IMPERFECT INFORMATION AND OPPORTUNISM

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Nature of Information

Economics focuses on the optimum allocation of scarce resources. The subject defines resources finitely, although in some abstract theoretical sense resources could be considered as being infinite. The universe, after all, is infinite, and therefore so also are the resources that it contains. This central emphasis can therefore only be justified, if it is presumed that scarcity is a fundamental aspect of the real world in which we live, and reality should be the subject of our study. Unfortunately, the standard model that has emerged in economics applies this logic only to some of the inputs that enter the allocative process, but not to others. Information, which is a fundamental input into the decision making processes whereby resources are allocated, has traditionally been treated as being available fully, and to an unlimited extent, depending on the requirements of optimizing agents. The fact that information is manifestly limited is assumed away. Even where the initial information is lacking, the world is taken to having ontological characteristics which enable full information to become available to decision-makers over time.

This unrealistic view of information and its availability needs to be done away with. In the same way that resources are treated as scarce in economics because it is considered a fundamental characteristic of the real world, likewise the nature of reality is such that information is inherently scarce. Creating models which assume unlimited resources or perfect information may take us into some interesting theoretical fairyland, but does not help us to understand the functioning of the world as it is. Fortunately, the economic science is moving away from building models based on unrealistic assumptions, and as Stiglitz (2000: 1441) notes, there is now "recognition that information is imperfect, that obtaining information can be costly, that there are important asymmetries of information ……. (and this has) a profound effect on how we think about economics today."

In this paper therefore, we will first elaborate the reasons why information is inherently available only in imperfect form to decision-makers. Once these characteristics have been outlined, we will then consider how the standard neoclassical model and the mainstream new institutional economics/transactions cost approach, deal with the implications of imperfect information in their core models. The simplifying assumptions will be analyzed from an ontological and behavioural point of view to establish what are realistic or plausible, and what are central to explaining the performance of complex markets in recent times. This latter is particular important in the context of the recent market failure observed during the financial crisis.

Uncertainty: Ontological and Epistemic

Imperfect information arises first and foremost due to uncertainty. Uncertainty relates to the unknowability of the future. This is a basic characteristic of capitalism wherein competition encourages decision-makers to innovate in search of greater profitability. Thus Minsky (1996:8) states that. "uncertainty … is a deep property of decentralized systems in which a myriad of independent agents make decisions whose impacts are aggregated into outcomes that emerge over a range of tomorrows". There are two ways of viewing uncertainty: ontological, where it is associated with the nature of reality; and, epistemic, where it relates to a lack of knowledge. Where uncertainty has to do with the state of the world or the nature of reality, it has also been characterized in two ways in the literature. The first view is that uncertainty can be modeled and quantified through a probabilistic mathematical calculus (Savage 1954). The second view is that expounded by Knight (1921), and others. In this, the ontology of the system is open, and since the future is yet to be created, the set of outcomes cannot be fully identified. Therefore, no probabilistic quantification is possible and fundamental uncertainty exists. Let us discuss these two views.

Samuelson (1969) states that, the claim of economics to be a science rests on its acceptance of the ergodic hypothesis. In this view, reality can be analyzed in terms of stochastic processes. Dunn (2001) elaborating on this hypothesis indicates that all stochastic processes yield time series data for which statistical measures such as averages and standard deviations can be calculated. These measures consist of our empirical knowledge of past and future relationships. As the number of observations increase, the measures coincide such that averages calculated from past data eventually collapse into an objective probability distribution that describes all possible past, present and future realizations. If the relationship between economic variables is ergodic, the future is merely a statistical reflection of the past. Uncertainty viewed in this form can therefore be subjected to a quantification using the theory of stochastic processes. Random shocks can also be accommodated within this system by introducing an uncorrelated error term which captures the impact of casual exogenous events.

Knight (1921) on the other hand, indicates that the legitimacy of a probabilistic quantification is limited to planned or naturally occurring situations that are repeated indefinitely under identical conditions. In such circumstances uncertainty can be characterized as risk and actuarially measured. As Radner (2000) points out, for such a calculus the decision-makers underlying model of the world must be fixed so that the probability space remains unchanged. However, as argued by Keynes, Schumpeter, and others, this is not a proper characterization of a real economy. Under capitalism there are endogenous pressures to innovate in order to make more profits. Innovation creates new states of the world and leads to fundamental uncertainty. In situations where there is creativity and structural change, the future is yet to be created, and

so some relevant information cannot be known, even in principle. This leads to fundamental uncertainty, and a situation in which a reliable probabilistic estimate cannot be made. Fundamental uncertainty implies that an objectively defined optimal solution does not exist *exante* (Dequech 2001).

