complex society with many public choice decisions to be made. This, in fact, was precisely the reason why the delegation process alluded to in this paper arose in the first instance.

The final option is to choose a different convention. Sen (1995) makes this argument, suggesting that focussing on outcomes, as the resource allocation function of parliamentary legislation attempts to do is not a useful approach, due to the operation of Arrow's Impossibility Theorem. Instead, he suggests, society should focus on the building of institutions which engender good, or at least not too objectionable, social choices. There is no particular reason why these institutions need necessarily be associated with government. Indeed, a key component of the problems identified in this paper be the centralisation of decisions in a single body like government.

Institutional building is a complex process, and it may not be clear what the 'right' institution should be in a given situation. However, two things provide at least some hope that a society might be able to experiment successfully to develop better institutions which avoid the problems of delegation outlined in this paper. The first of these is based upon public services that can be provided at a local level (roads, schools, parkland etc). Whilst there may be economies of scale in the provision of such services, Tiebout (1956) shows how the ability of members of society to 'vote with their feet' in choosing where to live based upon the level of localised public service provision (which they pay for through local taxes) can provide a mechanism by which neighbourhoods can compete in resource allocation mechanisms to determine which institutional structures work. Indeed, this is precisely the intent of a federalist system, albeit at a smaller scale. Whilst issues may exist in determining the optimal size and nature of neighbourhoods, the principles of such benchmark competition are well established.

Secondly, humanity has a long history of developing solutions to resource allocation mechanisms outside the framework of economics, using sets of locally develop social norms. Such social norms work better at smaller, rather than larger scales, due to the difficulty of holding together larger communities of interest. They are most useful in dealing with over-exploitation of common resources, such as fisheries. Ostrom (1990) catalogues some of these locally-develop social norm systems, many of which have served (or did serve) their societies for much longer than parliamentary democracy has served ours. In many cases, such social norms might be difficult to engineer. As an approach, they may also be inimical to the centralised determinism of bureaucracy; as indeed is that other important social construct for allocation resources, the market. However, they have a proven history of successful operation which motivates further examination by policymakers.

It should be noted that different institutional arrangements do not necessarily avoid Arrow's Impossibility Theorem. Instead, they bring the issue of social choice to the

centre of the decision-making process, rather than labouring under the misperception that it has been somehow removed through delegation to bureaucratic agents. This allows for a focus on procedures which address social choice, rather than on outcomes which are in any case involve the unachievable maximisation of social welfare.

Conclusions

This paper has argued that one of the key underpinnings of the process by which decisions on public goods are delegated from a parliament to a bureaucratic agent is incorrect. That is, a parliament cannot create a resource allocation function which an objective bureaucrat can use to optimise some aspect of social welfare, because there is very rarely sufficient objective information for the relevant bureaucratic agent to do so. Instead, assumptions based upon subjective information must be made, and in so doing, the choice made by the bureaucratic agent becomes a social choice, subject to Arrow's Impossibility Theorem. This gives rise to some troubling consequences in respect to the way governance is performed.

Unfortunately, there does not seem to be a solution whereby subjective information can be banished from the decision-making framework. Instead, the paper suggests that the optimal approach may well be to bring social-choice to the centre of the resource allocation problem which arises. It may be difficult, in a general sense, to move beyond this statement, because each problem may require a different social-choice solution. Certainly, the structure within which decision-making occurs successfully for one problem need not be the same as the structure which is successful for a different problem. This means it may not be particularly attractive to governments, enamoured of general, deterministic solutions that be applied 'across the board'. However, the long history of addressing social choice problems through such localised solutions suggests that people are actually rather good at doing so, even if governments are not.

Bibliography

Arrow, K.J. (1950) A difficulty in the concept of social welfare, Journal of Political Economy, 58,4,328-46.

Arrow, K.J. (1998) Arrow's theorem. in J. Eatwell, M. Milgate & P. Newman (eds) The New Palgrave Dictionary of Economics Vol1. London: MacMillan Press, 124-6.

Australian Competition and Consumer Commission (ACCC) (1995) Access regimes: A guide to Part IIIA of the Trade Practices Act. Canberra: AGPS.

Bromley, D.W. (ed) (1992) Making the Commons Work. San Francisco: ICS Press.

Buchanan, J.M. (1954) Social choice, democracy, and free markets, Journal of Political Economy 62, 2, 114-23.

Feldman, A. (1980) Welfare Economics and Social Choice Theory. Boston: Martinus Nijhoff.

Hardin, G. (1968) The tragedy of the commons, Science. 162, 3859, 1243-8.

Hoogenboom, A. & Hoogenboom, O. (1976) A history of the ICC: From panacea to palliative. New York: WW Norton & Co.

McWilliams, R.F. (1923), The future of railway control, Quarterly Journal of Economics. 38, 1, 31-53.

Ostrom, E. (1990) Governing the commons: The evolution of institutions for collective action, Cambridge UK: Cambridge Uni Press.

Plott, C.R. (1976) Axiomatic social choice theory: An overview and interpretation, American Journal of Political Science. 20, 3, 511-96.

Quinet, E. (2006) France: avoiding competition. in J.A.Gomez-Ibanez & G. De Rus (eds) Competition in the Railway Industry: An international comparative analysis. Cheltenham UK: Edward Elgar, 81-110.

Selten, R. (1975) A re-examination of the perfectness concept for equilibrium points in extensive games, International Journal of Game Theory. 4, 25-55.

Sen, A. (1995) Rationality and social choice, American Economic Review. 85, 1, 1-24.

Sonnenschein, H. (1974) An axiomatic characterization of the price mechanism, Econometrica. 42, 3, 425-34.

Stigler, G.J. (1971) The theory of economic regulation, Bell Journal of Economics and Management Science. 2, 1, 3-21.

Tiebout, C. (1956) The pure theory of local expenditures, Journal of Political Economy. 64, 416-24.

Virtue, G.O. (1909) The Minnesota railway valuation, Quarterly Journal of Economics. 23, 3, 542-47.