The government economic agenda in a society of unequally rational individuals

Pelikan, Pavel

Prague University of Economics, Department of Institutional Economics

11 November 2008

The Government Economic Agenda in a Society of Unequally Rational Individuals

Pavel Pelikán*

JEL Classification: A10, D02, D61, H10, O12, P51

Key words: unequally bounded rationality, rationality-allocation, markets, government, economic policies

Abstract: What economic roles, if any, should government play? This is still an incompletely analyzed issue that different individuals – depending on their ideologies, rent-seeking opportunities, and analytical abilities – may answer very differently. To advance its analysis, this paper recognizes that human rationality (as empirically testable cognitive abilities) is bounded unequally across individuals, and is therefore a unique scarce resource that markets and government allocate in significantly different ways. The results conflict with ideologies of both socialism and classical liberalism, but agree with two puzzles of recent economic history and with ideological compromises in actual economic policies.

I INTRODUCTION

What roles in the economy should government be allowed or required to play? This is still an incompletely analyzed issue that different individuals, and even different economists – depending on their ideologies, rent-seeking opportunities, and analytical abilities – may answer very differently. In political debates, it is indeed still possible to hear advocacy of different mixtures of many roles – including national planning, macroeconomic tuning, industrial policies, ownership of banks and other enterprises, demand for public goods, income redistribution, social policies, legislation of laws and regulations, and maintenance of law and order. The mixtures range from extensive uses of all these roles to their complete refusal, including the claim that even the making of laws and the maintaining of order should be left to private enterprise and voluntary market contracts.

Admittedly, economic analysis may never be able to specify the right answer in all relevant details – there may not even be a well-defined sense in which any answer could be declared "right." The purpose of this paper is only to show that analysis can throw more light on this issue than has been done so far. The way to this extra light starts by dropping the standard assumption that everyone's rationality is equally perfect, and recognizing instead what is in social practice obvious, but in economic theory still rarely admitted fact: human rationality, in the sense of empirically testable cognitive abilities, is not only bounded, as today's economists increasingly often admit, but moreover unequally so across individuals.

The first consequence is that rationality must be included among the scarce resources that pose the problem of their efficient allocation in society. But this resource turns out to be unique. As rationality plays a key role in the decisions on allocation of all resources, it also plays a key role in the decisions on allocation of itself, which complicates this allocation by what Hofstadter (1979) terms "tangled hierarchies."

Because of this complication, the problem of allocation of scarce resources in society becomes extremely difficult to solve. As explained below, it escapes the powers of standard formal analysis and demonstrates – contrary to what many today's economists seem to believe – that not all important scarcity problems can be crammed into a consistent axiomatic system. But there is a relatively simple way to obtain interesting partial results relevant to the government economic agenda. This is to compare rationality-allocation by government with the one by markets in two respects: (1) for the expected rationality of the individuals selected for the top jobs of investors, entrepreneurs and managers in production; and (2) for the inefficiencies caused by little-rational individuals in final consumption. What makes this

comparison interesting is that it leads to conflicts with pure ideologies of both socialism and classical liberalism, but helps explain two puzzles of recent economic history, and provides theoretical support to ideological compromises observable in practical economic policies.

This paper is based on my inquiry into problems of unequally bounded rationality and their policy implications, which started in Pelikan (1997). In existing economic literature close references still appear rare. Perhaps the closest are: Frey and Eichenberger (1994), who denote cases of bounded rationality as "anomalies," argue that they can be reduced by suitable incentives, and examine whether or not government should help to reduce them; Thaler and Sunstein (2003), who argue that bounds of human rationality justify government intervening in final consumption by certain paternalistic policies that they term "libertarian"; and Caplan (2007), who examines the effects of unequally bounded rationality on public choice and policy decisions.

But the closeness is limited and several differences are important to note. That incentives and learning can help, as Frey and Eichenberger argue, improve people's *actual* rationality is admitted, but with the qualification that all learning is constrained by talents, which limit the *potential* rationality that people might attain with the strongest incentives in the best learning environments. As individuals undeniably do differ in talents, important rationality inequalities will therefore subsist regardless of how strong incentives for their reducing might be provided. It is such irreducible inequalities that this paper is about.

Thaler and Sunstein's argument for paternalism is both enlarged, to include in certain cases also some more authoritarian forms, and strengthened. As their argument only recognizes rationality to be bounded, but does not take into account its inequalities, it is not, as shown by Glaeser (2006), compelling. The reason is, in essence, that for individual consumer choices, government can never have as strong and as correctly targeted incentives as the consumers themselves. Then, without some rationality advantage over at least some of them, there would indeed be no good reason to let government intervene in such choices at all. It is such an advantage that this paper will show government to posses.

While the agreement with Caplan is complete about both the existence of rationality inequalities and their importance for policy issues, the difference is in the sorts of the rationality considered. The sort considered by him is relevant to *political* decisions on how to vote and which economic policies to support. In contrast, the present focus is on the sort relevant to *economic* decisions on specific investment, production and consumption. Of course, the two are linked. All findings about the possibilities and limits of government to help with economic decisions contribute to the rationality of political decisions: if

2

government is found able to help in certain ways, but not in others, it is then irrational to vote for any political party that would allow it to do less, or require it to do more. But they do differ. In particular, individuals with degrees in theoretical economics, shown by Caplan to be more rational than others in public policy choices, appear to have much weaker advantages in practical economic decisions. Many entrepreneurs and investors have greatly succeeded without any academic degree, while many theoretical economists (including this author) have been only modestly successful in practical economic life.

Emphatically, the present focus on the rationality of economic agents does not mean to deny the importance of their incentives. Unless the incentives are reasonably correct, adapted to the actual motivations and ethical standards of the population, selecting for top jobs highly rational individuals is recognized to have strong perverse effects: the more rational they would be, the more ingenious ways they could find to seek rents for themselves to the detriment of others. The present point is only to make it clear that correct incentives, while necessary, are not sufficient: assigning top jobs to well-motivated, but insufficiently rational individuals would be detrimental to everyone.

The paper is organized as follows. Section II interprets the rationality of individuals in terms of their cognitive abilities, justifies this interpretation as compulsory for dealing with multipersonal problems, and shows that rationality in this sense must be admitted bounded in individually unequal ways, and thus recognized to be a unique scarce resource. Section III brings to light the tangled hierarchies with which this uniqueness complicates the standard resource-allocation problem. Section IV compares rationality-allocation by government with that by markets, separately for production and for final consumption. Section V summarizes the implications for the government economic agenda. Section VI concludes by briefly relating these implications to empirical facts, ideologies, and actual economic policies.

