

**THE ECONOMICS QUEEN HAS SOURED**  
**(It is time to change)**

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**ABSTRACT**

The paper questions the validity of economics as a science of prediction and correct reasoning, which it claims to be according to the so-called idea of economic fundamentals. The arguments against the predictive power of economics are carried out on the basis of a comprehensive concept of economic and social sustainability but without losing sight of the need for scientific rigor and real-world facts. Thus the alternative model of a process-based idea of economic reasoning involving unity of knowledge or complementarities between the good and productive choices carried out in concert with polity-market social participation is formalized. Sustainability is thus studied in respect of such a process-based model of learning in complementary choices of the good things of life, which economics cannot aspire for, given her prevalent methodology.

The contrasting model is studied in respect of the monetary policy transmission to gain transparency with the case study of the European Central Bank (ECB). The lack of unifying circular causation interrelations between money, finance and real economy as the much-needed medium of a transparent monetary policy transmission is argued to be the cause of total economic volatility. The mismatch between economic fundamentals and reality in the midst of global financial volatility is examined. The cogent system of robust circular causation relations between money, finance and real economy in the absence of interest-rate is devised to address the issue of sustainability with effective monetary policy transmission.

Thus the theme of souring of Economics as the Queen of social sciences needs keen intellectual attention. So also is the immediacy for a robust alternative paradigm to the souring experience.

*Keynotes: critique of economic theory and application, sustainability and economic theory, application in ECB monetary policy transmission.*

## **THE ECONOMICS QUEEN HAS SOURED** **(It is time to change)**

For long now the profession has boasted of Economics as the Queen of the Social Sciences. That was the era when Economics matured under the shade of a classical notion of the physical universe, whose properties it imported into rational choice. Economics emulated the mathematical methods of optimization and equilibrium behavior and overarched these methods between microeconomics and macroeconomics in the areas of economic growth, public choice theory and rational expectations. Each of these branches of economics remained entrenched in rational choice behavior exported from the micro-level to institutional and collective norms. In this way, a unique and universal premise of self-interest, individualism and independence and completeness of rational choice assumptions was extended to the institutional level. Thus the rational choice behavior of individualism became the principle of methodological individualism of liberal institutionalism. Buchanan, and Buchanan and Tullock write about such overarching nature of economic theory and rational choice as its heart in the following words:

“Concomitant with methodological individualism as a component of the hard core is the postulate of rational choice, a postulate that is shared over all research programs in economics.” (Buchanan, 1999, p. 391)

“... all collective action may be converted to an economic dimension for the purposes of our model. Once this step is taken, we may extend the underlying economic conception of individual rationality to collective as well as to market choices.” (Buchanan & Tullock, 1990, p. 34)

### **The issue of sustainability in focus**

The soul and face of economics overarching methodological individualism across all matters of market exchange, voting behavior and institutional perks became an obsession with economists. This happened even under our eyes as scientism took the better of reality. But the problems of our economic, social and political lives became complex and intertwined. Such problems entered center-stage in the study of learning processes as the underlying concept of sustainability.

Sustainability is understood among economists as extension of non-inflationary economic growth caused by balanced utilization of resources. On the other hand, social learning as the foundation of sustainability is based on organic fusion of unity by complementary and participatory relationships between the good things of life. The objective thereby is attainment of increasing levels of total well-being. In this concept of sustainability the human world is a product of the interrelationships between material exchange and social exchange. In this kind of social order, ethics and markets, choices and preferences, models and variables, individual and the collective are embedded relational entities (Holton, 1992; Parson and Smelser; 1956). What is good for one is good for all. Hence the increase in welfare depends on the joint advancement of the good of all the agents and entities in diverse domains.

The wider field of exchange valuation between goods, services and social becoming within the overarching principle of sustainability has rendered the methods of economics to be insufficient. The concept of process and participatory dynamics between interacting entities and agencies replace optimal and steady-state equilibrium with and without time, by the methods of continuous learning. This also forms the substantive meaning of sustainability.

Economics as it is perceived today does not have the methods or methodology to explain inter-systemic dynamics with learning processes and pervasive participation between them. Yet another name of pervasive participation is complementarities existing in continuums. This principle once established and applied to the theme of economic problems within the comprehensive idea of sustainability is of massive proportion. Regarding this kind of process-based synergy of system-learning Herman Daly (1991, p. 32) writes: “The upshot of these considerations is that natural capital (natural resources) and human-made capital are complements rather than substitutes. The neo-classical assumption of near perfect substitutability between natural resources and human-made capital is a serious distortion of reality, the excuse of ‘analytical convenience’ notwithstanding.” Karl Polanyi (1977) questioned any trace of historical validity of the axiom of scarcity of resources, particularly in respect of land as resource.

### **What is the souring experience of the Economics Queen?**

The souring of Economics as idea and science has come from her failure to address the endless theme of sustainability. The methods and language of process, participatory dynamics, hence pervasive complementarities that open up opportunities for resource augmentation, all these and more are unavailable in age-old economic reasoning. Hence Economics is no more equipped to answer relevant issues of the real world adequately. She does not have either the reasoning or the methodology to perform this function. Thus the ageing of economics has fallen out of grace and relevance.