Elaborating on this view, Dunn (2001) indicates that fundamental uncertainty relates to a world not characterized by stochastic processes or governed by ergodic laws. This ontological view underlies the epistemic concept of uncertainty emphasized by Keynes (1921). In a non-ergodic world, even if agents can collect all the required information about the past and process it, this will not provide a reliable basis for forecasting the future, and expectations based on past probabilities will differ persistently from the time averages that emerge as the future unfolds. In the words of Minsky (1996), the elements determining long term expectations change so often that what happens in the economy at any date is contaminated by market conditions that reflect actions determined by mental models that differ from the model that now guides expectations. In such a world, agents are truly uncertain in that there are no deterministic laws to be discovered, and they have to create the future themselves by their own actions. Crucial decisions have to be taken which are non-repeatable, which are of necessity creative, and which change the economic landscape forever. Dunn (2001) further points out that the presence of crucial decisions is a sufficient condition for the existence of non-deterministic processes. In such a world of fundamental uncertainty, Say's Law is inapplicable and involuntary unemployment equilibriums can exist in the long run.

Complexity and Human Behaviour

So far we have been considering how imperfect information can arise from the ontological or epistemological characteristics of the system. However, even if full information exists in the system, decisions could be based on limited or imperfect information because of the innate or behavioural characteristics of the decision-maker. These characteristics lead us to the second area underlying the presence of imperfect information: those of the complexity of information and limitations in cognitive capabilities.

Orthodox price theory deals with simple market exchanges. In this model, the price system is the mechanism for communicating all the information necessary for parties to conduct the exchange. Changes in market opportunities are fully reflected in changes in relative prices, and this provides an adequate basis for economic actors to adjust spontaneously (Hayek 1945). However, as Arrow (1974) has pointed out, for rational decision-making, even relating to simple exchanges, a more complex process of optimization has to be followed. Information on future markets, commodities and prices are needed. Where forward contracts providing for such information needs are not available, the only theoretical device to restore the functioning of markets, are contingent markets. If uncertainty prevents most of the above from existing, the

only solution is for there to be an estimation of expected utility based on some set of subjective probabilities. So even if all the information needed is potentially available in the system, its complexity is likely to be such that, even if there are no search or transaction costs, in practice only a limited set of imperfect information is available to the average economic actor.

In any event, most transactions in the modern world are not simple rather they are characterized by complex market exchanges. In such exchanges, mutuality of advantage requires continuity of the exchange relationship (Commons 1932). Thus there is a need for contracts to facilitate exchange. However, where transactions require complex contracts, this makes the information requirements for the conclusion of such contracts also complex. In such a situation, any process of rational decision-making will place significant demands on the cognitive capabilities of the economic actor. As Simon (1972) notes, complexity in the environment could be so great that it prevents the actor from calculating the best course of action. Using the example of chess, Simon indicates that the chess player's difficulty in behaving rationally i.e. choosing the optimum strategy, has nothing to do with uncertainty – in the sense of statistical decision theory. As von Neumann and Morgenstern (1953) observe, chess is a game of perfect information. Theoretically, the full tree of possible games can be known. Considering expert chess, on average this amounts to 10^{120} possible games. Given the impracticality of such a calculation, even the best chess players do not consider more than around 100 possibilities from a given position. Imperfect information is therefore used even in a perfectly certain environment because of the computational inability to ascertain the structure of the environment. Complexity is therefore an important reason for the use of imperfect information by market participants.