II UNEQUALLY BOUNDED RATIONALITY AS A SCARCE RESOURCE

II.1 Defining "rationality" for problems involving more than one person

Nearly all economists are concerned with rationality. Most of the mainstream ones still build on the assumption that it is perfect, or unbounded – meaning that everyone is able optimally to solve all economic problems, however difficult. For their heterodox opponents, this assumption has been the principal target of criticism. Since the early attacks on it by Simon (1955, 1979), the debates about the existence of rationality bounds and their roles in economic theories have been growing and ramifying. Disagreements start with the very

meaning of this notion: its different interpretations admit different rationality bounds, and some interpretations succeed in formally excluding such bounds altogether.

To clarify and justify the present interpretation as briefly as possible, Vanberg's (2004) distinction between two views of the perfect-rationality assumption – *as a non-refutable principle* and *as an empirically refutable hypothesis* – appears most helpful. The difference between the two can best be seen in how they situate the undeniably existing limits of human cognitive abilities. In the latter view, such limits simply *are* rationality bounds: any empirical evidence that an individual commits errors when solving some economic problems is taken to demonstrate that his or her rationality is bounded (cf., e.g., Kahneman and Tversky, 2000). In contrast, the former view adds such limits to the optimization constraints. Everyone can then be viewed as irrefutably optimizing under these constraints – that is, perfectly rationally doing *his* or *her* best under the constraint of his or her cognitive abilities – however severe these constraints might be (cf., e.g., Boland, 1981).

At first sight, economists may appear free to choose which view to adopt. But in fact this freedom is restricted to analysis of one-person problems. Why this has not always been realized is that most of the rationality debates have concerned one typical person. But it is easy to see why in problems involving several persons, to define everyone perfectly rational is unreasonable. Although everyone might still be viewed as doing his or her *personal* best, this would miss the often crucial fact that for many economic problems, the "best" of some persons may be much better, or much worse, than the "best" of others. As the issue of government economic roles, and indeed any policy issue, always involves more than one person, the view of rationality as a non-refutable principle must therefore be rejected.

In agreement with Simon, Kahneman and Tversky, the notion of "rationality" is here interpreted as *the cognitive abilities, or competence, or intelligence, of human brains for solving economic problems* – meaning, as usual, problems of how to allocate and use given scarce resources to obtain best feasible outcomes in terms of given preferences. This interpretation makes it indeed possible empirically to refute the perfect rationality assumption and demonstrate that rationality bounds do exist. It suffices to observe – as Kahneman and Tversky were among the first systematically to do – that many people, when trying to solve even only modestly difficult economic problems, often commit serious errors.

II.2 The properties of rationality relevant to government economic roles

Rationality has several properties that analysis of government economic roles, to avoid unrealistic results and misleading policy implications, must recognize. The first is the unequal distribution of its bounds. When solving the same economic problem, different

individuals – *even when they have the same access to relevant information* – may, and as any teacher of economics can testify often do, commit different and differently serious errors. Hence – be it due to their inborn talents ("nature") or to their education and experience ("nurture") – their rationality must be recognized bounded in different ways and degrees.

Note that rationality is here distinguished from available information that is possible to observe or communicate: it includes the abilities to perceive, understand and use such information, but is not the information itself. It is in how the same available information is perceived and exploited that some of the most important individual differences in rationality bounds often come to light. Information asymmetries are thus not the same as rationality asymmetries. Although very generally, rationality can also be viewed as a kind of information, this is the kind described by Polanyi (1967) as "tacit knowledge": its owner can use it, but cannot directly observe it, nor transmit to others.

Second, it is recognized that rationality can be classified into different sorts, relevant to different sorts of economic problems – for instance, involving different kinds or amounts of resources, or different degrees of risk or uncertainty. Rationality differences between individuals are therefore not limited to overall superiority or inferiority, but different individuals may have comparative advantages in its different sorts.

Third, as an economically valuable ability that is intimately and inseparably tied to each individual, rationality must be recognized to be a kind of human capital. Like any human capital, individuals can improve it by their own learning from more or less costly experience and education, but cannot, as noted, directly receive it from anyone else. Like all learning, also this one is constrained by personal learning abilities, or talents. These imply a certain maximum of rationality that their owner could potentially learn in ideal learning environments, and may be referred to as *potential* rationality – as opposed to the so far learnt, and therefore typically more bounded, *actual* rationality. The fact that the results of any education are most often both limited and individually unequal makes it possible to infer that also potential rationality is bounded with different bounds for different individuals.

Like all human capital, rationality must be included among the scarce resources that raise the problem of their efficient allocation and uses in society. But, as noted above and examined in more detail below, it is a very special resource that complicates the allocation problem by tangled hierarchies. Standard resource-allocation theories have been avoiding this complication by wishfully assuming that rationality, however scarce it might be in reality, is always abundant. Admittedly, as advocates of such theories like to point out, many economic questions can be given reasonably correct answers even under this simplifying

assumption. But not all, and certainly not the question of government economic roles. For it, as will become clear below, to ignore the scarcity of rationality is often grossly misleading.

III THE PROBLEM OF RATIONALITY-ALLOCATION

III.1 Estimating the rationality of individuals

All resource-allocation must begin by assessing the available stocks of the resources to be allocated. The first problem of rationality-allocation is, therefore, how to assess the rationality of different individuals, including oneself. The difficulty is – and here comes one of the tangled hierarchies – that its solution depends on the rationality used for solving it. Artificial experiments, intelligence tests, and problems in economic textbooks can only demonstrate that rationality bounds exist, but cannot reliably determine the rationality of different individuals relevant to real-world problems – especially the most complex ones, such as the organizing and managing of large firms, or picking future winners among large numbers of new technologies and new firms, of which many will turn out to be future losers.

The rationality relevant to such problems can therefore be only subjectively estimated, with the risk of more or less large errors depending on the rationality of the estimating individual: *the more bounded this rationality, the larger the errors are likely to be*. Importantly, this principle also applies when individuals estimate their own rationality: those suffering from severe rationality bounds are likely to commit large errors also in such estimations, as they are typically unaware of how severe these bounds really are.[1]

To be fruitful, however, analysis needs to express this rather obvious general principle by a more specific, even if somewhat less obvious, assumption. Here, it will suffice to consider simple situations, in which given individuals face given candidates, possibly including themselves, and strive to select (vote for) the most rational one(s). For such situations, it appears plausible and analytically fruitful to assume the following.

Estimating Rationality in Function of Own Rationality Assumption: Each individual can safely recognize all the candidates whose rationality is lower than his/hers, but is unable fully to appreciate the possibly subtle differences between this rationality and all the higher rationality, and may have irrelevant prejudices that make him/her underestimate the rationality of a random subset of the equally or more rational individuals. Therefore, when

---

[1] In addition to casual observations of (and frequent irritation with) such individuals during personal encounters, their existence is now solidly documented in experimental psychology by Kruger and Dunning (1999), in their wittily titled article "Unskilled and unaware of it: how difficulties in recognizing one's own incompetence lead to inflated self-assessment." This evidence devalues all the standard models of allocation of abilities that stand and fall with the assumption that all agents perfectly know the abilities of themselves.