### **A new and revolutionary paradigm to fill the gap in economic reasoning on sustainability**

What is the new and revolutionary paradigm to fill the gap left by a soured Economics? We will address this issue by examining a problem that has been noted by some recent economic gurus. In the European Central Bank (ECB) there is a concern today that the decreasing labor productivity is caused by an ineffective long-run monetary policy transmission to society. The consequences of a faulty monetary transmission through ineffective institutional policies and forecasting mediums are higher than required long-run interest rates and productivity decline that caused a slowing down of gains in real potential output, thereby fueling inflationary pressures. In the end, a combination of ineffective transmission of monetary policy caused by a failure of institutional reform and predictive power of adopted models, the looming prospect of inflationary pressures causing lower expected real potential output and decreasing labor productivity are symptoms of an unsustainable relationship between money and the real economy.

This problem is stated by Trichet, the President of ECB (17 Jan. 2008) in the following words:

This confirms that the best contribution that monetary policy can make in order to foster sustainable economic growth and job creation is to maintain price stability. This is generally true, not just in response to productivity developments. A monetary policy that is credible in pursuing price stability and ensuring that inflation expectations remain well anchored will help to create a stable macroeconomic environment. This, in turn, will ensure the economy functions smoothly, facilitate firms' long-term planning and stimulate investment.

Furthermore, on the policy of effective monetary transmission the ECB, Papademos, Vice-President of ECB (5 Jan. 2008) states:

Monetary policy transparency and communication are beneficial when they help the central bank to achieve its objectives by enhancing the understanding of the markets and the public of the policy aims, strategy and decisions, thereby offering clear guidance for the formation of expectations as well as reducing uncertainty.

### **The need for economy-wide consciousness in monetary, finance and real economy circular causation relations**

By combining the monetary policy transmission approach with the real economy through the medium of financial instruments we can analyze the following relationship:

$$M = f(P, Y, r/i, \theta) \tag{1}$$

Where M denotes stock of real money supply;

P denotes price level;

Y denotes real output level;

r is the rate of return and can be proxy for the rate of labor productivity;

i denotes long-run interest rate;

(r/i) denotes relative price-factor for resource mobilization between the real economy when (r/i) increases, or it decreases when resources are driven into the financial economy with savings mismatched with productive investment;

$\theta$  denotes the consciousness in public and investors that would make them understand the monetary transparency policy in relation to financial instruments and the real economy.

Because expression (1) is well-defined in terms of the variables according to the instructions contained in the ECB prescription of maintaining price stability, therefore, an inverse implicit function 'g' of the function 'f' exists with a non-vanishing Jacobian (Hogg and Craig, ) and is of the form,

$$P = g(M, Y, (r/i), \theta) \quad (2)$$

Now note the following differentiated expression:

$$dP/d\theta = (\partial P/\partial M).(dM/d\theta) + (\partial P/\partial Y).(dY/d\theta) + (\partial P/\partial (r/i)).(d(r/i)/d\theta) + \partial P/\partial \theta \quad (3)$$

According to the optimal conditions attained under price stability in a sustainable growth environment involving monetary policy (M), real potential output level (Y), and effectiveness of the monetary transparency policy as suggested by ECB, expression (3) simplifies to expression (6):

$$(\partial P/\partial (r/i)).(d(r/i)/d\theta) = 0 \quad (4)$$

$$\text{That is } (d(r/i)/d\theta) = 0 \quad (5)$$

$(\partial P/\partial (r/i)) \neq 0$  necessarily, because increasing productivity (r) relative to long-term interest rate (i) will activate the real economy and generate price stability. But if (r/i) decreases then price-stability will be defeated. ECB remains silent on the interest-rate mechanism.

Thus, from expression (5) we obtain the final relationship (after simplification),

$$dr/r > di/i \quad (6)$$

That is, the rate of increase in real economy return (total productivity) must exceed the rate of change in long-term interest rate to establish price-stability under the joint action of monetary policy and its transmission through transparency effectiveness. The resulting policy therefore is that interest rate is an impediment to the growth of real economic growth with price-stability and thereby sustainability. The inference is that effective monetary policy transmission via the transparency approach cannot be attained in any regime of interest rates.

### **Opening up the ethical theme of money and real economy interrelationship**

Money and real economy interrelationship is an ethical issue. But it is a complex one that goes against prevalent economic reasoning, and builds upon its ruins a new worldview of ethics, society, economics, finance, institutionalism and development. Let us examine the problem raised by expression (6) in new light.

The comparative percentage change between 'r' and 'i' in the perspective of the interrelationship between money and real economy, and thus to establish sustainability, now becomes a problem of allocation of financial and productive resources between the real sector and the financial sector. Received economic theory treats such an allocation in terms of the marginal rate of substitution between the real sector and financial sector.

These are now seen to compete with each other on the assumption that resources are scarce. Indeed, resource scarcity is the core problem of economic theory.

Substitution of the financial sector for the real sector as competing sectors increases savings as withdrawals from the real sector as 'i' increases. Consequently, the mismatch between savings and investment makes business cycles as the principal cause of unsustainable economic growth. The effectiveness of monetary policy now goes in support of the savings curve shifting to the right, while the investment curve shifts to the left. Thereby, the (Savings – Investment) gap widens and the real output declines. The aggregate demand curve shifts to the left while the aggregate supply curve shifts to the right. This causes a widening gap between potential output and actual output. Thereby, price stability comes about by a depressed level of real output below the potential output.