The discussion above indicates that rational decision-making in the context of complex market exchange requires that human actors have the cognitive capabilities to process the necessary information. The problem of complexity can only be addressed if we assume that economic agents are hyper-rational or nearly omniscient. However, given natural human cognitive limitations, we are led to the concept of bounded rationality (Simon 1957). Rational behaviour in the real world is as much determined by the "inner environment" of people's minds, as by the "outer environment" of the world on which they act. Bounded rationality is the idea that the choices people make are determined not only by some overall goal, but by the knowledge that decision makers do and don't have of the world, and their ability or inability to evoke that knowledge when it is relevant (Simon 2000). Bounded rationality recognizes that there are constraints on the information processing and computing capabilities of human beings. Consequently as Simon (1957: xxiv) puts it, human actors are intendedly rational but only limitedly so.

Although the neoclassical model rejects this view, there seems to be increasing agreement that bounded rationality is the appropriate cognitive assumption for economic actors (Williamson 2010). In fact Selten (1999) indicates that even in situations involving no risk and uncertainty, there is overwhelming empirical evidence (see Kahneman, Slovic and Tversky 1982), that people do not follow optimization procedures to maximize utility. Given the limits of a decision-makers mental capacity to consider all alternatives and their consequences, it is inevitable that he must apply some heuristic procedure to arrive at the best decision. This of course implies that limited or imperfect information will be the basis for decision-making. Conlisk (1996) states that, over the past 30 years hundreds of studies have been done by psychologists and experimental economists showing that human beings make economic decisions based on bounded rationality. Reviewing the major studies in this area, he argues that the literature on 'heuristics and biases' conclusively shows that subjects make systematic errors by using decision heuristics or rules of thumb, which fail to accommodate the full logic of a decision. Further, the evidence suggests that the magnitude and nature of these departures from unbounded or instrumental rationality are themselves systematically related to economic conditions such as deliberation cost, incentives and experience.

Unbounded rationality implies zero deliberation costs. However, bounded rationality introduces the notion of positive deliberation costs. Conlisk (1996) points out that when such costs are included in the optimization process, it means that the augmented optimization problem will itself be costly to analyze, and the new deliberation cost will be neglected. This leads to infinite regress. As Johansen (1977: 144) puts it, "The question of how far to go ….. is in itself an optimization problem," consequently, "At some point a decision must be taken on intuitive grounds." The infinite regress problem indicates that optimization, or maximization of some objective function, cannot be the ultimate logical basis for behaviour. Rather given positive deliberation costs, resulting from bounded rationality, a truncated decision-making process will occur based on imperfect information. Complexity and bounded rationality are therefore important reasons for the presence and use of imperfect information in decision making.

Hidden Information and Information Asymmetries

The final reason why decision-making in the real world is based on imperfect information is the presence of hidden information. Hidden information occurs when the agents who are participating in a transaction fail to self-disclose either the true attributes of a good or service *exante*, or fail to self-disclose true performance *expost* (Williamson 1993). The standard model accepts that in a decentralized economic system knowledge is inherently localized and therefore the information available to any agent is necessarily incomplete. But as Hayek (1937, 1945) argued the price mechanism can provide the necessary coordination, whereby through

an adaptive process such limited information can become the complete information necessary for efficient solutions to emerge at the aggregate market level. However, as Williamson (1991) points out, for the adaptive process in such a model to work, all the parties to a transaction must behave honestly and candidly, and tell the whole truth and nothing but the truth. If they do not do so, a situation of asymmetric information between the parties develops, and this encourages human actors to pursue individual sub-goals rather than solutions which serve the common interest.

The problem of hidden information and hidden action has best been elaborated in the context of the principal-agent relationship (Arrow 1984). Arrow states that although the standard economic model postulates an arm's length relationship between agents, it is now recognized that the agency relationship is a pervasive fact of economic life, and such interactions are virtually universal in an economy. Hidden information about characteristics leads to the adverse selection problem. The classical example of adverse selection in the goods market is the 'lemons' problem analyzed in the context of the used car market by Akerlof (1970). In this, buyers unable to assess the exact quality of a used car will offer prices which result in all the good quality cars withdrawing from the market. Consequently, there will be market failure, with little or no trade occurring in the resultant 'pooling' equilibrium in which cars of all qualities remain pooled in the same market. The more common case of the adverse selection problem, and one that has been widely analyzed in the literature, is that of the insurance market. The insured (the agent) has better knowledge about his/her health, probability of falling sick, or dying, but the principal (the insurance company) cannot check this information in order to ascertain whether this has been used in a way that best serves the company's interests. Since the population of those being insured is heterogeneous and the insurance company cannot differentiate between the various categories, a common premium will be charged to all. This will result in high risk individuals purchasing more insurance and low risk individuals less, leading to an inefficient market solution (Arrow 1984, Rothschild and Stiglitz 1976).