6

trying to select the most rational individual(s), he/she chooses from a complementary (and therefore also random) subset of the equally or more rational candidates.

To see why this assumption is plausible, consider individual A who estimates the rationality of individual B. If B commits what A considers to be errors, A estimates B's rationality to be lower. But A may be right or wrong. What A considers to be B's errors may be A's own errors. In any case, A will not vote for B, either because B is truly less rational, or because B belongs to the subset of the more rational individuals whom A fails to recognize. To belong to the subset of individuals eligible by A, B must not do anything that A considers to be error, which means that B's rationality cannot be lower than, although it may be as low as, A's.

That an individual may not recognize all of the more rational individuals, but may underestimate many of them, is an important part of the assumption. This makes it possible realistically to admit that geniuses may be unrecognized by mediocrities, that highly rational individuals may underestimate themselves, and thus exclude themselves from their choice set, and that little-rational may underestimate all the others, and thus choose only themselves. This part is also important for analysis: it precludes the simplistic shortcut through which the most rational individuals might orderly be found by successive eliminations of all those that everyone not yet eliminated would agree are less rational.

III.2 The tangled hierarchies of rationality-allocation

A simple tangled hierarchy appears in the one-person problem of optimal investing in own human capital. Standard human capital theory builds on a straight two-level hierarchy of human abilities, topped by an assumingly perfect investment rationality, which makes it possible to optimize the investment in any other, admittedly imperfect and thus logically inferior kind of human capital. When also investment rationality is admitted to be imperfect, the top gets tangled with the bottom: imperfect investors, in order to invest optimally in improving their investment rationality, would need *already now* the improved rationality that they only consider to acquire, as a result of their present investment, *in the future*.

A more intricate and for present purposes more important tangled hierarchy appears in the multipersonal problem of resource-allocation in society. Standard theories build again on a straight hierarchy: the individuals deciding on the allocation are all assumed to possess abundant rationality, which makes them logically superior to the scarce resources they allocate – somewhat like the players of a game of cards are superior to the cards. When it is recognized that also rationality is scarce and that different individuals possess it in different qualities and quantities, the top gets again tangled with the bottom. The individuals both

7

decide on the allocation of scarce resources and are differently scarce resources themselves – as if in a game of cards the players themselves were also cards of different values, included among the cards with which they play.

This substantially increases the number of variables involved in the problem of resource-allocation. In the standard form of this problem, all the resource-allocating individuals, their positions, and their (abundant) rationality are assumed constant, and only the flows and stocks of other resources are variable. Rationality-allocation adds to the variables the design of jobs, their assignment to individuals, and the individuals' rationality.

To be efficient (in the usual Pareto sense), resource-allocation must therefore meet more conditions, which include avoiding two types of rationality-allocation inefficiencies: (I) some highly rational individuals occupy too easy jobs, which wastes their scarce high rationality; and (II) some insufficiently rational individuals occupy too difficult jobs – in Heiner's (1983) words, cause "competence-difficulty gaps" – which wastes resources because of the errors that such individuals cannot help committing.

Why the standard theories that try to deal with rationality-allocation – such as the ones of mechanism-design, matching, and job-assignment – cannot fully succeed is instructive to realize. Namely, each of these theories only deals with one of its parts, assuming that all the other parts have already been solved. Thus, the job-assignment theories study how individuals of different abilities, which may include different rationality, may be assigned to different jobs, but assume that all these jobs have already been optimally designed, and that there is at least one perfectly rational job-assigner. The mechanism-design theories study how to design a network of jobs, but assume all individuals to be perfectly rational, and thus ignore all constraints on how difficult the jobs might be and the entire problem of job-assignment. The tangled hierarchy that makes it impossible to build a unified standard theory of both job-designing and job-assigning is that the jobs of job-designing and job-assigning must also be included among the jobs to be designed by, and assigned to, differently rational individuals. As no one is a priori guaranteed to be sufficiently rational for any of these jobs, there is none of the fixed initial points that these theories need to be able to start.

III.3 Efficiency of rationality-allocation: production vs. final consumption

Rationality-allocation raises different efficiency problems in production than in final consumption. The differences begin with the very notion of efficiency: the one of final consumption depends more on subjective values and preferences than the one of production. The latter can even be made entirely value-free by defining final demand to comprehend all that the consumers might individually and collectively want from production – including job

8

creation, working conditions, and nature protection. The rationality-allocation in production then has the value-free task to use most efficiently (least wastefully) all the relevant rationality available in the population – that is, to minimize inefficiencies I and II – for meeting such a comprehensive final demand, whatever this might be.

Although the efficiency of final consumption might also be largely disconnected from subjective preferences and values, this is possible to do only in a very long, evolutionary perspective, which will not be considered here. In the more usual shorter views, consumers' values and preferences, including their sensitivity to the externalities, both physical and psychical, of others' consumption, must be taken into account.

There are two main differences between production and final consumption concerning rationality-allocation. One is in the ways which this allocation may be allowed to take to decrease inefficiencies I and II. Such ways can be divided into (A) redesigning jobs; (B) changing the rationality of the individuals assigned to jobs. The latter can further be divided into (B1) changing the individuals by firing, hiring, promotions or demotions; and (B2) keeping them while trying to make them acquire the needed rationality by learning.

Ways A may be used in both production and final consumption – for instance, the job of a manager may be redesigned by changing the size and/or the diversification of the firm, and the position of a consumer may be redesigned by quality controls, taxes and other regulations concerning consumer goods. The difference is in ways B. Both B1 and B2 can fully be used in production – for instance, a manager of an insufficient actual rationality can either be fired or, if his/her potential rationality (talent) is judged promising, allowed to learn. But only B2, the learning alternative, can be used in final consumption. Namely, a civilized society can hardly admit that people be fired from their positions of final consumers – that is, starved to death – because of their low rationality. Inefficiencies caused by little-rational consumers may therefore only be decreased by combinations of A and B2 – that is, by limiting and/or simplifying their choices and/or helping them to learn to be more rational.

The second main difference between production and final consumption is in the rationality levels that raise the most urgent problems. In production, this is the highest level. A key problem for any economy is how to find, recognize and select some of the most relevantly rational, and therefore scarcest, individuals for the top jobs of organizing, managing, and investing in, production enterprises, while protecting these jobs from lastingly growing more difficult than what even such top individuals are able to handle. In final consumption, in contrast, the greatest problems are caused by low rationality levels. There the key problem is how to diminish the inefficiencies caused by little-rational consumers,

who may waste resources on harming themselves in terms of their own preferences, and/or harm others through the possibly strong external effects of their little-rational consumption.