At the low level of output the general macroeconomic equilibrium with aggregate demand curve intersecting the aggregate supply curve implies a resulting contraction in real output. Expansionary monetary policy shifts the aggregate supply curve rightward. In the situation of general economic equilibrium level of real output remains permanently below the potential level of real output. Thereby, savings as withdrawal remain above the anticipated investment, causing a mismatch between expenditure policy and monetary policy to establish real potential output with price stability. Now monetary policy permanently loses its effectiveness and transmission power.

To restore macroeconomic equilibrium, productive spending must make savings equal investment continuously over time. This would require the financial sector to link up with the real sector to generate increasing productivity while the business cycles stabilize. The marginal rate of substitution and competition between the financial sector and the real sector now disappears. Monetary policy and its transmission now regain effectiveness in establishing a complementary linkage between money and the real economy through the function of friendly financial instruments based on 'r' (productivity) while interest rate 'i' is phased out. The principle of pervasive complementarities between money, finance and the real economy now replaces the marginal substitution postulate of mainstream economics. The momentum increases by increasing 'r' until it replaces the rate of interest in the long-run (i).

How is the ethical impact explained in the above arguments? Ethics and sustainability spanning economy and society are of the essence. In the case of monetary dynamics and the real economy through the function of proper financial instruments the concept of social and economic sustainability is attained as an organic unity by complementarities between these activities. Such a learning environment is established by the critical function of  $\theta$ -value inducing the variables as in expression (1).  $\theta$ -value then represents communicative knowledge in expressions (1) and (2).

Generating  $\theta$ -value is of critical importance in monetary transmission for establishing transparency of monetary policy in the ECB. In this regard Papademos, Vice-President of the ECB (5 Jan. 2008) writes: "For all of these reasons, the announcement of, and consistent commitment to, our monetary policy strategy constitute a milestone in our

communication activities.” Good transmission of such  $\theta$ -value is fundamental in good market functioning. Thus  $\theta$ -value helps to unify money and the real economy through the medium of effective monetary policy. The financial instruments that realize this organic unity are those that avoid interest rate. Instead, they invoke complementarities between the financial and real sectors, continuous savings-investment equality to smooth business cycles, and enhance the growth of real potential output by complementarities between monetary and fiscal policies.

**Diagrammatic explanation of knowledge-induced monetary dynamics**

Figures 1-2 explain the opposite consequences that change the standard economic reasoning involving monetary transmission and sustainability in the comprehensive sense.

**Figure 1: Savings and investment disequilibrium and equilibrium caused by  $i$  &  $r$**

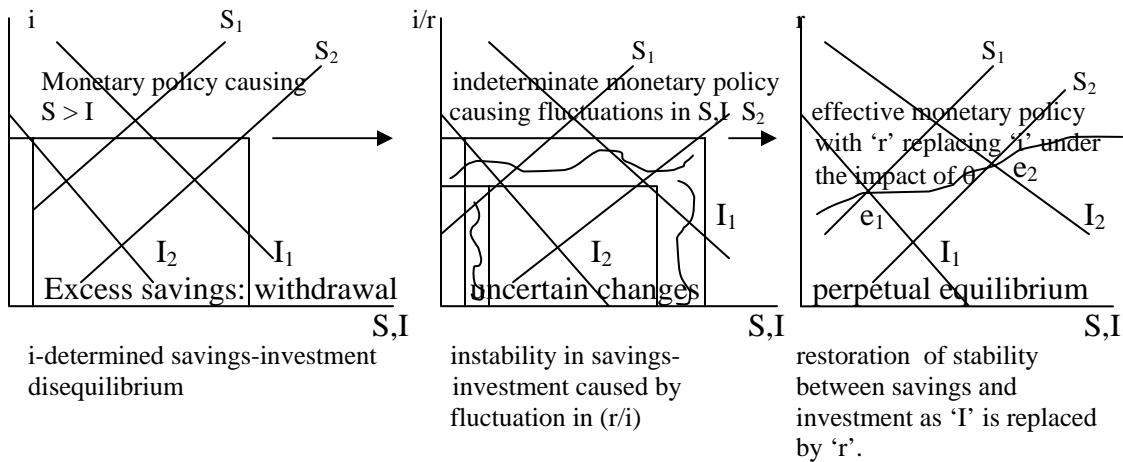


Diagram 1

Diagram 2

Diagram 3

The effect of 'i' on shifts in the savings curve is compounded by monetary policy at high rate of interest. This joint effect of 'i' increases savings but decreases investment, thus causing excess savings along the business-cycle. Therefore, the role of 'i' as financial instrument is untenable in resource mobilization between money and the real economy.

The effect of variable  $i/r$  (or  $r/i$ ) on savings and investment is unpredictable along the business cycle. Thus volatile mismatch are generated between savings and investment. This is shown by the wave-region. The implication is that the monetary transmission process in terms of stabilizing the economic cycles has not been well communicated to establish monetary transparency in the market economy and in disseminating informed knowledge to society at large. That is, the role of monetary policy in its relation to the economy is not well-understood, and thereby, not well-received.

