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An economic theory of FDI: A behavioral economics and historical approach☆

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Abstract

This is an attempt to argue that explaining the foreign investment decision (FDI) need not lie outside the realm of economics, for it can be explained using the attributes of behavioral economics. Behavioral economics, which tries to improve the assumptive realism of economic theory, and objects to the neoclassical acceptance of the simplistic economic model of rational agents exhibiting optimizing behavior, is certainly capable of explaining the decision of multinational enterprises making investment decisions when they face the complex and uncertain international environment. It is in this spirit that I have tried to model the FDI decision using the attributes of behavioral economics.

However, before presenting this behavioral economics model of FDI decisions, I discuss the problems that neoclassical economics faced in explaining the new reality of FDI/international production after World War II, when neoclassical economists utilized the unrelated arbitrage theory of portfolio flows to explain it. I do also Stephen Hymer's critique of that attempt, and his attempt to explain FDI decision, which helped it move outside of the realm of economics. I do also review and discuss the various FDI theories that emerged, after the 1960 dissertation of Hymer, in the works of Dunning, Buckley, Casson, Markusen, and others presented as transaction cost, internalization, and the eclectic theories of foreign direct investment. While praising the contributions of these theories, I argue that they are inferior to the behavioral economics based model I develop in this model.

JEL classification: A12; B19; F21

Keywords: Behavioral economics; Multinational enterprises; Neoclassical; FDI

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1. Introduction

In the years prior to World War II, international production (including foreign direct investment) comprised a small share of international business. Since international trade constituted the largest component of international business, international economists essentially focused their attention on the explanation of trade among nations. The Ricardian and other versions of the comparative advantage doctrine, which assumed perfect international immobility of the factors of production (thus zero FDI), were utilized to explain trade among nations.

After World War II, in particular after the 1960s, the character of international business began to change. It was during this phase of international economic history that the multinational enterprise (MNE), thus foreign direct investment (FDI) and other forms of international production, began to emerge and gradually become significant.

Unable to explain the unprecedented rise of FDI via the comparative advantage doctrine, for explanation, international economists adhered to the neoclassical arbitrage theory of portfolio flows. In its original (1936) version, this theory had been utilized to explain foreign investment activity in its portfolio (and not direct) form (Iverson, 1936). However, the portfolio theory too was unable to explain foreign direct (or other forms of) international investment. Thus, there emerged other attempts to explain the FDI theory. But, the new FDI theories gradually moved away from economics, and towards the new and interdisciplinary field of international business. This move could be explained by the absence of realism on the part of those neoclassical theories, and the complexity of the international production environment which involves more than the mere economic assumptions of conventional economics. What I want to argue is that this need not be the case. Economics, when it includes proper, realistic and relevant assumptions, should have the ability to explain the phenomenon of foreign direct investment and capture the reality of international production. While neoclassical economics is too narrow to capture this complexity, behavioral economics, on the other hand, should have no conceptual difficulty in dealing with this reality. The reasons are: (1) behavioral economics tries to make economic theory consistent with the accumulated body of knowledge in all behavioral sciences including psychology, sociology, anthropology, organization theory, and decision science; (2) it tries to improve the assumptive realism of economic theory by emphasizing the importance of empirical research and the explanation of observed behavior, rather than deducing principles of economic behavior from features of human nature assumed to be valid at all times and in all cultures; and (3) it objects to the neoclassical acceptance of the simplistic economic model of rational agents exhibiting optimizing behavior. It is in this spirit that Herbert Simon introduced the notion of bounded rationality, and replaced the maximization assumption of conventional economics with satisficing. (see Hosseini, 2003).

In the analysis of MNC decisions, I will not assume that MNC decision makers are omnisciently rational. Rather, in the face of complex and uncertain political, economic, and cultural environments, I will argue that MNC decision makers – as imperfect human beings – naturally display limited mental and analytical capacity, in contrast to the omniscient entrepreneur of neoclassical economics. (See Galbraith and Kay, 1986, pp. 2–19).