IV RATIONALITY-ALLOCATION BY MARKETS AND BY GOVERNMENT

IV.1 Comparative analysis of rationality-allocation

As noted, the present analysis of rationality-allocation will only compare the ways in which it is conducted by markets and by governments, without determining any outcome in absolute terms. Note the additional bonus: such comparative analysis is immune to what Demsetz (1969) criticized as "nirvana fallacy" – that is, naively rejecting one alternative upon finding it imperfect, when all other feasible alternatives are even more imperfect.

The present analysis, however, has little to do with the existing field of comparative economic systems. Its crucial deficiency is to compare given resource-allocation mechanisms, where all jobs are already designed and assigned. In contrast, the present comparison must include ways of job-designing and job-assigning, as this is how rationality is being allocated. This makes it necessary to turn from fixed mechanisms to *institutional rules* – in the sense of rules-constraints, or "rules of the game" – which shape how individuals design and assign their jobs, and thus make their resource-allocation mechanism only gradually form and develop.[2]

An important consequence is that the comparison must involve time, starting with an inefficient rationality-allocation, where no one is guaranteed to have the right job and no one's rationality is generally known. Different individuals, depending on their more or less bounded rationality, have different beliefs about both, but again, it is not generally known how correct or incorrect their beliefs are. Government and markets may only be represented by the institutional rules that shape the ways in which individuals within them may or must proceed. The key question is: how do the alternative institutional rules compare for the abilities to diminish, through their shaping of individual behaviors, the initial inefficiencies?

An initial situation that is both easy to handle and fully neutral can be defined as follows. Assume a population in which all sorts of rationality are distributed in a similar way

---

[2] This can be seen as another case of economics repeating itself in the sense of Frey (1990), in which a difficult, by standard analysis unsolvable problem ("paradox") turns out to have a solution in terms of social rules-of-the-game. Frey notes several such repetitions, starting with Buchanan (1954), who termed such rules "constitution." Other repetitions include Hayek (1973), who labeled them "negative," and North (1990), who shortened their name to "institutions." As this convenient shorthand has not been generally accepted – many economists still call "institutions" also some large organizations – it is safer to use the longer term "institutional rules."

as most of other human abilities – that is, roughly normally. Assume moreover that for each top job there is a set of candidates over whom the relevant rationality is also distributed roughly normally – in other words, that the candidates are either the entire population, or a random sample of it. To recall, none of these distributions is commonly known: different individuals estimate the rationality of each other and of themselves differently, in function of their own rationality, as considered in Section III.1 above.

In order best to organize and coordinate their production activities, and thus obtain most from their division of labor, the individuals have a common interest in having their economy contain certain highly complex top jobs – such as those of large-scale entrepreneurs, investors, and policymakers – assigned to correspondingly highly rational individuals. Their common rationality-allocation problem can then be put as follows: *How to design such top jobs, and how to recognize and select such highly rational individuals, while also making sure that none of the jobs will lastingly grow more complex than what the individual who can feasibly be selected for it can handle?*

IV.2 Personal vs. impersonal procedures of rationality-allocation

Rationality-allocation procedures can be *impersonal*, imposed by the economic outcomes ultimately resulting from choices of goods, or *personal*, run by choices of persons by persons, who use their rationality for estimating own and others' rationality. It is in the uses of these procedures that markets and government most significantly differ.

Market rationality-allocation is based on impersonal procedures, starting with their uses on product markets. If undistorted by producer subsidies, these markets will indeed promote or demote producers impersonally, in function of the profits or losses realized from efforts to meet some individual and/or collective demand – and thereby in function of the producers' relevant rationality. But note that the demand itself need not be very rational: as discussed in somewhat different terms by Frey and Eichenberger (1994), it may even be rational for producers to try to decrease its rationality by clever advertising.

Chance may also matter, but its influences are likely to weaken over time. In addition to the natural regression of chance deviations to the mean, the deviations are here moreover significantly asymmetrical: bad luck may lastingly demote many highly rational individuals, so that only a subset of them may actually succeed, but good luck is not very likely to promote little-rational individuals more than temporarily.

But markets may, and in developed economies extensively do, also use personal procedures. The main examples are financial markets, where entrepreneurs seek investors for supporting their projects and investors seek entrepreneurs for placing their capital. In efforts

to find some of the relevantly most rational entrepreneurs, and avoid all the insufficiently rational ones, the investors must therefore also make some personal choices, using their own rationality for estimating others' rationality. As some of the entrepreneurs may also act as investors – for instance, as heads of investment banks or mutual funds – personal procedures may form ramified multilevel structures.

In market rationality-allocation, however, even the most complex structures of personal procedures are ultimately hardly constrained by impersonal ones. Sooner or later, there will always be some well-defined profits or losses to be divided among the individuals involved, which will have the last word on how rationality will consequently be allocated (unless government decides otherwise).

In contrast, rationality-allocation by government is based on personal procedures. Like on financial markets, they may form multilevel structures – such as the voters electing politicians, the politicians appointing government executives, and the executives hiring government bureaucrats and experts. But the constraint of impersonal procedures is there much weaker; for long periods of time it may even be entirely out of work.

This weakness has several causes. First, government economic results are difficult to measure. Second, even when they can be measured, the responsibility for them is difficult to ascribe to specific politicians. By clever speeches, these may convince many less rational voters that good results are their merits and bad results are not their fault. Third, political choices depend on government economic results only partially. There are many other factors on which political votes and appointments may, and often do, depend. In Kornai's (1986) words, the government budget constraint is always much softer than the one of any of (unsubsidized) market participants.

IV.3 Three easy-to-obtain results relevant to government economic roles

The task of the present comparative analysis is now sufficiently clear to allow its formalization by means of an agent-based computational model (cf. Pelikan, 1997, 1999, and 2007: Appendix). Here, however, mathematics will not be necessary. Three key results relevant to government economic roles can be obtained by simple verbal logic.

Result 1. In the long run, market rationality-allocation – provided that its institutional rules will keep all important markets reasonably competitive, or at least reasonably contestable – will tend to (a) select for all top jobs some of the relevantly most rational individuals, (b) protect these job from being lastingly assigned to insufficiently rational individuals, and (c) prevent these jobs from lastingly becoming more complex than what the individuals assigned to them can successfully handle. All this logically follows from the

12

plausible assumption that long-term success of investors and entrepreneurs on reasonably contestable markets is positively correlated with their relevant rationality.

Much of this result only repeats what Alchian (1950), Friedman (1953) and Winter (1971) argued in different words a long time ago. What may be considered theoretically novel is only its extension to financial markets, which it discloses as instruments of double selection: the one of entrepreneurs by investors, and the one of the investors according to the rationality with which they select the entrepreneurs. This is a more robust defense of these markets than the standard one, which proves them to be optimal investment-allocation mechanisms – but only under the assumption that all investors are perfectly rational, which so many recently turned out not to be. As shown below, it is as instruments for selecting entrepreneurs and investors, and not as mechanism for allocating investment, that financial markets can most poorly be replaced by government.