When 'i' is well replaced by the rate of return (productivity rate) the implication is that monetary policy has been effectively communicated to the market economy. Consequently, a permanent economic equilibrium is established by fully mobilizing all savings into productive investment in the real economy continuously. Withdrawal by way of savings is phased out. The perpetual sustainable path of economic expansion in this situation of a productive financial instrument replacing 'i' for resource mobilization is shown by the  $e_1e_2$  trajectory. The trajectory  $e_1e_2$  is of a non-linear form. Along it 'r' may yield to the slowing down of the impact of  $\theta$ -value while waiting for new monetary and real economy synergy to arise, and innovative financial instruments without 'i' to be generated.

Figure 1 through its three diagrams shows the ethical evolution of a productive economy governed by the proper communication and transparency of monetary policy in terms of the money-finance-real economy organic unity of relations (circular causation). Sustainability both in terms of economic stabilization and institutional dissemination of economy and society wide learning is best served by replacing 'i' by 'r'.

Next we extend the above explanation of sustainability in the two opposite kinds of socioeconomic reasoning in Figure 2.

**Figure 2: Interest rate disequilibrium effects of monetary and fiscal policies**

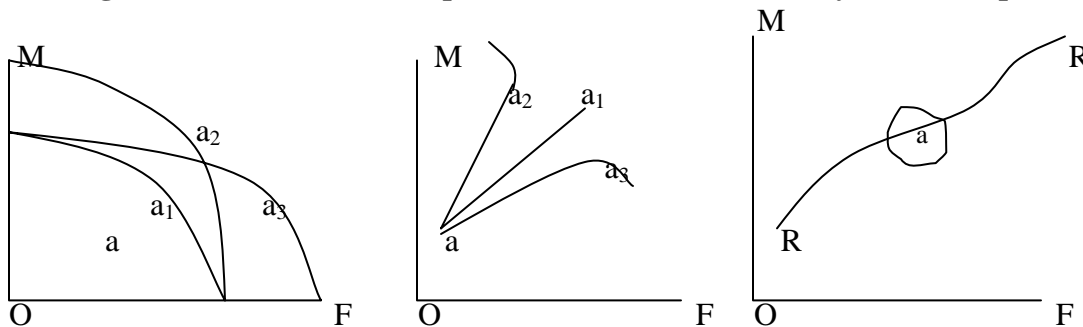


Diagram 1

Diagram 2

Diagram 3

M denotes the monetary side of the economy signifying monetary policy, monetary transmission and quantity of money. F denotes the fiscal side signifying productive spending. M is positively influenced by the growth of savings. F is positively influenced by the growth of productive spending. Hence 'i' influences M positively and F negatively. Contrarily, 'r' influences M negatively in the neoclassical marginal substitution framework. 'r' influences F positively. These substitutions are shown along the trade-off curve in (M,F).

The shifts in the PPC are the consequences of competition between M and F. Thus a<sub>2</sub> and a<sub>3</sub>, respectively arise from a<sub>1</sub>. In respect of the role of monetary policy positively influencing M, and thus negatively F, as in the case of neoclassical marginal substitution case, the trajectory aa<sub>2</sub> will be prevalent. But the same argument can be extended to the case of F being preferred. In that case, the trajectory aa<sub>3</sub> will prevail.

In respect of the complementarities between  $i$ , savings and monetary policy transmission, the economic expansion paths will be  $aa_1$ ,  $aa_2$ ,  $aa_3$ . This corresponds with Diagrams 1 and 2 of Figure 1. Contrarily, the complementarities (positive circular causation) between  $r$ , savings = investment and monetary policy will correspond with Diagram 3 of Figure 1.

Furthermore, we note that complementarities between ‘ $r$ ’, savings = investment, money and interest-free financing instruments are embedded in a learning field like that shown around ‘ $a$ ’ in Diagram 3 of Figure 2. ‘ $a$ ’-region makes an organic synergetic field. The same property is generalized all along the trajectory  $RR$ , wherein pervasive complementarities between the good things of life exist. They can expand further by the ethical and social forces of replacing ‘ $i$ ’ by ‘ $r$ ’ everywhere. The learning trajectory  $RR$  complementing  $(M,F)$  in the money-finance and real economy organic interrelations (positive circular causation) under the impact of  $\theta$ -value is the path of total sustainability. Diagrams 3 of Figure 1 and Figure 2 equally implicate the interest-free, productivity and business-cycle debate as presented above.  $RR$  differs from  $aa_1$  of Diagram 2 of Figure 2 by being a learning path, whereas  $aa_1$  is a steady-state optimal path, and hence has no simulative learning along it.

### Further explanation of Diagram 3 of Figure 2

Define  $\{.\}$  as the perturbation set of possibilities like in the region bounded by ‘ $a$ ’ in Diagram 3 of Figure 2. Now  $\{dM/dF\} > 0$ , as  $\theta$ -value increases. This is the condition of pervasive complementarities by learning between  $M$  and  $F$ . Also  $\{d^2M/dF^2\}$  can take all possible signs. Thus no directions toward optimality and steady-state equilibrium can be made. Yet the learning equilibriums of region ‘ $a$ ’ in Diagram 3 of Figure 2 are stable in nature, because each gravitating point in this field is subject to the continuously evolutionary yet limiting  $\theta$ -values as monetary policy transmission synergizes with the market order with ethical overtone along phases of development, that is along the path of sustainability.