Information asymmetries about performance, typically hidden action relating to the effort of an agent leads to the moral hazard problem. Common agency relationships in this area include that of the patient (principal) and physician (agent); stockholders (principal) and management (agent); and, landlord (principal) and tenant (agent). As Arrow (1984) points out these relationships are a significant departure from the arm's length fixed price relation amongst economic agents postulated in economic theory. The principal does not buy agent services at a fixed price set by the market, nor does the principal simply buy output from the agent. Rather the principal observes the outcome but cannot analyze its two components – the impact of the agent's action and exogenous uncertainty. Consequently, the variable to be determined is not a price but a complex functional relationship.

If information were perfect, then potential hidden action could be resolved through contracts which would stipulate all the actions that may need to be taken to bring about an optimal solution. However, since this is not the case, it leads to the incentive alignment problem between the two parties in a transaction. Thus if individuals are insured against risk, they have inadequate incentives to take actions that avoid that risk. In a firm, managers have special expertise and inside information that they have acquired over time about the organization. This creates an information asymmetry between management and shareholders, thus creating opportunities for the former to use their managerial discretion to obtain "rents" i.e. payments in excess of opportunity cost. Managers will consequently pursue objectives other than maximizing shareholder value (Edlin and Stiglitz 1995). As Arrow (1984: 10) states: "In general, there does not exist a Walrasian (or Nash) equilibrium with the property that no principal has an incentive to introduce new profitable alternatives." Stiglitz (2000) further points out, that dealing with the moral hazard problem through incentive contracts and pay also presumes that there are no transaction costs. For instance, if managers' differential information is a major source of the rents they receive, they will take action to increase the information asymmetries through obfuscation and creating noise. In the presence of search costs therefore, market forces will not result in arbitrage, rather incentives are created to bring about non-optimal outcomes (Edlin and Stiglitz 1995).

Hidden information and hidden action, which lead to the adverse selection and moral hazard problems, are pervasive phenomena. The literature on information economics show that they are ubiquitous and affect the behaviour of individuals and firms (Stiglitz 1985; Arnott and Stiglitz 1991; Edlin and Stiglitz 1995). There are therefore, little grounds for believing in the Pareto efficiency or inherent equilibrating capability of a market economy. On the contrary, in the presence of information asymmetries, markets will be prone to serious fluctuations, disequilibrium and crises. In Mishkin (1990) we find an analysis of how adverse selection and moral hazard cause financial crises. Considering evidence from financial crises that occurred between 1850 and 1940, Mishkin concludes that the observed relationship between banking panics, and the timing of increased interest rate spreads between low and high quality borrowers, supports the asymmetric information view of the causes of these crises. He also indicates that many of the other features of these crises, in particular the consequences on the real economy, are hard to explain using any other theoretical point of view. Kirabaeva (2010) and Stiglitz (2008) come to the same conclusion about the causes of the 2007-2008 sub-prime related financial crisis.

Neoclassical Model

In our analysis we have so far outlined the three fundamental reasons why information is inherently available in imperfect form to decision makers. These are the presence of

uncertainty, complexity and the behavioural characteristics of human agents, and finally the existence of hidden information. We shall now consider how the neoclassical model and mainstream NIE-related approaches address these issues in their models.

In Arrow (1974) we find a succinct exposition of the key elements of the neoclassical model. Arrow indicates that one of the central concepts of the model is that the behaviour of agents is governed by the criterion of optimization under constraints. For the purposes of optimization the individual agents need not know his utility function or production possibility set because "markets have supplied the information economized on, in the form of prices" (Arrow 1974: 4). However, rational decisions about consumption and production must be made with reference to the future as well as the present, and information about future commodities must include their prices. These prices can only be found in a suitable market in which future supply and demand are equated. Unfortunately, such markets do not exist. The non-existence of futures goods markets implies that the information needed by the optimizer is not provided by existing markets and consequently he faces a world of uncertainty. Hence the optimizer must replace market commitments to buy and sell, by expectations. Expected utilities, of course, require some probabilities. This leads to the conventional dominant paradigm of neoclassical theory, the expected utility hypothesis.

