The Sunset of Equilibrium Economics, The Dawn of Differential Delta-Economics: Exploring a New Analytical Paradigm

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Abstract: *Drawing on the presence of information asymmetry within the framework of real economics, the study posits several key points that explore a new direction for economic theoretical analysis (Yap, 2011). Firstly, that conventional economics that assumes equilibration is flawed because the almost certain presence of information disequilibria and the subsequent re-positioning of equilibrium is separated by time. Thus the study advocates that every economic system be analyzed using a system of differentials rather than absolute levels. Only relative positions matter and only economic convergence or divergence needs to be established. Rising velocities implies a rising information gap between contractual parties. Finally, the study maintains that a local information- based "equilibrium" (if ever achieved) does not necessarily imply optimization.*

Keywords: *Equilibrium, information asymmetry, optimization*

JEL-Code: *D50, D80, D82*

1. INTRODUCTION

This study explores a fresh paradigm in economics where the traditional assumption of information asymmetry permeating a large part of mainstream economics no longer holds true (Stiglitz, 2002). The following section provides a theoretical outline that underscores several points. Firstly, the study advocates a shift to Differential Delta-Economics where analysis operates on change rather than absolutes. It is pointed out that the concept of equilibration is fundamentally flawed. Therefore, absolute equilibrium does not matter, only relative equilibrium or disequilibrium requires attention.

The study provides a simple yet central framework for consumption and production paths arguing that information set changes drive decisions for

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households and firms. In the integration of consumption and production changes, a long run time path is identified. Therefore convergence or divergence in the short run can be determined.

As differentials are derived as time-relative, velocities can be explained. The study postulates that velocities are reflective of the information gap between time points and that an increasing velocity suggests rising difficulty in accommodating the information shift.

Finally, a zero change in decisions implies consistency and inertia in the information set that is known and relevant. This in turn implies that a local equilibrium subject to only the known information set is achieved. However, a critical consideration to be made is that in the presence of moral hazard and/or adverse selection, there is deliberate effort to maintain information asymmetry. If the information sets of consumers and producers do not change, because important and relevant information is not available, than an equilibrium (on the basis of zero change subject to known information set) will not be consistent with economic optimization.

2. THEORETICAL OUTLINE

Consumer optimization analytics should retain the fundamental theory which has been so well developed (see for example Romer 1996) only arguing that every utility function of consumer i is subject to information known:

$$U_i(q_1, q_2 \ldots q_n) \mid \Phi_t$$

Since only changes in utility matters, consumption optimization requires;

$$\acute{L} = \max \int_t^{t+1} DU_i(dq_1, dq_2 \ldots dq_n) \mid d\Phi_{i,,t} +_t$$

$$\lambda \quad [\int_t^{t+1} ((p_1 dq_1 + \ldots \ldots p_n dq_n) - dw_i)]$$

where $\acute{L}$ is the Lagrange function, DU_i is the change in utility for the ith consumer, dq_1, $dq_2 \ldots dq_n$ are the changes in demand for goods 1 to n, $d\Phi_{i,,t}$ the shift in information set known by the ith consumer, with the function constrained by wage change $dw_{i,.}$

The above already operates on the marginal. Thus when the change in the change is zero, local optimization, subject to change in relevant information known, is achieved. However, an important difference is put forward which is that utility change is optimized only insofar as known information is the premise upon which choices are made.

For example, utility from house ownership (a large consumption component) could decrease when new information about pollution in the vicinity is acquired. Alternatively, new information about plans for a 'green lung' or botanical park in the area can create increased utility.

Even so, the assumption may have to be made that the adopted utility function remains stable over the time shift indicated. Also, the issue of constraint involves fixed prices at least for the duration in question.

With complex decision trees, the entry of the information condition creates multiple possibilities. In this regard, operating on marginal functions gives another advantage in that we may design a time difference that is sufficiently small so that the utility function is deemed stable.

The use of differentials becomes even more important when production maximization subject to a cost constraint, is analyzed. Even adopting the simple Cobb Douglas function, the impact of information shift on the function's parameters is unlikely to be constant. There is a continuous effect of information on the knowledge-embodied labor and capital affecting output elasticities. These effects may be subtle, but over time, technology, labor and capital elasticities transform.

Thus the adoption of a particular production function must be based on the assumption that the parameters are constant over the designed time frame.