### The analytical dynamics embedded in the learning field of resource allocation

A brief examination of the dynamics within the ‘ $a$ ’-region of Diagram 3 of Figure 2, while leaving out technical details, reveals the following intricacies:

Circular causation between the money-finance-real economy variables under the endogenous influence of  $\theta$ -value simulates the wellbeing criterion,  $W(.)$ , as,

$$\text{Simulate}_{\theta} W=W(M,r,p,Y)[\theta]; \text{ each of the variables is influenced by } \theta \quad (7)$$

$$\text{Subject to, } x = f(\theta, x'(\theta)) \quad (8)$$

$$\theta = g(x(\theta)) \quad (9)$$

$\theta$  is assigned ordinal values in respect of the ranking of  $x$ -variables.  $g(x(\theta))$  is a monotone of  $W$ . Hence estimation of  $\theta$ -function is sufficient for a monotonic estimation of  $W(x(\theta))$ .

New  $\theta$ -value arises by a polity-market restructuring of  $x(\theta)$  at the end of specific learning process in unity of knowledge between the interacting entities.

In the above expressions, each element in  $x = (M,r,p,Y)$  depends on the rest through the common embedding of these variables by  $\theta$ .  $x'$  is the  $x$ -vector excluding the selected dependent variable.

The system comprising (7) or (9) and (8) forms a stochastic model with probabilities that are unlike the frequency probability measure. That is because the 'a'-region contains events that are determined by a combination of historical data, and new information arising out of institutional discourse and ethical valuation for future action. Restructuring is done on these grounds. Thus the probability measure used in forming the stochastic values of the variables like  $(\theta,x(\theta))$  are measure-theoretic and governed by conditional probability functions. See Appendix for a technical formulation.

### **Connecting real monetary policy transmission to financial volatility**

The ineffective transmission of monetary transmission into the real economy through the function of financial instruments and proper monetary policy is reflected on financial volatility. Proper real monetary transmission mechanism can be realized by equating savings and investment continuously over time. In the absence of this condition, the ensuing business cycles will trigger financial volatility and cause rifts between the financial sector and the real economy. The real monetary transmission is deeply affected by the economy-wide and society-wide learning about its market-friendly effects.

Let us now examine how the compound effect of learning by monetary policy transmission in the presence of interest rate ( $i$ ) and the presence of productivity rate ( $r$ ) enter the financial volatility equation. By definition, financial volatility ( $Vol$ ) is computed by the formula,

$$Vol(Q) = \text{standard deviation } \{ \log({}^tQ) - \log({}^{t-1}Q) \} \quad (10)$$

But if we write expression (10) in terms of the variance of the stochastic processes  ${}^tQ$ ,  ${}^{t-1}Q$ , say in respect of price movement, interest rates, rates of return and divergences between savings and investment, we obtain the formula,

$$Vol(Q) = \text{Var}\{\log{}^tQ\} + \text{Var}\{\log{}^{t-1}Q\} \quad (11)$$

While expression (10) measures financial volatility in terms of estimated log-linear forms of financial variables, expression (11) shows that financial volatility is cumulative over time in the log-linear form of the variable under consideration. In this case, financial volatility would be alarming if the rate of change in  $Vol(Q)$  over time for expression (11) would exceed a given ceiling as set by the financial authority.

But we will redefine financial volatility by including explanatory factors in the formula and studying volatility as change in the risk factor. This is done as follows (Choudhury & Bhatti, 2006):

$$\text{Vol}(Q) = (d/dx) [\text{Var}(Q)] \quad (12)$$

where,  $Q = K(M,P,i/r,Y,\theta)$ ,  $K$  being capital movement and can be taken as S-I. The variable  $x$  denotes any one of the selected element of  $\{M,P,i/r,Y,\theta\}$ .

Let,  $Q = S-I$  in the log-linear form in terms. We can now construct the expression,

$\text{Var}(Q) = \sum_x a_x^2 \text{Var}(x)$ , where ‘ $a_x$ ’ denotes coefficients of  $x$ -variable in  $Q = K(M,P,i/r,Y,\theta)$ :

$$\text{Vol}(Q) = (d/dx)[\text{Var}(Q)] = \sum_x a_x^2 (d/dx)\text{Var}(x) = \sum_x a_x^2 [(\partial/\partial x')(\text{Var}(x)).dx'/dx]. \quad (13)$$

Here  $x'$  is the reference variable in  $Q = K(M,P,i/r,Y,\theta)$  with respect to which  $\text{Var}(x)$  is partially differentiated. All these are the consequences of the circular causation relations between the  $x$ -variables of the  $Q$ -vector. The method was explained in the system (7)-(9).

In the special case we can write,

$$\begin{aligned} \text{Vol}(Q) &= (d/d\theta)[\text{Var}(Q)] = \sum_x a_x^2 (d/d\theta)\text{Var}(\theta,x(\theta)) \\ &= \sum_x a_x^2 [(\partial/\partial x')(\text{Var}(\theta,x(\theta))).dx'/d\theta]. \end{aligned} \quad (14)$$

### **Some inferences on the monetary-real economy effects regarding financial volatility**

The implication here is that as  $\theta$  increases, that is monetary transmission with transparency and learning across economy and society takes heightened effect, then  $\text{Var}(Q)$  decreases. S-I as a stochastic ‘ $Q$ -variable tends to zero. Along with this, the effect of price-stability, increasing real potential output, the equality of quantity of money with productive spending, and increasing  $r$  with decreasing  $i$ , all contribute to a decreasing  $\text{Vol}(Q)$ . The converse is true when  $|S - I|$  diverges along the business cycle.