In the paper, after discussing the inadequacies of neoclassical trade theories, I will review the post-1960 contributions of Hymer, Dunning, Buckley, Casson, Teece, Galbraith, Kay,

Brainard, Horstman, Markusen, etc. in the field of International Business (and FDI theory). I will argue that these contributions, which by and large utilize concepts like bounded rationality and transactions cost, while incomplete for not capturing all the complexities of international production, still are closer to the behavioral approach in economics. Next, I will discuss the relevance of behavioral economics and its application to the complexities of international production. At the end, I will try to model the behavior of MNCs as far as international production is concerned, using the attributes of behavioral economics.

2. The difficulty of trade theory in explaining FDI

FDI, no doubt, is unexplainable by either version of the comparative advantage doctrine. The assumptions of these models are too unreal to allow such explanation. In the Ricardian version, we are faced with a two factor, two commodities, two country model in which productive factors are perfectly mobile domestically but perfectly immobile internationally. The model also assumes a perfectly competitive market where goods move freely between those two nations (Emmanuel, 1972). Such a simple model would not allow the possibility of FDI, or any other form of international production, particularly since it assumed labor time as the only relevant factor of production. The Heckscher–Ohlin–Samuelson version emerged to replace the Ricardian formulation, substituting labor cost with factor endowment differences as the cause of international trade. This neoclassical factor proportions (and two country, two commodity, two factor) model of international trade preserved the international immobility of the factors of production assumption while assuming the same production function for each good in both countries, but assuming away the possibility of absolute advantage. This model too remained unrealistic and unable to describe the realities of international production (including trade and investment activity). The Leontief Paradox, Frank Graham's argument that certain combinations of increasing and decreasing returns would make free trade harmful (Graham, 1948), and the factor reversals argument by Arrow, Cheney, Minchas, and Solow, all suggested that the H–O–S model even exhibited difficulty explaining international trade, let alone explaining FDI activity and other forms of international production.

More recently, new trade theories have tried to bring about more realism into the analysis of international trade, since, as suggested by Markusen, "trade and gains from trade can arise independently of any pattern of comparative advantage (as traditionally assumed) as firms exploit economies of scale and pursue strategies of product differentiation in an imperfectly competitive environment" (1995, p. 169).

Although more realistic, the new theories of international trade still cannot capture the entire complexity of FDI and other forms of international production. The new theories of international trade, while making trade among nations more realistic, still do not attempt to explain foreign direct and other forms of international investment (and production).

During the 1950s, Nobel laureate Robert Mundell tried to develop a model of international trade that relaxes the assumption of international factor immobility. Mundell's model assumed two countries, two commodities, two factors, and identical production functions of homogeneous of degree one for the same good in both countries, where one commodity requires a greater proportion of one of the factors than the other, and that factor endowments are such that they will exclude the possibility of complete specialization.

Mundell's model too is incapable of explaining the complexities of international production of FDI. The type of foreign investment that Mundell tried to incorporate in his model is not FDI but rather short term and portfolio types of investment. It is worth noting that FDI differs substantially from short term and portfolio international investments; it differs from those two in at least two ways. First, the main concern of FDI is not necessarily the international mobility of capital, for it can in part be financed in the host country, as exemplified by the case of joint ventures. Secondly, FDI, in addition to capital transfers, also includes a package that contains managerial skills and technical knowledge (Mundell, 1957).

A variant of Mundell's model was developed by two members of the Japanese School – Kiyoshi Kojima and Terutoma Ozawa – in order to explain both international trade and foreign direct investment activity. In the models they developed, while exports should take place on the basis of the country's comparative advantage in a product, FDI activity, on the other hand, should occur when a country has a comparative disadvantage in a product, or when its comparative advantage has been eroded, to allow foreign skills or capital be combined with host country factors in order that the product is produced at much lower costs. In their "micro" and "macro" models, Kojima and Uzawa combined micro variables such as factor endowments and intangible assets with macro variables like trade policy and industrial policy (Kojima, 1978; Kojima and Osawa, 1984). However, as argued by Mark Casson, "attempts by trade theorists to develop a theory of the MNE by grafting capital movements into the Heckscher–Ohlin–Stopler–Samuelson (HOSS) model have significantly failed. This is because the HOSS model stands firmly in the neoclassical tradition. There are no transaction costs in the HOSS model, and so there are no grounds for distinguishing between direct and indirect investment" (p. 51).