The production function is then based on the premise of available information to firm j as in:

$$\acute{L} = \max \int_{t}^{t+1} DF_j \, (dx_1, dx_2 \ldots dx_n) \mid d\Phi_{i,t} +$$

$$\lambda \quad [\int_{t}^{t+1} ((p_1 dx_1 + \ldots \ldots p_n dx_n) - dC_i)]$$

where the Lagrangian is the maximization of output subject to a cost constraint. DF_j is the change in output for the jth producer, dx_1, $dx_2 \ldots dx_n$ the changes in inputs $1 \ldots n$, $p_1 \ldots \ldots p_n$ the prices of inputs $1 \ldots n$ and dC_1 represents change in cost constraint.

Firm behavior, as with consumer behavior, must be analyzed differentially and local optimization determined as second order differentials.

The basic tenets of microeconomic behavior remain, and summation over m individuals and n firms yields the macroeconomic representation. However, this study argues that the deliberation of information asymmetry brings the necessity to analyze economic relativity as opposed to absolutes.

Microeconomic foundations of macroeconomics have largely adopted models that assume function stability. While the theories are sound (see for example infinitely lived models Ramsey (1928), Cass (1965) and Koopmans (1965) and Real Business Cycle Models for example Prescott (1986), Campbell (1994)), the implicit assumption of constant functions and perfect information is unrealistic. By narrowing the time definition to a period that just about enables the functions to hold, we can proceed to analyze firm and household behavior while acknowledging that information affects choices.

The study's second point concerns convergence or divergence. This must be with reference to a long run path. A summation of all utility changes from t=0 is generated as:

$$\int_{t=0}^{T} DU_i = Nett \ \Delta \bar{U}_T$$

where the utility shifts need not all be positive.

A summation of all production changes from t = 0 is generated as:

$$\int_{t=0}^{T} DF_i = Nett \ \bar{\Delta} F_T$$

One would expect the long run growth of utility to be, on average, positive, which suggests that the long run expected path is a rising one. This may be reasonable given the increase in both quantity and quality of products. Consider for example, developments in health, housing and education. However, there may also be rising inequality, crime, pollution and unhappiness which means one cannot discount a downward long-run trend.

The paper maintains that we should study the given path for households and firms in relation to its long run tendency. For a chosen short run change, a convergent path would be one consistent with its overall trend.

Assuming that the long run utility and production path is broadly positive, divergence beyond a set limit should trigger counter-cyclical measures.

It is also postulated that since change is time-defined, convergence velocity (speed and direction) will provide a measure of the information gap. For a given length of time, increasing velocity implies that the economy is attempting to adjust to new information. Rising velocities also imply that it becomes more difficult to accommodate the information gap.

On the premise that decisions are rational, it is only when changes are zero that no new information can be acquired. When zero change results, the economy resides in a information-based local equilibrium. As long as change is impacted, the economy lies in information-disequilibrium.

The study underlines the seriousness of adverse selection and moral hazard using the arguments as follows:

Moral hazard and adverse selection occurs when parties deliberately create information asymmetry. If important and relevant information is not known, then the information sets of consumers and producers do not increase, and current decisions are maintained. If so, an information-based local equilibrium (attesting to only known information sets that are unchanged) can actually be non-optimal.

Therefore, the study argues that an equilibrium does not necessarily imply optimization. This is a significant departure in theoretics from the standard approach to solving economic problems. Therefore, economists should re-examine arguments

maintaining that equilibrium points are optimal. This is the dilemma highlighted by the paper.

Even a cursory look at the Subprime Mortgage Crisis and the Asian Financial Crisis indicates that elements of information asymmetry in varying degrees were at play. While a good amount of theorizing must precede any empirical work, at this juncture, it suffices to say that it is hoped that this paper throws reasonable doubt on the basic mode of analysis which we have practiced thus far, and perhaps, pave an exploratory path into Differential Delta-Economics.

3. CONCLUSION

To summarize, the study proposes that economic analysis begin with first-order differentials and optimization be drawn on second order differentials.

Secondly, only relative positions matter, not absolute levels, and that this is within the framework of an information set known and relevant to decisions.

Thirdly, convergence or divergence can be established with respect to the long run path. Positing a tolerance limit to divergence, any shift beyond a given ceiling should be followed by counter-cyclical measures.

Fourthly, embedded within the shifting path is the issue of velocities which are presumed proportional to the information gap. A growing order of adjustment implies rising difficulty with coping or accommodating the information gulf.

Fifthly and finally, in the presence of information asymmetry, a local equilibrium subject to a given information set does not necessarily achieve optimization.

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