As such instruments, however, financial markets increase the demands on their institutional framework. Its difficult task is to make it reasonably sure that entrepreneurs and investors will be selected for high relevant rationality and not low ethics.

Result 2. In the short run, markets may perform very poorly. If they start, as emerging markets often do, with a grossly inefficient rationality-allocation, in which much capital is in the hands of overconfident, but little-rational entrepreneurs and investors, the economy may be at first shrinking, rather than growing.

The reason is that the gains realized by the initial, possibly very small minority of highly rational entrepreneurs and investors may not suffice to compensate the losses caused by the initial majority of their insufficiently rational competitors. Although the dynamics of market rationality-allocation will make the gains grow and the losses diminish – the little-rational entrepreneurs and investors will typically have less and less to lose – it may take long before the gains exceed the losses, and even longer before Result 1 can be considered reasonably approximated.

Result 3. Government can relatively fast select for any given job experts whose relevant rationality is far from the lowest – for instance, they may be required to have a certain minimum formal education – but also far from the highest, as true talents for entrepreneurship and investment appear only weakly correlated with either university diplomas or judgments by government committees.

This result is based on the *Estimating-Rationality by Own Rationality Assumption* (Section III.1), which implies that only the least rational voters will vote, on average, for candidates of average rationality, while all the other voters, by avoiding candidates less

13

rational than themselves, will slightly raise the average rationality of the elected ones. In the presently assumed case, in which all sorts of rationality are distributed over both the voters and the candidates roughly normally, the following principle, which may be regarded as a cousin of the Condorcet Jury Theorem, can be shown to follow (Pelikan 1997, 2007).

Rationality-Raising-by-Voting Principle. If, on average, the candidates are not less rational than the voters, then the average rationality of the elected candidates will slightly exceed the average rationality of both the candidates and the voters.

The good news for government is that it can benefit from this principle several times – for instance, as noted, in the election of politicians, in the appointment of executives, and in the hiring of experts – and can thus assign its jobs to individuals whose relevant rationality is several notches above the population average.

But there also are two pieces of bad news. One is that on average, with rare occasional exceptions, the relevant rationality of these individuals will still remain far from the best. The notches are only small and cannot be many. As each additional voting or personal appointing complicates government bureaucracy by additional information asymmetries and agency losses, a few notches suffice to make the losses exceed the benefits. Although similar agency losses also threaten the bureaucracy of privately-owned firms, the harder and faster working ultimate constraints of the impersonal procedures to which these are submitted can prevent the losses from growing as high, or at least from lasting as long, as the ones of government bureaucracies.

The second piece of bad news is that not much will improve over time. In democracies, government rationality-allocation is irremovably rooted in the votes of the entire adult population, where each voter keeps the same amount of votes, regardless of how rationally or irrationally he/she votes. Then, however extensive the competition among politicians might be, the average relevant rationality of the elected ones is bound to remain about the same – that is, far from the worst and far from the best – also in all future elections.

In contrast – and here is the key difference between rationality-allocation by markets and the one by government – the voting of investors on financial markets, where the *Rationality-Raising-by-Voting Principle* is also at work, has the extra advantage of gradually raising also the average rationality of the voters. Those who vote well, by placing their capital with future winners, will gain votes (meaning the capital under their control), while those who vote poorly will lose them. Although in the short run, changes in the amount of such votes may also depend on chance, the correlation between this amount and the relevant rationality of investors is likely to grow, for above-noted reasons, stronger with time.

It may help to recall from the introduction that all this is about rationality relevant to economic decisions on specific investment, production and consumption, and not the one relevant to decisions on public policies. No limits are implied for government about the latter rationality. It is fully admitted that competition and learning of politicians, enlightened by theoretical analysis and empirical evidence about the performance of own and other economies, can make it grow. In fact, it is precisely one of the aims of the present analysis to contribute to such enlightenment, by making government aware of its rationality bounds, and of the need for institutional rules under which higher economic rationality than its own could be discovered and usefully employed. Intuitively, this need may be compared to the one for chess tournaments for selecting better players than any government committee.

The three results have two important corollaries: (I) In the short run, rationality-allocation by government can outperform the one by markets, and thus initially lead to a better economic performance and a higher economic growth. (II) After a limited initial period, markets will catch up with government, and then outclass it by allocating the rationality for organizing, managing, and investing in, production in vastly superior ways.

To see why (I), recall from Result 2 that new market economies are typically scourged by large numbers of little-rational beginners in investing and enterprising, and from Result 3 that governments can rapidly mobilize well-educated experts who, even if far from be the best, can nevertheless do much better than many overconfident beginners. To see why (B), recall from Result 3 that government will remain stuck with such neither the worst nor the best experts, and from Result 2 that markets will slowly but systematically work towards selecting as top entrepreneurs and investors some of the scarcest industrial champions.

Emphatically, all these advantages of markets are only comparative, far from implying any absolute perfection. It is fully admitted that also markets may cause enormous losses and deep crises. It is only that thanks to their stronger, more direct dependence on actual economic outcomes, they are much faster and more rigorous in discovering such losses and triggering corrective actions than what government is likely to do about its losses. This does not mean that government cannot help correct *market* losses, but this is another story.

V IMPLICATIONS FOR GOVERNMENT ECONOMIC ROLES

V.1 Government roles in production

Two implications matter most: (A) For the organizing and managing of, and investing in, production enterprises, the relevant rationality of individuals selected by

15

government will be, on average and with the exception of a limited initial period, significantly lower than the relevant rationality of the individuals selected by markets. (B) Rationality-allocation by markets, especially financial markets, strongly depends on their institutional framework, in particular on the capabilities of this framework to keep them reasonably competitive, or at least reasonably contestable, and make them promote participants for high relevant rationality, and not low ethical standards.

Implication (A) is a new theoretical argument against government ownership of production enterprises – including commercial and investment banks, and the producers of public and merit goods that in many otherwise capitalist economies have traditionally been government-owned. Although many arguments for privatization and against nationalization of production enterprises already exist, they are still being put in doubt as ideological. Standard analysis with its perfect rationality assumption has not been very helpful: it made it possible to produce formal proofs that government-owned firms can be as efficient as private ones (see, e.g., Stiglitz, 1994). The Public Choice argument that points to the agency losses caused by rent-seeking politicians and public servants is not entirely convincing, as private firms can be shown to suffer from similar losses caused by their rent-seeking managers.