3. Attempts to explain foreign direct investment after 1960: a review

Initially, the theory of portfolio flows was utilized to explain the advent of FDI after World War II. However, this attempt was futile, for it could not capture the reality of foreign direct investment. According to this theory, when there are no risks or uncertainties, or when barriers to movement are absent, capital moves from countries where the interest rate is low to those where the interest rate is higher. In this simple case, the expectation is that no international cross movements of capital will take place. Of course, these respective assumptions have no basis in reality. And, when we use the more realistic version of this theory, i.e. by introducing risk and uncertainty and barriers to the movement of capital among nations, the theory loses its predictive ability. For, capital can move in any direction, including cross movements.

The tremendous rise of U.S. initiated FDI in Western Europe in the years after WWII, and the complexity of these developments, gave rise to several important questions. Why should US firms invest abroad instead of within the US while trading with other nations? If American firms invest in Western European nations, how can they compete with already-existing European firms, given the additional costs of doing business abroad? And, why do not these U.S. firms, if they do indeed possess ownership advantages as compared to Western European firms, license their ownership advantages to European firms (Dunning, 1971)?

It was the desire to respond to such questions that motivated Stephen Hymer to devote his 1960 dissertation to the study of foreign direct investment, which required to take on the neoclassical application of the portfolio flows theory to foreign direct investment after WWII. His study found several features of FDI (and MNE) inconsistent with the neoclassical portfolio flows theory. Among these were two features: that the multinational firms overwhelmingly finance their host-country operation in host-country capital markets, and secondly that there existed substantial concentrations of FDI and MNEs in certain countries.

Hymer's criticism of the neoclassical application of the portfolio flows theory was complemented by his attempt to search for a plausible theory of FDI. In this attempt, he found two factors motivating FDI. The first of these was that FDI was motivated by attempts to reduce, or remove, international competition among firms. A second motivation was the desire of MNEs to increase their returns from the utilization of their special advantages. He also indicated a minor motive—that of diversification, which does not necessarily lead to control. (Hymer, 1976, p.33). Many, including David Teece, view these as important insights, which: "laid the foundation for a completely new paradigm of international firm" (1985, p. 234). With this, Hymer transported the theory of foreign direct investment out of the neoclassical international theories of trade and finance and into industrial organization, the study of market imperfections. This became known as Hymer–Kindleberger paradigm.

For Hymer (who used industrial organization theory), the multinational enterprise, thus FDI, came to existence because of market imperfections. He began his analysis by assuming that MNEs operate at a disadvantage with respect to host country firms, since there exist additional costs of doing business abroad. To him, in the face of these additional costs, for an MNE to be profitable, it must possess other advantages, in the form of superior technology, better products, or firm-level economies of scale. (Norman, 2001, p. 3).

Hymer died during the 1970s. However, the market failure approach he initiated was formalized and further developed, in the form of transaction cost, internalization and the eclectic paradigms. These, in particular, appeared in the works by Buckley and Casson (1976, 1985, etc.), Rugman (1981, 1985, 1996, etc.), and Dunning (1977, 1981, etc.). For these writers, Hymer's dissertation had failed to distinguish between two types of market imperfections- the structural type (ala Bain, 1956) and the transaction-cost type (ala Williamson). Structural imperfections would lead to deviation from perfect competition in the product market, and result from: "the control of ownership advantages of factors proprietary technology, privileged access to inputs, scale economies, control of distribution systems, and product differentiation" (see Kalfadellis and Gray, 2002, pp 5–6). The transaction cost type imperfections arise naturally and are assumed to be exogenous to the MNE. According to Casson (1987), Hymer's failure to distinguish clearly between those two types of imperfections meant that he failed to relate the discussion to Coase's (1937) theory of the firm. (Ibid). In distinguishing themselves from Hymer's argument, and providing their insights into transaction cost theory and the MNE, McManus (1972), Buckley and Casson (1976), Hennart (1982), and Dunning and Rugman (1985) argued that market imperfections are inherent or natural consequences of dealing in a market because neoclassical assumptions of perfect knowledge and perfect competition cannot be realized. (Ibid, p. 7).