The following data on critical financial indicators bring out the inferences on financial volatility in relation to real monetary transmission and the other variables. Only selected data are available for developing countries to support our analysis in this paper. We will therefore be more comprehensive for the case of the U.S. where economic recession is feared to be at the corner. This economic recession is bound to adversely affect the world economy.

Table 1 data point out that although gross investment in billions of USD exceeded national savings, yet actual real GDP fell short of potential output. Inflation remained stable at approximately 3 per cent annually. Yet there was significant mismatch between the rates of change of real GDP and total money supply. Bond yield as ration of long-term yields to prime rate declined in the face of declining real GDP, increased money

supply and deepening investment gap. These are adverse signs of ineffective communication of monetary policy to the social and economic order. The results also point out that there is no accordance between theoretical predictions and facts. This suggests that governance of the economy should be conducted along lines of moment-to-moment simulation of the economic and social relations as facts. Discourse and good reasoning guide such experiences.

This means that there is no such thing as economic fundamentals for all times, and upon which prediction, policy development and governance can be established. Alexander Gray wrote on such a character of economic imprecision: “Economic science, if it be a science, differs from other sciences in this, that there is no inevitable advance from less to greater certainty; there is no ruthless tracking down of truth which, once unbarred, shall be truth to all times to the complete confusion of any contrary doctrine.”

**Table 1: Some critical economic indicators: USA**

	2000	2001	2002	2003	2004	2005	2006
GDP at constant prices (10xbillions of USD)	981.70	989.07	1007.48	1038.13	1173.35	1243.89	1315.27
Output gap (%potential output)	-0.40	-1.30	-2.60	-2.30	-0.90	-1.30	--
Inflation Index (2000=100)	100	102.83	104.44	106.83	109.70	112.71	115.40
Savings (10% GDP)	18.00	16.40	14.20	13.50	13.60	12.60	13.00
Savings (10xBillions USD)	176.71	162.21	143.06	140.15	159.58	156.73	170.99
Investment (% GDP)	20.80	19.10	18.40	18.40	19.60	19.80	20.00
Investment (10xBillions USD)	204.19	188.91	185.38	191.02	229.98	246.29	263.05
%change ratio of Money/real GDP ratio (est)	(0-6)	(-1.5-0)	(2-6)	(3.5-6.5)	(3)	(1-3)	(2)
Yield in 10-years 3-months Bonds (percentages)				+5	(2.0 – 3.5)	(0.5 – 3.5)	(-0.5-0)
Prime rate (percentage) currently:							6.00

In the light of ECB arguments on monetary transmission several points can be factored in to explain the prevailing ineffectiveness of monetary policy transmission to attain sustainable economic change (Papademos, op cit). These factors also beckon the end of sound economic reasoning and predictions in prevailing models.

Firstly, “the model or parameter uncertainty makes it hard to define and announce conditional intentions about the likely future path of policy rates...”

Secondly, there is considerable disagreement on the “appropriate path of future policy rates... especially in periods of heightened uncertainty and perceived structural change.”

Thirdly, there is qualm that markets and public will fail to understand “announced future policy path on forecasts or assumptions about the future evolution of exogenous variables that will influence the choice of the policy path.”

Fourthly, frequent changes of policy paths and mismatch between the policy rates vis-à-vis interest rates will erode public and market trust on announced policies.

Furthermore, the implication in the case of ECB’s focus on price-stability as the linchpin of economic sustainability while governing the role of monetary policy in maintaining this with the concert of market-friendly adaptation to future evolution of policy rates conveys an important lesson. In this it becomes increasingly clear that no further predictability of economic fundamentals is available. For instance, price stability with monetary control would require a long-term stability of interest rates and productivity gains by moving the actual output level closer to the potential real output level. None of these is possible. That is because as the real output gap narrows, expectations pick up and the economy gets volatile by competition for resource allocation between the financial and real sectors. Resulting effects are found to be growing concern on the side of price and interest-rate stability. Competition for financial resources between the real sector and the financial sector sparks financial volatility, as we have pointed out the arguments through expressions (17)-(21).

Consequently, the same causes of marginal rate of substitution compounded by the inadequate monetary transmission mechanism in the midst of such faulty money-finance-real economy relations, causes breakdown in the transparency of monetary policy communication. The money-real economy linkage is disrupted and the financial instruments depending on and caused by fluctuations in the short-to-long term interest rates causes overall financial volatility. The whole idea of economic sustainability and price-stability is thwarted.

## **Conclusion**

This paper has argued that consciousness in economic reasoning that comes by way of proper information flow and the fusing of ethical consideration as learning inputs in generalized systems of social, economic and scientific interrelations is not to be found in mainstream economic theory. On top of this, monetary policy taken as an example remains piecemeal application. If modeling here is based on received economic theory, the result is a failure of predictability on attaining socioeconomic sustainability. If it relies on institutional approach and discourse alone considering exogenous factors and the inability to govern them, then the result is uncertainty. It causes loss of market and public trust on monetary policy and the real economy. All these effects result in the failure of transparency in monetary policy.