Radner (2000) provides us with an analysis of the subjective expected utility hypothesis first expounded by Savage (1954). Savage's hypothesis is a theory of unbounded rationality in decision making in the face of uncertainty. The focus is on how a rational decision maker revises initially subjective beliefs in the light of new observations about the world. The theory consists of: a set of alternative states of the world, alternative actions, and alternative consequences. States can be ascribed probabilities, consequences can be given utilities, and using a scale of probabilities and utilities, an expected utility can be calculated for each act. The updating of beliefs based on new information is done through a process of Bayesian learning i.e. governed by the laws of conditional probability. As Dunn (2001) notes, in the neoclassical model, the long run is an asymptotic end state of a process of learning. Subjective expected utility is based on the ergodic axiom that in the long run all choices made, based on Bayesian learning processes, will collapse into the substantive rationality of pre-programmed choices. We are therefore dealing with an immutable system in which omniscience is possible in the long run.

In this model therefore, the inherent presence of uncertainty and complexity in the real world are dealt with through: the ontological assumption that the world is ruled by ergodic laws and that uncertainty can be quantified through the theory of stochastic processes; and, that human beings have adequate cognitive powers, or unbounded rationality, to modify their behaviour based on observation and learning procedures which follow the laws of conditional probability. As Schlicht (1990) indicates, obviously the world being described in this model is remote from

any real world economic processes. Consequently, as a gesture to realism, the neoclassical school has proceeded to defend Instrumental or unbounded rationality through what is called the "as if" defense. In the "as if" defense it is admitted that the motivation and mental processes underlying economic behaviour may be diverse. However, it is argued that this nevertheless leads to choices which approximate that which would have been obtained by assuming unbounded rational behaviour i.e. "as if" optimization is being undertaken by the agent and a utility function is being maximized.

The classic defense using the "as if" argument is provided by Friedman and Savage (1948), using the expert billiard player example. The hypothesis is that an expert billiard player makes his shots "as if" he knew all the complicated mathematical formulae of angles, etc. that are required to make the perfect shot. Friedman (1953) argues that confidence in the hypothesis is not based on the belief that the players can or does go through such processes, rather "it derives from the belief that unless in some way or another they were capable of reaching essentially the same result, they would not in fact be expert billiard players" (Friedman 1953: 21). This argument is based on Friedman's "predictionism", which is that assumptions are justified so long as they lead to correct predictions, and no explanation of the mechanism linking the variables is required. However, since this hypothesis was proffered, a considerable literature has emerged which suggests that heuristics, and learning theory based on this, provide a better explanation for the billiard players expertise. The manner in which expert chess players think has already been referred to above (Simon 1972). As von Neumann and Morgenstern observe, since computing the optimal strategies is practically impossible, it "necessitates the use of those incomplete, heuristic methods of playing, which constitute good chess" (von Neumann and Morgenstern 1953: 125).

The use of heuristics rather than optimal strategies is now well established as the basis on which expert chess players play the game. Thus the limited rules that govern chess tactics include: a calculation of points gained or lost in an exchange; whether a combination of some moves results in a better position such as control of the centre, or control of a diagonal or file, etc. These rules are also the basis on which chess playing computer programs are designed. Even modern computer based chess programs therefore do not use optimization strategies because they are computationally intractable. Gigerenzer (2004) provides a further example of what cricket or baseball players actually do in order to catch a ball in flight, which shows that the "as if" approach to optimization is inaccurate and has no value. Experiments show that players do not make any calculations or measurements as the optimization approach suggests. Rather they use what is termed a "gaze heuristic". This involves running towards the ball while keeping the angle of the gaze between the eye and the ball constant. Successful catching has therefore nothing to do with optimization. Further, in comparison to the "as if" approach, heuristics provide a useable explanation which can be used to train inexperienced players.