The above-mentioned writers developed various models of FDI. According to Norman, the basic idea in these models was that: "incomplete contracts and missing markets give rise to the possibility of opportunistic behavior in arms-length exchange (Williamson, 1975)

and so to the preference by the firm to replace external contracts by direct ownership and internal hierarchies" (2001, p. 3).

In addition to the transaction cost theory emphasized by writers such as Teece, two important paradigms emerged out of these argument. The first of these was the internalization paradigm, which came from the writing of Buckley and Casson (1976), Casson (1983), and Rugman (1982). As argued by Rugman, internalization is a general encompassing theory which can explain FDI. According to this theory, whenever an intermediate product or some special raw material is needed as an input for an enterprise and it is cheaper to cooperate with the supplier instead of buying it at the market, it is possible for the firm to internalize the supplier. An important pre-requisite for internalization (which can be done vertically or horizontally) is the existence of an imperfect market.

Internalization is linked (or, should be linked) to transaction cost theory. For example, according to Teece, "The internalization paradigm developed in the literature to date needs to have transaction costs economics embedded within it if a deep understanding of the multinational enterprise is to evolve" (1986, p.23).

Merging the above theories, Dunning has come up with his eclectic paradigm. According to this paradigm, FDI takes place in these different situations: (1) The MNC possesses ownership advantages that are not available to the host country firms. These advantages can be tangible (such as superior technology, superior product, or transferable economies of scale and scope), or they can be intangible (brand name, trade mark, etc.). (2) There can be some locational advantages that would make the investment (i.e. FDI) in the host country more profitable or easier than exporting to that country. This can be because of the market size, transportation costs, tariff or non-tariff barriers, or severe anti-dumping laws. (3) Internalization advantages, when the MNE believes that its ownership advantages are best exploited internally (through FDI, etc.), rather than sold directly through spot markets, or offered to other firms through contractual arrangements such as licensing, the establishment of joint ventures, or managerial contracting. It is in terms of the third element that Dunning's eclectic paradigm and the internalization paradigm of Rugman, Casson, etc. are similar. Rugman (1981) argues that the concepts of ownership and location as proposed by Dunning (1980, 1988, 1993) are accounted for in the internalization paradigm. Buckley (1988) suggests that Dunning's ownership advantages result in double counting.

The issues raised in the internalization-eclectic paradigm debate have given rise to other research activity. Some writers have employed game theory approaches (and concepts like Nash equilibrium) in dealing with issues. Examples include research by Hortsman and Markusen (1992), Motta (1992), and Motta and Norman (1996). These writers have treated the choice between FDI and exploring as a purely strategic issue.

Researchers have also approached the issues in terms of information asymmetry and public good related characteristics. For, as some have argued, an MNE decides to internalize because knowledge-based ownership advantages have public good characteristics, and give rise to informational asymmetry, and thus moral hazard and adverse selection. (Markusen, 1995, pp. 182–183). Many writers have tried to model these informational asymmetries, demonstrating the difficulties of uninternalized choices such as licensing. For example, because of non-exclusivity property of new knowledge, a firm may not want to reveal its process or product technology to a potential host country licensee. The MNE may fear that the licensee would reject the deal made, thus, acquiring the technology free of charge.