At the end, we have argued in this paper that a new kind of economic, social and scientific reasoning is needed to fill in the gap of ethical implications of learning in a generalized system of complementary relationships. This is the paradigm of endogenous

ethics. It is particularized in this paper to money-finance-real economy circular causation relations premised on unity of knowledge between these learning entities. Ethical endogeneity can be possible by taking away all that cause total economic volatility, not simply financial volatility.

We have argued that removal of interest rates and its negative causation in the money-finance-real economy productive relationships is that way towards sustainability. The paper has argued that such relationships explained by evolutionary kinds of learning through circular causation in the framework of their reinforcing positive consequences constitute the essential meaning of ethical endogeneity and systemic learning of unifying entities. It becomes the basis of monetary transmission of transparency. It is gained in the money-finance-real economy unifying relationships.

In such a generalized system of interrelationships with pervasive complementarities between the entities economic governance is neither institutionally imposed nor left to the mercy of unbridled market forces. The circular interrelationships are learned. The way towards this is participation. It is understood as polity-market coordination with receptivity in economy and society. The resulting kind of economic thinking and policy transmission for structural change brings about transparency in the organic system of participatory actions and responses.

Such is the social discursive method of unity of knowledge in the policy-market learning processes. An economic paradigm deprived of such process-based learning process in unity of knowledge between the participatory entities remains an imposition of externally imposed authoritative will. The consequences and the reasoning are not integrative.

The cause of global financial volatility is shown to emanate from the slowdown of the US-economy (IMF, Jan 29, 2008). Causes for this are given as the slowdown in housing and consumption spending and its after-effect on employment in the US. These are variables for the real economy. But, as we have pointed out in Table 1, the economic relations remain soured towards rectifying the weakening situation. On the financial side, slowing down of global movement of financial resources will particularly hit the emerging economies. The mismatch between savings and investment will thus continue.

If the focus of economic futures as engineered by international development financing institutions is still on growthmanship for structural change, the total global volatility is nowhere in sight on a sustainable scale. There will be bumps along the road, as explained by the learning probability measures explained in the Appendix. But if global economic reasoning and policy transmission follow the pattern suggested by our generalized system of unified circular causation in expressions (7)-(9), then certain true monetary-finance-real economy interrelationships can emerge. Economics, society and their scientific reconstruction now take up new visions of the future. Such is the revolutionary change that leads to sustainability.

So at the end, Economics as the Queen of the social sciences has indeed decorated herself well with all the external posture and embellishments. But her interior is now

permanently fraught with the insecurity of its divorce from human realities. The old Queen Economics can appear in public with a clarion call. But this has none of the appeal she had in her heydays of youth.

Like the firefly, the Economics Queen has burnt herself, even in the very moment of her tempting forays. Economics as that Queen has thus soured.

## APPENDIX PROBABILITY FUNCTIONS FOR LEARNING FIELDS

The probability analytics can be summarized as follows (Vanmarcke, 1988):

$$\text{Prob}(x_1(\theta_1) | \theta_1) = \text{Prob}(\theta_1, x_1(\theta_1)) / \text{Prob}(\theta_1); \quad (\text{A1})$$

$$\text{i.e. } \text{Prob}(\theta_1, x_1(\theta_1)) = \text{Prob}(x_1(\theta_1) | \theta_1) \cdot \text{Prob}(\theta_1). \quad (\text{A2})$$

Likewise,

$$\text{Prob}(\theta_2, x_2(\theta_2)) = \text{Prob}(x_2(\theta_2) | \theta_2) \cdot \text{Prob}(\theta_2),$$

etc.

$$\text{Prob}(\theta_n, x_n(\theta_n)) = \text{Prob}(x_n(\theta_n) | \theta_n) \cdot \text{Prob}(\theta_n) \quad (\text{A3})$$

$$\begin{aligned} \text{Prob}(\theta_1, \theta_2, \dots, \theta_n, x_1(\theta_1), x_2(\theta_2), \dots, x_n(\theta_n)) = \\ \prod_{i=1}^n \text{Prob}(x_i(\theta_i) | \theta_i) \prod_{i=1}^n \text{Prob}(\theta_i). \end{aligned} \quad (\text{A4})$$

Expression (A1) on compound conditional probabilities can be re-written in its equivalent probability density functions (f) and cumulative distribution function (F), respectively as,

$$f(\theta_1, \theta_2, \dots, \theta_n, x_1(\theta_1), x_2(\theta_2), \dots, x_n(\theta_n)) = \prod_{i=1}^n f_i(x_i(\theta_i) | \theta_i) \prod_{i=1}^n f_i(\theta_i) \quad (\text{A5})$$

$$F(\theta_1, \theta_2, \dots, \theta_n, x_1(\theta_1), x_2(\theta_2), \dots, x_n(\theta_n)) = \int_{-\infty}^{x_1} \dots \int_{-\infty}^{x_n} \int_{-\infty}^{\theta_1} \dots \int_{-\infty}^{\theta_n} \prod_{i=1}^n f_i(x_i(\theta_i) | \theta_i) \cdot f_i(\theta_i) dx_i d\theta_i \quad (\text{A6})$$