The main strength of the present argument is in its probabilistic nature. It does not naively claim that a government-owned firm must always be inferior to a comparable private firm – which is easy to disprove by occasional empirical counter-examples. It only argues that such firms are and will remain exceptions: less probable to attain excellence and more probable to lose it without having to redress themselves or close down than private firms.

Implication (A) can moreover be used for three arguments about the current financial crisis. One is a warning that, however inefficient financial markets might be, government should not try to replace them, nor to regulate them by detailed quantitative measures – simply because it is unlikely to have sufficient relevant rationality for not doing even worse. A second argument is an objection against uses of tax money for bailing out bad banks and other failing firms, especially with their managers in place, as this would preserve the very inefficiencies of rationality-allocation that markets have so painfully, but usefully disclosed. A third argument is an improvement of the reputation of the often criticized speculative bubbles, showing them also to have a good side: by transferring capital from less rational investors, who follow the crowd, to more rational ones, who are the first to realize that something is wrong, they are improving the efficiency of rationality-allocation.

The main opportunities for government to help production follow from implication (B). Although many market institutional rules must be informal, based on trust and other

16

cultural norms that are created, spread and sanctioned spontaneously by market participants themselves, such rules rarely suffice. To prevent important inefficiencies, they must often be complemented by formal rules, legislated and enforced by government.

In general, such rules can be divided into those regulating (constraining) transactions *between* market participants; and those regulating the forms of corporate governance (internal institutional rules) *within* those market participants that are complex organizations with management separated from ownership.

In the frequent controversies between advocates and opponents of the legislation of such rules, rationality-allocation analysis can often help the advocates. It strengthens arguments both for antitrust legislation by emphasizing the role of markets in the selection of the relevantly most rational producers and investors, and for more restrictive corporate laws by calling attention to the high costs and the low speed of market selection with which it can demote insufficiently rational individuals from top economic position if they hide as managers inside large firms.

In agreement with standard analysis, government roles in production are recognized to include the formulation of the demand for, though not the organization of the production of, producer public goods – such as infrastructure, general education, and basic research. On these roles, however, rationality-allocation analysis has little to say.

V.2 Government roles in final consumption

The main implications are here also two: (C) the average relevant rationality of government agents, although far from the best, is nevertheless superior to the one of many, possibly a majority of, consumers; (D) the best and therefore scarcest potential rationality (talents) for top economic jobs may be scattered in a priori unknown ways across the entire society. But, because of the important influences of subjective preferences and values, noted in Section III.3 above, analysis can say less about these roles than the ones in production.

Implication (C) accords government a certain potential for beneficial paternalistic policies. Conceivably, it might help all the less rational consumers to improve the efficiency of their consumption, in terms of their own preferences and/or in terms of the preferences of their fellow consumers who suffer from the external effects of their little-rational choices.

To visualize some of this potential, consider that: (a) many important consumer goods – such as pension plans, life insurance contracts, and bank loan conditions – are complex, with properties that are often difficult to understand and correctly assess; (b) even in the most developed economies, many consumers have difficulties with only mildly advanced calculus and some even with basic reading; and (c) government agents can be guaranteed to have a

17

relatively high minimum of education, and thus better understand properties of complex goods and the consequences of their consumption, than many less educated consumers.

But to what extent, if any, should this potential actually be exploited? In part, the answer depends on the value of consumer sovereignty, which all forms of paternalism are bound to reduce. Although this value may vary from culture to culture, it appears everywhere to be positive. This implies a largely culture-independent preference for that form of paternalism by which, other things being equal, consumer sovereignty is reduced the least – which appears to be the one that Thaler and Sunstein (2003) term "libertarian."

In part, the answer also depends on the benefits that paternalism is perceived to realize. They depend on consumers' preferences concerning others' consumption, and on their sensitivity to the externalities of this consumption. Two cases are interesting to distinguish: (a) little-rational consumers only hurt themselves in terms of their own preferences; (b) the externalities of their little-rational consumption cause suffering to others. While in case (a), the benefits only depend on the prevailing feelings of compassion, in case (b) they also depend on the suffering by the others. If these are many and their suffering is strong, the benefits of any paternalism that limits such consumption are perceived as high. Such paternalism may then even be quite authoritarian, causing large losses of consumer sovereignty, and yet obtain strong political support.

Familiar examples are compulsory primary education, car insurance, health insurance, and pension plans. Because of cultural differences, the political demand for paternalism may substantially vary – even between otherwise so close Europe and the USA. In countries where this demand is high, classical liberals face the difficult dilemma between defending political democracy and defending consumer sovereignty. The difficulty is that according to liberal values, individuals cannot be forbidden to have preferences that make them enjoy, or suffer from, others' consumption, and to express such preferences by democratic means.

Implication (D) strengthens the case of redistribution policies, more of those reducing poverty than of those limiting wealth. Namely, if the best talents for top economic jobs may be hiding anywhere in a society, and if large segments of the society suffer from poor nutrition and/or insufficient education, then the talents in these segments will be wasted. The usual arguments for reducing poverty are thus extended by the argument that such policies, if successful, will also reduce this particular waste.

But this argument comes with three qualifications. First, even if some poverty may be due to bad luck, much of it logically goes together – be it as a cause, or a consequence, or both – with low economic rationality. Redistribution policies, as also argued by Glaeser

(2006) and Beaulier and Caplan (2007), cannot therefore have desired effects, unless combined with some form of paternalism – such as the one that prevents the resources intended for healthy food and rationality-increasing education from being spent on junk food and rationality-impairing indoctrination, or just alcohol, drugs and gambling.

Second, redistribution harms incentives less than usually claimed. Since efficient rationality-allocation is based on competition, and success in competition is a well-known human incentive by itself, people may often seek personal satisfaction and social recognition by demonstrating their high rationality – be it to others or just themselves – independently of the expected economic rewards, and thus also of the taxes on these rewards.[3]

Third, redistribution does harm efficiency, but for another reason. In rationality-allocation, the incomes and wealth gained from successful entrepreneurship and investment are not just ex ante incentives, but also and above all ex post means of allocation of capital from less rational to more rational entrepreneurs and investors. In consequence, *any* redistribution of the control of capital from highly rational entrepreneurs and investors to less rational individuals is more or less inefficient.

All this modifies the limit of the classical efficiency-equity trade-off above which the losses of redistribution exceed its possible benefits. The second qualification pushes this limit up, and the third down.

But this limit also depends on the form of redistribution policies. The search for the form that would push the limit as high as possible leads to the important, but not always properly made distinction between wealth for final consumption and wealth for the control over production. To the extent that the two can effectively be separated, and to the extent that final consumption is not the only incentive for employing one's rationality in production, the former wealth can be redistributed more, without harming the economy, than the latter.