Conversely, the licensee too may be fearful, not knowing what would it end up getting from the MNE. Under such circumstances, no licensing deal will be made, and the MNE will internalize. Examples of such research done include the papers by Ethier (1986), Teece (1986), and Rugman (1986).

4. Behavioral economics and the multinational enterprise

When an exclusively local firm decides to go international, it faces a much more complex environment. This new environment is more complex in its economic, cultural and political dimensions; it is also more complex because these various dimensions involve more uncertainty in international situations. Aspects of this complexity are captured by Markusen when he writes: "After all, there are added costs of doing business in another country, including communication and transport costs, higher costs of stationing personnel abroad, barriers due to language, customs, and being outside of the local business and government networks" (1995, p. 173).

Conventional economics, which assumes away non-economic dimensions, and presumes the rationality of optimizing behavior on the part of economic agents, is not equipped to deal with the type of environment faced by the MNE. In fact, such a complex environment cannot even be adequately explained by the various paradigms that have emerged since Stephen Hymer composed his dissertation in 1960. For, these models, although exhibiting much improvement over the H–O–S or the portfolio capital flows theories, still are exclusively economic in nature. These models too (in contrast to behavioral economics) lack the above-mentioned complicated dimensions of politics, culture, and economics. Thus, they too should be viewed as incomplete.

The local firm, when it decides to go international, faces numerous choices, each one being more complicated than the choice a local firm faces when it only produces for the domestic market. An internationally inclined firm has to decide on the nature and location of its production facility. However, it must also strategize about its distribution facility (which links production to final demand, involving warehouses, transportation, and perhaps even retailing, and thus requires an investigation of customer needs, and maintaining the product's reputation by providing customers the services they require). In its choice of production facility, the firm also needs to decide if it wishes to remain local or go international. This implies deciding between exporting, FDI, joint venture, and licensing. If it decides to go with FDI, it has to decide between greenfield FDI, as opposed to acquired FDI. The same applies to its choice of joint venture. Investments in distribution facilities face the same situation. Regardless of its choice of production facility, the firm faces the choice of utilizing an independent distribution facility in the host country, as opposed to owning its own distribution facility. The MNE can own both production and distribution facilities, or only one of them (each one, when owned, can be either greenfield, or it can be acquired from previous owners in the host country). The firm, in its choice of production facility, may decide against exporting, FDI, or, joint ventures. If so, it can license its technology to a firm in the host country. Choosing among all these combinations of the production and distribution facility (involving different locations and types of ownership) is an extremely difficult task.

Deciding one of the many choices indicated above will require a consideration of various economic factors such as economies of scale, the size of the market in the host country (or region), the availability of needed human resources and the level of their skills, and for extractive industries, the availability of the resources to be extracted. Various writers have tried to employ the concept of net present value to decide one of the many choices MNC managers face when they decide to enter a foreign market. However, the problem with this method is that is only economic. For, we also have international cultural and politics factors that cannot be captured by the proposed NPV models.

Multinational enterprises need to develop an understanding of the cultural environment they face. This point is not always appreciated by students of FDI. However, as suggested by Tomasz Lenartowicz and Kendall Roth, "International business scholars generally recognize that culture is an important construct and that the field is in need of additional understanding about culture and its effects" (1999, p. 781). In fact, these writers quote Dunning stating that: "firms which are best able to identify and reconcile (cultural) differences, or even exploit them to their gain, are likely to acquire a noticeable competitive advantage in the market place" (Ibid).

For various reasons, culture (with indicators such as ethnicity, religion, language, etc.) is important for studying the behavior of multinational enterprises, in their investment and other activities. For example, argued by Luis Gomez-Mejia and Leslie Polich, "The greater the extent to which corporate headquarters and subsidiaries differ in their cultural characteristics [a phenomenon termed cultural distance by Johanson and Vahlne (1977, 1990)], the more difficult it becomes to effectively supervise the various units". Building on earlier work by Nohria and Ghoshal (1994) and Kogut and Singh (1988), a recent study by Roth and O'Donnell (1996) depicts the headquarters-subsidiary relationship in agency terms and argues that agency costs increase as a function of cultural distance. Gomez-Mejia and Polick, 1997(1997, p. 309).