Expression (A6) conveys the fact that each event in the set  $\{(\theta_1, \theta_2, \dots, \theta_n, x_1(\theta_1), x_2(\theta_2), \dots, x_n(\theta_n))\}$ . This is rewritten in the form with  $\mathbf{Event}_i = \{(\theta_i, x_i(\theta_i))\}$  as  $\{E_1, E_2, \dots, E_n\}$ , subject to learning probabilities conveyed by  $\text{Prob}(\theta_i)$  for each  $E_i$ , respectively. These are compounded by the probabilities of occurrence of the state variables  $(x_1(\theta_1), \dots, x_n(\theta_n))$  within themselves and the occurrence of  $(\theta_1, \theta_2, \dots, \theta_n)$  within themselves. As well as there are interactively developed integration in the total set  $\{E_1, E_2, \dots, E_n\}$ . This implies the interactive joint occurrence of the two activities, namely market forces and endogenized ethical value guidance, programs and policies. The latter are generated by discursive dynamics (Shakun, 1988). The probability of occurrence of such an event increases as learning indicated by a limiting value of  $\theta$  in the interactive, integrative and evolutionary (IIE) set  $(\theta_1, \theta_2, \dots, \theta_n)$  increases. We note here that each  $E_i$ , with  $i = 1, 2, \dots, n$  comprises a process in Figure 1 that leads to subsequent process by continuous learning.

Thus a further simplification is possible:

$$\text{Let } \text{plim}_L \{\theta_1, \theta_2, \dots, \theta_n\} = \theta + \xi_n(\theta); \quad (\text{A7})$$

$\xi_n(\theta) > 0$  is a monotonic increasing  $\theta$ -induced impetus to learning probabilities in 'a'-region

Here L denotes a finite range of interaction leading to the state of consensus (integration) in a derived  $\theta$ -value. L applies to intra-system, as in Mapping 1 of Figure 1. Equally it applies to inter-system, as in evolutionary diagram 2 of Figure 2. Besides, since this limiting value emerges over learning set, there is also evolutionary learning behind the derivation process of  $\theta$ -value.

Likewise, with the same arguments and the fact that compound probability measures exist also in the set  $\{x_1(\theta_1), \dots, x_n(\theta_n)\}$ , and that there are conditional probabilities for these state values in the set,  $\{(\theta_1, \theta_2, \dots, \theta_n, x_1(\theta_1), x_2(\theta_2), \dots, x_n(\theta_n))\}$ , therefore, the following are derived:

$$\text{plim}_L \{x_1(\theta_1), \dots, x_n(\theta_n)\} = x(\theta) + \lambda_n(x(\theta)); \lambda_n(x(\theta)) > 0 \text{ as for } \xi_n(\theta); \quad (\text{A8})$$

$$\text{and } \text{plim}_L \{(\theta_1, \theta_2, \dots, \theta_n, x_1(\theta_1), x_2(\theta_2), \dots, x_n(\theta_n))\} = (\theta, x(\theta)) \quad (\text{A9})$$

Expressions (A7)-(A9) in the sense of  $\text{plim}_L$  now reduce to,

$$\text{Prob}(\theta, x(\theta)) = \text{Prob}(x(\theta) | \theta) \cdot \text{Prob}(\theta) + (\xi_n(\theta), \lambda_n(x(\theta))) \quad (\text{A10})$$

$$f(\theta, x(\theta)) = f(x(\theta) | \theta) \cdot f(\theta) + \alpha(\xi_n(\theta), \lambda_n(x(\theta))). \quad (\text{A11})$$

$$\text{Let, } \alpha(\theta, x(\theta)) = \alpha((\xi_n(\theta), \lambda_n(x(\theta))))$$

$\alpha(\theta, x(\theta))$  denotes monotonic positive transformation around functionals of  $(\theta, x(\theta))$ . Such variations reflect the RR-paths of IIE-processes in learning spaces of L as indicated in Diagram 2 of Figure 2 (Choudhury & Zaman, ).

$$F(\theta, x(\theta)) = \int_{-\infty}^x \int_{-\infty}^{\theta} f(x(\theta) | \theta) \cdot f(\theta) dx d\theta + \int_{-\infty}^x \int_{-\infty}^{\theta} \alpha(\theta, x(\theta)) dx d\theta \quad (\text{A12})$$

Because of the discoursed learning variables and their induced state variables the data of the probability distributions are a combination of historical and generated information in the system of pervasively participatory endogenous relations. They have in them the essence of social interaction leading to integration (consensus) over evolutionary learning experience (Thayer-Bacon, 2003). Yet such probabilities are computable to convey measures of progressively unraveled reality. That is because such probability measures are obtained by progressive experience in learning fields. Such probability functions are therefore different from those based on the frequency notion of probability measures. They may be compared better to Quantum probabilities (Nadeau, 1990). Learning and ethics of relations in unity of knowledge thus brings consciousness into socio-scientific understanding, where it is absent at present.

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Data in Table 1 are obtained from IMF. World Economic Outlook; Bloomberg.com: rates and bonds, Feb. 14, 2008. A World of Possible Financial Futures, [NowAndFutures.com](http://NowAndFutures.com),