For an instructive illustration, consider the egalitarian argument by Roemer (1987). Recognizing that some people are given too little talents by nature, he demands, for the sake of social justice, that they be economically compensated by society. The point made here is that regardless of how much compassion for such people one might feel, and for how high compensation one might consequently vote, this compensation must be limited to parts of final consumption. To let untalented persons gain control over capital in production would ruin the economy, leaving there little to be redistributed.

The actual separation of the two forms of wealth mostly depends on the type of taxes.

---

[3] For experiments demonstrating that high quality of complex problem-solving does not require high economic rewards, and may even be negatively influenced by them, see Sutherland (2007/1992: Ch.8).

The sharpest separation appears possible to obtain by the in theory well known, but in practice rarely used taxation of net final consumption, defined as "income minus investments plus disinvestments." Such taxation may even be progressive, provided that working capital, productive investment and re-invested profits are left tax-free.

V.3 Rationality vs. incentives as constraints on government economic roles

The rationality of economic agents, as noted, is only one part of the story, the other being their incentives. The implications of rationality-allocation analysis must therefore be complemented with the implications of incentive analysis. For present purposes, the most relevant is the original Public Choice analysis, as recapitulated in Buchanan (2003). It poses the incentive problem of government agents by assuming them to be, just like market participants, perfectly rational, utility-maximizing individuals. The problem is, how to induce them to work for society at large, rather than just seek rents for themselves. Unless this problem is perfectly solved, which it can hardly ever be, some agency losses cannot be avoided. The incentive constraint on the government economic agenda can then be put as follows: to be efficient, this agenda must exclude all those roles for which the agency losses exceed the benefits that government by playing these roles can generate.

In contrast, the rationality constraint excludes government from all the roles for which it is unlikely to possess sufficient relevant rationality. They include both those for which no one is rational enough, such as national planning, and those for which relevant rationality is more likely to be found by means of market competition and selection within the private sector – in particular organizing, managing, and investing in, production. But government is admitted to formulate the final demand for collective goods, and to intervene with certain paternalistic and redistribution policies in the consumption of private goods.

The two constraints interestingly cross each other: the incentive one is stronger for final consumption and the rationality one for production. The incentive constraint is strongest for paternalistic policies. There are three incentive-related reasons why the modest rationality advantage of government may not suffice to justify many of them: (i) it may be difficult to stop policymakers from accepting bribes for defending the interests of producers rather than those of consumers; (ii) their rent-seeking may be difficult to stop from overextending their budgets and bureaus, and thus expanding paternalism far beyond the limits of its potential usefulness; (iii) they may be difficult to motivate to do with due diligence and care enough of the right things for which they are being paid.

Like most of the other factors on which the net benefits of paternalistic policies depend, also the strength of these reasons appears to be culture-dependent. For example,

20

bribing is a form of corruption, for which the dependence on culture is formally documented by the Corruption Perceptions Index published by Transparency International, and can informally be confirmed probably by anyone who has travelled from Scandinavia through Central and Southern Europe to Africa. An additional problem is that a high level of corruption is usually a sign of low ethical standards, which are rarely limited to government, but typically also pervade the private sector. Little-rational consumers are thus also likely to suffer from dishonesty of private producers, who may fool them by misleading advertising into buying little effective or even harmful products. The problem then is, who can make suffer them less: dishonest private producers or rent-seeking policymakers?

There are two reasons why the incentive argument loses its strength in production. First, large private firms are threatened by comparable agency losses due to the rent-seeking of their managers. Yet, they are quite often reasonably efficient thanks to certain well-known, not fully perfect, but reasonably working incentive schemes. This makes it difficult convincingly to show why similar incentive schemes could not be used for the managers of government-owned firms. Second, policymakers may claim, and some may even be sincere, that far from being selfish rent-seekers they wish to do the best for society. If they can make themselves credible, arguments based on the incentive constraint lose much of their strength.

In this respect, the rationality constraint is not only stronger, but also more diplomatic. To tell policymakers that they should not play the roles of owners of firms because they are awfully selfish rent-seekers is indeed hardly a good start for a conversation. The advantage of the rationality constraint is that it accords policymakers the benefit of the doubt as to their intentions, but only to tell them that doing the best for society includes admitting own rationality bounds and recognizing that much higher relevant rationality for matters concerning production is most likely to be found by market competition and selection.

Of course, none of these constraints is immediately binding. A politically powerful government may for a long time arrogantly ignore them. How long this time may be depends on the harshness of environments. It is the states of nature, other economies and own society that determine how much inefficiency an economy can afford without pushing the entire society into a disruptive crisis. If nature is generous, the terms of trade with other economies are advantageous, and the population is not, or can be kept not to be, too demanding, this time may be very long. This appears indeed to explain why in the past, so many powerful empires could grossly violate both these constraints and yet last for centuries. Today, however, due to increasing scarcity of natural resources, hardening international competition, and populations growing both in numbers and in demands, this time is rapidly shortening.

VI CONCLUDING NOTES ON EMPIRICAL EVIDENCE, PURE IDEOLOGIES AND ACTUAL POLICIES

VI.1 Rationality as a hidden factor in two puzzles of recent economic history

Rationality-allocation analysis has an inherent difficulty with empirical evidence: as noted in Section III.1, rationality cannot be objectively measured, but only subjectively estimated with errors that depend on the rationality of the estimating individual. Rationality must therefore be understood as a hidden factor strongly influencing economic performance, but impossible directly to follow by any reliable statistics.

But there is an indirect way that appears promising: (i) observe economies with different institutional rules defining different roles for government, (ii) deduce how, under these rules, rationality is being allocated, (iii) deduce the impact of this allocation on economic performance, and (iv) compare these deductions with actual observations. A reasonably good fit can then be taken for an indirect empirical support of the analysis, especially if the observations are difficult fully to explain in other ways.

Such an indirect support appears possible to obtain from two series of observations from recent economic history. One is the story of Japanese economy during the last decades of the 20th century. Until the beginning of the 90s, government was there intervening in production in many ways, including extensive uses of selective industrial policies and highly constraining regulations of investment banking. For many years this appeared to work admirably well: Japanese economy was growing faster than economies where entrepreneurship and investment were left to markets. But to a widespread surprise, it suddenly fell into a deep crisis that proved to be more structural than cyclical: it turned out to suffer from many for a long time hidden and uncorrected entrepreneurial and investment errors that had distorted its industrial structure and accumulated into an enormous amount of bad debts. Soon afterward it became clear that both the amount of the debts and the long time it took to discover them were largely due to errors of the industrial policies and to excessive banking regulations, which limited competition and forced many banks to keep throwing good money after the bad. In the long run, the relatively more transparent US financial markets proved superior – not for preventing enormous errors, but for bringing the errors committed to light much faster.