The theories explaining the behavior of MNEs and FDI would be incomplete if international political factors are not taken into consideration. Political factors, in particular when they change, influence the process of information gathering by MNEs, and the choices they make. In fact, as early as 1966, Aharoni was aware of the impact of political uncertainty on the FDI decision. To him, the MNE must be more concerned about international political uncertainty than cost situations. While cost situations change slowly and gradually, international political changes can be drastic and abrupt: revolutions, coups, imposition of sanctions regimes, political violence against a certain firm or industry, and expropriations. The possibility of such political events can cause both political uncertainty and risk for the MNE (See Fitzpatrick, 1973). These changes, which lead to political uncertainty, are difficult to predict. Empirical studies are indicative of the fact that the perception of political risk and uncertainty can discourage foreign direct investment. (for example see Shihata, 1988). Due to political uncertainty, MNEs might find certain host countries too risky for investment at preliminary stages of decision-making process. This will prevent the identification of investment opportunities in these countries. However, political uncertainty may also lead to an over-optimistic assessment of the FDI decision. Specifically, the MNEs face uncertainties about government policies related to the nature of the ownership of their subsidiaries; they might encounter government policies that directly constraint local operations of these subsidiaries; or they might face government policies that regulate the flow of capi-

tal, technology, and manpower. Such political uncertainties exist because of the limits of the management's information and understanding of local conditions. This information gap may take the following forms. Firstly, MNE decision makers may fail to adequately distinguish between the international political environment directly affecting the MNE's international operations and other political events not affecting these operations. Secondly, these decision makers may find it difficult to (correctly) establish an explicit relationship between the actual international political events affecting their investment decisions and their perceptions of the events. This, as argued in the literature of cognitive dissonance, may emerge because individuals often err in their perceptions because the information they receive is inconsistent with their existing beliefs. Thirdly, MNE managers may place too much emphasis on discontinuous, recent and emotionally charged events, and too little emphasis on continuous and more permanent political events. Fourthly, the MNE decision makers may exaggerate the negative aspects of government intervention as they relate to the investments made by MNE. This will make there decision more general, subjective, and superficial.

5. Modeling the FDI decision

From the perspective of behavioral economics, MNEs should be viewed as complex organizations and MNE decision makers as real human beings who are not omnisciently rational. And, as individuals, these decision makers do not possess the same capacity to interpret information relevant to the benefits and difficulties of FDI (or a related investment) decision. Thus, information processing skills are non-homogeneous, and uncertainties are agent specific. In this uncertain environment, MNC managers must make decisions whose difficulties exceed their competence. (As a result, the FDI decision making process is transformed from one of risk to one under uncertainty). In other words, while the complexity of the international environment faced by decision makers is unlimited, decision makers have limited capacity for facing this complexity (Hosseini, 1994).

The reality of international (economic, political and cultural) environment faced by MNE managers seem to reflect the C–D (i.e. capacity-difficulty) gap model developed by Ronald Heiner in 1983, 1985 (AER). A (behavioral economics based) C–D gap model of FDI decision will be superior to the types of models developed since Stephen Hymer moved the FDI decision making away from the straightjacket of neoclassical type of models. The models discussed above, although far superior to the portfolio flows model, are still inferior to one inspired by behavioral economics.

Following Heiner, let U represent the uncertainty associated with making a right FDI (etc.) decision. It can be assumed that U is a decreasing function of the decision makers' perceptual abilities, P, and an increasing function of the complexity of the MNE's (economic, political, and cultural) environment, E. It is obvious that E itself is a decreasing function of newly attained information (i.e. political, economic or cultural), N. Thus we can write the following,

$$U = (P, E(N)) \tag{1}$$

where $U'(P) < 0$, $U'(E) > 0$, $E'(N) < 0$.