Beyond this discussion about the use heuristics, we have the vast literature on cognitive illusions, anomalies and biases (Kahneman and Tversky 1979; Kahneman, Slovic and Tversky 1982; Rabin 1998), which shows that human behaviour systematically deviates from the rationality assumptions of the neoclassical model. Instrumental, abstract or unbounded rationality, and it's "as if" justification therefore has little empirical validity, and is an unsafe hypothesis from an explanatory or predictive point of view. Such assumptions may be of value in formulating an elegant theoretical framework, but do not provide a basis for explaining the behaviour of individuals or firms when faced with uncertainty and complexity in the real world.

Finally, let us consider the manner in which the neoclassical model deals with hidden information and its consequences. The neoclassical view in this area derives from Adam Smith's original exposition in his *Theory of Moral Sentiments* (1759). In this Smith compares market competition to a race and states that for the race to be successfully run there must be no violation of fair play (quoted from his *Theory of Moral Sentiments* in Wilson 1976: 83). Elaborating on this Williamson (1985: 47) states that for the neoclassical system to work, when agents confront self-interested others across markets, bargains must be struck in a rule-bound manner on the basis of fully and candidly disclosed initial positions. The model treats individuals like playing a game with fixed rules that they all obey (Williamson 1993). There can be no problematic behaviour attributable to rule deviance amongst human actors. Williamson (1985) calls this simple self-seeking. Such rule-based self-interest implies that symmetrical information is available to all actors in a bargain. Hidden information and all the problems of adverse selection and moral hazard are therefore assumed away in the model. Clearly this is not a satisfactory solution. As we have discussed earlier, asymmetric information is a very real phenomenon, it is pervasive, and has a major impact on agent behaviour and market performance.

New Institutional Economics

Behavioural assumptions are central to any research agenda. The NIE approach therefore, starts by accepting a behavioural model of man that is based on cognitive psychology. It accepts Simon's (1957) view that economic agents have limited computational and cognitive capabilities, and therefore "bounded rationality" is a more appropriate concept to describe decision making processes. Bounded rationality implies that all decision making will be made on the basis of imperfect information. The impact of bounded rationality on market exchanges, in the presence of uncertainty and complexity, is that all complex contracts will unavoidably be incomplete (Williamson 1991). If optimal long term contracts cannot be concluded, then could these be replaced by complete sequential short term contracts? Dunn (2001) argues that this is possible if we accept an ergodic environment; then, through observation and a learning process governed by Darwinian natural selection agents can arrive at the objective probabilities.

Rational expectations can then be formed and *exante* maximization can replace satisficing. But as Arrow (1974) notes, this convergence towards correct values that clear markets optimally requires that the structure of the world remain the same from period to period, and that there is common knowledge amongst agents i.e. that everybody observes everything that is relevant. But this is obviously not the case since there are changes in technology and tastes over time, and information is dispersed.

Arrow (1974) further indicates that when fundamental uncertainty of the kind discussed above exists in the world, this has other implications. Firstly, it becomes evident that any variable that improves predictability will have economic value. Agents will therefore seek to acquire additional information. But information is costly. The fact of information being imperfect, and that transaction costs are involved in obtaining additional information, then becomes an integral factor that will influence the functioning of markets. Efficiency can no longer be consider purely in terms of productive efficiency, but will have to include efficiency in information gathering and processing. Secondly, uncertainty amongst buyers and sellers about prices and quantities will result in the non-existence of markets for future goods. Theoretically, as pointed out earlier, this can be addressed by proposing contingent markets, but in the real world we find that forward contracts for future goods transactions are very limited. This is so because contracts are not enforceable without costs, and forward contracts are even more costly to enforce than contemporaneous contracts. In the presence of bounded rationality therefore, uncertainty can only be accommodated within an optimization framework if transaction costs (search, bargaining, enforcement, etc.) are zero, or at least minimal.

The question therefore that needs to be asked is given bounded rationality, is it a sufficient condition to overcome contractual incompleteness if we assume that transaction costs (including the costs of information) are zero? Williamson (1993) does not agree. He indicates that for contractual difficulties and *expost* maladaptation problems not to arise, it is necessary for rule-based self interest to guide the decision making of agents. This implies that:

- parties at the outset self-disclose all relevant information candidly, and continue to do so at every contract renewal interval, and
- promises made by all parties are self-enforcing.