The second series is the story of the new capitalist economies that started to be built at the beginning of the 90s from the collapsing socialist economies of both planned and market

varieties in Central and Eastern Europe. As is well known, the growth of all of them has followed a J-curve: first dipping down, making their bad situation even worse, and only later gradually turning upwards. Although the dip was given other plausible explanations, the initial excess of new overconfident, but insufficiently rational entrepreneurs and investors, whose exit was costly and took time, undoubtedly also mattered. The advantage of the rationality-allocation explanation is to interpret the dip as a logical start of all new markets, soon to be followed, in the same logic, by a substantial upturn. The other explanations were more pessimistic. Many were predicting a permanent decline, which made it more difficult to understand why, only after a few years, these economies started to perform relatively well, not much worse, and some even better than old capitalist economies.

The initial success of Japan together with the initial poor performance of the new capitalist economies can be seen to support Corollary (A), and the subsequent taking-off of the latter together with the structural crisis of the former, Corollary (B).

VI.2 Relations with pure ideologies and actual economic policies

The present results conflict with the ideologies of both socialism and classical liberalism. They provide the most universal reason why in difficult environments with low tolerance to inefficiencies all forms of socialism are bound to fail: any form of politically imposed collective ownership of capital – whether state or cooperative, and whether combined with national planning or with product and labor markets – is a serious obstacle to efficient rationality-allocation, and therefore, in such environments, fatal to the economy.

The conflict with classical liberalism is milder. The present results not only agree with, but even bring strong additional support to, the liberal pro-market and pro-free-enterprise stance concerning the ways of organizing and running production. There, the conflict is only with those extreme liberals who want to keep these ways also free from all forms of legislation. What all classical liberals in principle oppose is only the present support of paternalism and redistribution in final consumption.

In contrast, the relations with actual policies are less conflicting. The present results support, and in return are supported by, the ideological compromises to which many today's policymakers from both sides of the political spectrum can be observed to converge, both in the programs declared and in the policies conducted. As is particularly clearly illustrated by New Labour and Compassionate Conservatism, the political left is increasingly admitting that private enterprise and market competition are needed to deliver the goods, while the political right is increasingly recognizing that some redistribution and paternalism are needed to avoid costly social crises and political rejection.

23

References

Alchian, Armen A. (1950). Uncertainty, evolution, and economic theory, *Journal of Political Economy.* 58: 211-222.

Beaulier, Scott and Bryan Caplan (2007). Behavioral Economics and Perverse Effects of the Welfare State, *Kyklos.* 60: 485–507.

Boland, Lawrence A. (1981). On the futility of criticizing the neoclassical maximization hypothesis, *American Economic Review.* 71: 1031-1036.

Buchanan, James M. (1954). Social Choice, Democracy, and Free Markets, *Journal of Political Economy.* 62: 114-123.

Buchanan, James M. (2003). Public Choice: The Origins and Development of a Research Program. Fairfax, Va.: Center for Study of Public Choice, George Mason University. http://www.gmu.edu/centers/publicchoice/pdf%20links/Booklet.pdf.

Caplan, Bryan (2001). Rational ignorance vs. rational irrationality, *Kyklos.* 54: 3-26.

Caplan, Bryan (2007). *The Myth of the Rational Voter: Why Democracies Choose Bad Policies*. Princeton: Princeton University Press.

Demsetz, Harold (1969). Information and efficiency: another viewpoint, *Journal of Law and Economics.* 12: 1-22.

Frey, Bruno S. (1990). From paradoxes to social rules, or: how economics repeats itself, *Constitutional Political Economy.* 1: 27-34.

Frey, Bruno S. and Reiner Eichenberger (1994). Economic incentives transform psychological anomalies, *Journal of Economic Behavior and Organization.* 23: 215-234.

Friedman, Milton (1953). *Essays in Positive Economics*. Chicago: University of Chicago Press.

Glaeser, Edward L. (2006). Paternalism and Psychology, *University of Chicago Law Review.* 73: 133–156.

Hayek, Friedrich A. (1973). *Law, Legislation and Liberty, Vol. 1: Rules and Order.* Chicago and London: The University of Chicago Press.

Heiner, Ronald A. (1983). The origin of predictable behavior, *American Economic Review.* 73, 560-595.

Hofstadter, Donald R. (1979). *Gödel, Escher, Bach: An Eternal Golden Braid.* New York: Basic Books.

Kahneman, Daniel and Amos Tversky (Eds.) (2000). *Choice, Values, and Frames*. Cambridge, U.K. and New York: Cambridge University Press.

Kornai, János (1986). The Soft Budget Constraint, *Kyklos*. 39: 3-30.

Kruger, Justin and David Dunning (1999). Unskilled and unaware of it: how difficulties in recognizing one's own incompetence lead to inflated self-assessment, *Journal of Personality and Social Psychology*. 77: 1121-1134.

North, Douglass C. (1990). *Institutions, Institutional Change and Economic Performance.* Cambridge, UK: Cambridge University Press.

Pelikan, Pavel (1997). Allocation of economic competence in teams: a comparative institutional analysis, *IUI Working Paper 480*. Stockholm: http://swopec.hhs.se/iuiwop/abs/iuiwop0480.htm

Pelikan, Pavel (1999). Institutions for the selection of entrepreneurs: implications for economic growth and financial crises, *IUI Working Paper 510*. Stockholm: http://swopec.hhs.se/iuiwop/abs/iuiwop0510.htm

Pelikan, Pavel (2007). Allocation of scarce resources when rationality is one of them: some consequences of cognitive inequalities for theory and policy, *MPRA Discussion Paper #3657*. Munich: http://mpra.ub.uni-muenchen.de/3657/1/MPRA_paper_3657.pdf

Polanyi, Michael (1967). *The Tacit Dimension.* Garden City, N.Y.: Doubleday Anchor.

Roemer, John E. (1987). Egalitarism, responsibility, and information, *Economics and Philosophy*. 3: 215-244.

Schumpeter, Joseph A. (1976/1942). *Capitalism, Socialism, and Democracy*. New York: Harper & Row.

Simon, Herbert A. (1955). A behavioral model of rational choice, *Quarterly Journal of Economics*. 69: 99-118.

Simon, Herbert A. (1979). Rational decision-making in business organizations, *American Economic Review*. 69: 493-513.

Stiglitz, Josef (1994). *Whither Socialism*. Cambridge, Mass.: MIT Press.

Sutherland, Stuart (2007/1992), *Irrationality*. London: Pinter & Martin.

Thaler, Richard H. and Cass R. Sunstein (2003). Libertarian paternalism, *American Economic Review*. 93, Papers and Proceedings: 175-179.

Vanberg, Viktor (2004). The rationality postulate in economics: its ambiguity, its deficiency and its evolutionary alternative, *Journal of Economic Methodology*. 11: 1-29.

Winter, Sidney (1971). Satisficing, selection, and the innovative remnant," *Quarterly Journal of Economics*. 85: 237-261.