This new information (N) may either increase or decrease the risk-adjusted value of an investment project. Following Heiner, we can argue that, by and large, this new information decreases the complexity of the FDI decision. This is because new information can help managers to revise previously held expectations about the country they intend to invest in. The impact of this new information on the FDI decision depends on whether it is viewed as positive or negative. Positive new information can increase the volume of intended FDI, while new negative information can lead to a reduction in its volume. Because we have assumed, realistically, that individual perceptual abilities are non-homogeneous, we are in effect establishing that each MNE will react to a new piece of international information differently. In other words, we are arguing that international information gathering is, in effect, a subjective enterprise.

In this model, the decision to make FDI and how much of it, is a function of the level of uncertainty faced by the MNE. The conditional probability that the MNE manager will decide to make this investment when it should, depends on this uncertainty, $R(U)$. By the same token, we let $W(U)$ denote the conditional probability of MNE making a foreign direct investment when it should not. Both of these probabilities are functions of U, where

$$R'(U) < 0$$

and

$$W'(U) > O$$

Thus, as uncertainty increases, R will decrease and W will increase, this means the ratio of R/W will decrease.

Let $Q(E)$ be the probability that the firm's decision is correct, and $\mathrm{l} - Q(E)$ the probability that the firm's decision is incorrect.

Let us assume that the firm, if it made invest (FDI) when it should, it received an average profit rate of $G(E)$, and if it invested when it should not, it suffered a loss of $L(E)$. Obviously, the FDI must be made if the expected gain exceeds the expected loss, since

Expected gain = $G(E)R(U)Q(E)$
Expected loss = $L(E)W(U)$ $[1 - QW]$

we can write:

$$G(E)R(U)Q(E) > L(E)W(U)[1 - Q(E)] \tag{2}$$

dividing both sides of Eq. (2) by: G(E)Q(E)W(U),we will have:

$$\frac{G(E)R(U)Q(E)}{G(E)Q(E)W(U)} > \frac{L(E)W(U)[I - Q(E)]}{G(E)Q(E)W(U)}$$

since U is in effect $U(P, E)$, and Heiner's reliability condition can be written as: $R/W = B(P, E)$ we can re-arrange Eq. (2) to get a third equation, and introduce the tolerance limit, $T(E)$.

$$B(P, E) = \frac{R[U(P, E)]}{W[U(P, E)]} > \frac{L(E)[I - Q(E)]}{G(E) \cdot Q(E)} = T(E) \tag{3}$$

The left-hand side of the inequality is the reliability ratio, which is the ratio of two conditional probabilities, i.e. the probability of correctly making FDI when FDI produces

a gain relative to the probability of incorrectly making FDI when such action results in a loss. This ratio shows how an agent's C–D gap affects the relative probability of making an incorrect investment decision compared to the probability of making a correct one.

T(E) is the tolerance limit, which is a number greater than zero.

In the context of FDI decision, $T(E)$ would be different depending upon the risk-adjusted expected values. As the risk-adjusted expected value of an investment becomes negative, the investment becomes less desirable. $T(E)$ of greater than one represents investments of negative expected value, $T(E)$ of one shows equilibrium, and $T(E)$ of less than one (but positive) is the opposite. At any time, the risk-adjusted expected value of an FDI project may be positive or negative depending upon the positive/negative values of $G(E)$, $L(E)$ and $Q(E)$. In this model, the value of $T(E)$ may deviate from its equilibrium value of one, representing a behavioral change for the decision makers. The degree and speed of this change depends on their reliability ratio, which in turn depends on their perceptional competence to interpret new information, and the degree $T(E)$ divergence from one.

If new information becomes difficult to understand, actions will not be fully reliable and mistakes become possible. Thus, the reliability condition could be used as a guide to prediction. It is obvious that, for the MNEs of the industrialized world, C–D gaps would be lower and reliability ratios higher for the markets of other industrialized countries. This explains the fact that these MNEs make far greater investments in the more industrialized countries than in the LDCs. By the same token, those MNEs would make far less FDI (or other investments) in a given host country during periods of political upheaval, or economic crisis.