In other words, human action must not be guided by self-interest seeking behaviour which is of a strategic kind or "opportunism". Williamson (1985: 47) defines such behaviour as "self interest seeking with guile". Opportunistic behaviour includes subtle forms of deceit, such as attempts to mislead, disguise, distort or confuse, but also more blatant efforts such as lying, cheating, embezzling or stealing. Furthermore, it can be *exante* or *expost,* i.e. it can occur before or after a transaction has been completed.

Returning to our question on short term sequential contracting, it is safe to assume that the information requirements of such contracting are much more limited than that of an optimum long term contract. Cognitive limitations caused by bounded rationality therefore should not be such a binding constraint for contracting of this type. Furthermore, if information is candidly and fully self-disclosed by the parties, efficiency related adjustments can be made from one period to the next. Forward contracting then, should not be problematic, and enforcement should become a simple matter. Such a situation then will approximate one which is characterized by perfect information, with learning processes providing the adjustment mechanism from one period to the next so that efficient solutions can be achieved in the long run. In such a model, fundamental uncertainty can be accommodated, bounded rationality will not be a constraint, and transaction costs will be minimal. However, for this solution to occur there must be the absence of opportunism. If agents behave opportunistically, then all the implications of hidden information and hidden action discussed above will apply, and no optimization will be possible.

Our argument therefore is that in the context of bounded rationality, neither contractual completeness nor efficient solutions can be achieved even if transaction costs are zero, unless there is the absence of opportunism. This is an important conclusion. By recognizing the hazards of contracting in the presence of opportunism, the NIE view opens the way for an understanding of mechanisms which are devised to mitigate the effects of these hazards. A basis is thus provided for the study of real world institutions, and organizations, that economic actors consciously agree upon, or intentional governance structures, which are designed to minimize contractual hazards and facilitate market exchanges. Williamson (2010) indicates that the empirical evidence overwhelmingly supports the NIE/transaction cost approach to the study of economic organization. As of this date there have been more than 800 empirical studies using this approach with the results being broadly corroborative of this theory.

Conclusion

Unlike the neoclassical model therefore, NIE-related approaches accept that uncertainty, complexity, and information asymmetries cause imperfect information to be available to decision makers. Further these are not inconvenient factors which can be eliminated using theoretical gymnastics, but are essential elements of the world we live in, and consequently need to be taken account of in any model that tries to explain the functioning of the economic system. In the context of information asymmetries, to explain the fact that human actors are given to sub-goal pursuits, opportunism as a behavioural assumption then becomes a central postulate. If there were candid self-disclosure, then the information asymmetry would no longer exist. Akerlof's (1970) "lemons" problem would disappear if the parties made honest declarations. Instead of a 'pooling' equilibrium which leads to market failure, there would be a

‘separating’ equilibrium in which the market clears (Nechyba 2010: Chapter 22). As it happens, adverse selection, moral hazard, shirking by employees, and managerial discretion, all of which fall under the broad category of opportunism are widely observed phenomena (Stiglitz 1991, Williamson 1993). Moreover, an increasing number of studies now use these forms of opportunism as a basis to explain a range of phenomena that neoclassical theory cannot explain. This includes the functioning of insurance markets; the lending behaviour of banks and financial institutions; managerial incentives and rent-seeking; and, the causes of the recent sub-prime related financial crisis.

At the behavioural level, NIE-related approaches explicitly state that bounded rationality is the appropriate cognitive assumption for human actors. This automatically rules out unrealistic explanations based on unbounded or instrumental rationality and “as if” type of justifications. However, for bounded rationality to provide a good basis to explain real world phenomena that arise due to imperfect information, the additional assumption of opportunism is necessary. Only Williamson (1991, 1993) has given both factors equal importance, and continued to insist that both bounded rationality and opportunism are the key assumptions for any theory of economic organization. Although information asymmetries have become an important basis in the recent literature to explain a range of economic phenomena, without the behavioural assumption of opportunism, asymmetries do not necessarily translate into adverse selection or moral hazard. In spite of this, most of the literature does not put opportunism centre stage. Others such as Klein (2006), holds that opportunism is just self interest extended over a larger set of margins. This is a total misunderstanding of the meaning and impact of opportunism. As we have argued in this paper, self interest in the form of opportunism has implications fundamentally different from the Smithian view of simple self interest, and needs to be a central assumption of any theory that attempts to explain various key economic phenomena observed, including the performance of the economic system itself.

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