As stated before, a C–D based model, in contrast to the traditional maximizing model, assumes decision makers with non-homogenous perceptual abilities. We can introduce this non-homogeneity by assuming that different managers have different perceptual abilities in the form of:

$$P_1 > P_2 > P_3\rangle \cdots\rangle P_n$$

Given that they all have equal access to information (say disseminated through the media), and thus they all face the same degree of complexity, then we can assume that uncertainties faced by those managers are the opposite:

$$U_1 < U_2 < U_3\langle \cdots \langle U_n$$

Recalling that $R(U)$ is the probability that an investment (say FDI) is being made when it should be, $W(U)$ is the probability of it when investment should not be made, and that the first is a decreasing function of U and the second one an increasing function of it, then

$$R_1(U_1) > R_2(U) > R_3(U_3) \ldots > R_n(U)$$

And:

$$W_1(U) < W_2(U) < W_3(U) < \ldots < W_n(U)$$

These together imply that:

$$B_1(P_1, E) > B_2(P_2, E) > \ldots B_n(P_n, E)$$

The above-mentioned MNE managers would decide on the feasibility of an investment project depending upon the net present value. In other words, an FDI project would be undertaken if its $B(P, E)$ exceeds its $T(E)$. If information is vague and confusing, it brings a high level of uncertainty where: $B(P, E) < T(E)$ Thus, the investment project will not be taken unless additional information surfaces.

The most realistic case would emerge when the reliability rate exceeds the tolerance limit for some MNEs, and not for others. Thus, an investment project would be taken by those firms whose $B(P, E)$ exceed their $T(E)$ (i.e. those with a C–D gap). In the absence of a C–D gap, decision makers have no difficulty interpreting information/news, and there is no room for mistakes. This is the situation that also occurs under the assumptions of the conventional optimizing model. Thus, the neoclassical optimizing model can be viewed as a special case of the C–D gap model.

6. Concluding remarks

To explain the unprecedented rise of foreign direct investment after World War II, economists initially adhered to the neoclassical arbitrage theory of portfolio flows. However, as we saw earlier, this theory could not capture the reality of FDI and other forms of international investment. When we introduce risk and uncertainty and barriers to the movement of capital across nations and assume the reality of the MNE and the possibility of cross movement of capital, this theory loses its productive ability. Various writers, beginning with Stephen Hymer, emphasized that FDI was motivated by attempts on the part of multinational enterprises to reduce or remove international competition among firms, and by the desire of the MNEs to increase their returns from the utilization of their special advantages. However, these attempts gradually moved the theory of FDI away from economics (i.e. conventional economics), and towards the new and interdisciplinary field of international business (and in the forms of transaction cost, internalization and the eclectic paradigms). As I discussed before, we need not take the theory of FDI out of economics. For, economics, when it includes realistic and relevant assumptions, should have the ability to explain the phenomenon of foreign direct investment and capture the reality of international production. This occurs when we move from the narrow confines of neoclassical economics to the body of economic thought we now call behavioral economics. Behavioral economics, which (1) tries to make economic theory consistent with the accumulated body of knowledge in all behavioral sciences; (2) improves the assumptive realism of economic theory; and (3) replaces bounded rationality with the simplistic notion of rational economic agents exhibiting optimizing behavior, will have no conceptual difficulty in dealing with international economic reality. It was with this in mind that I tried to apply behavioral economics to international production and foreign direct investments. Behavioral economics allows us to view the MNE as a complex organization and its individual decision makers as boundedly rational real human beings who each possess different capacities to interpret information relevant to the benefits and difficulties of the FDI decision. Assuming that the complexity of the international environment faced by MNE decision makers is unlimited while these decision makers have limited capacity in facing this complexity, I was able to utilize the behav-

iorally bases C–D model developed by Ronald Heiner in explaining the FDI decision and modeling it.

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