

Monetary Policy in an Interconnected Global Economy

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Panel: We Are All FIT-ers Now:

Is Flexible Inflation Targeting fit to a new financial environment?

Takatoshi Ito

University of Tokyo

Comments by Andrew Sheng¹

President,

Fung Global Institute

Professor Takatoshi Ito's paper describes very well the dilemma faced by advanced country central bankers in an era of unprecedented contextual transformation and radical uncertainty. When the whole world is highly interconnected and interdependent, as the title of this Conference suggests, central bankers are struggling with policy tools and targets that have to be highly flexible and adaptive. In other words, there is no practical alternative except to be flexible, in inflation and other targeting. Fixed targeting on any target is likely to wrong.

Hence, I commend Professor Ito on his analysis and his suggestion that non-crisis countries should not mistake QE and flexible inflation targeting as exchange rate targeting or "currency wars". Non-crisis countries totally understand that crisis economies need to do whatever it takes to get out of their deflation trap, but the spillover effects are nevertheless real.

Hence, what I want to do in this short note is to concentrate on what has changed for central bankers pre-2008 and post-2008 and concentrate on what I think non-crisis central banks should think about what are their options in modus operandi are.

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Consensus central bank thinking pre-2008

The mainstream thinking behind central banks comprised satisfaction that the period of the Great Moderation proved that central banks had the tools to deal with the delivery of both price and financial stability. The underlying assumption in central bank models was that financial markets would revert to equilibrium, as long as central bankers took care of price stability.

In an FT interview discussing his new book, “The Map and the Territory²”, former US Federal Reserve Chairman Alan Greenspan acknowledged that: “*all the new concepts with every theoretical advance was embodied in that [Fed] model – rational expectations, monetarism, all sorts of sophisticated means of thinking how the economy worked.*” And yet in September 2008, “*the models failed at a time when we needed them most... and the failure was uniform. JPMorgan had the American economy accelerating three days before [the collapse of Lehman Brothers] – their model failed. The Fed model failed. The IMF model failed. I am sure the Goldman model also missed it too*³.”

“To me it suddenly seemed that the whole idea of taking the maths as the basis of pricing that system failed. The whole structure of risk evaluation – what they call the ‘Harry Markowitz approach’ failed. The rating agency failed completely and financial services regulation failed too.”

In his book, Greenspan argued, “that in the real economy, the models still work quite well. But in the financial sector, leverage can lead to failure, contagion and panic, because finance was not trading “commodity but human nature...and there is something about human nature which is not rational.”

Theory behind pre-2007 was flawed

As we now admit, but do not have a better alternative, the economic theory behind inherent stability of the financial system was seriously flawed. Frydman and Goldberg⁴ have argued that both the rational and behavioral theories of the market rest on the same fatal assumption--that markets act mechanically and economic change is fully predictable. As we all know from simple two-person games, with each person guessing how the other person would react, there is huge uncertainty in behaviour and outcomes, because each person has a different utility function that the other cannot know. In other words, human behaviour is non-mechanical, non-linear and the outcome of n-person interactive behaviour, namely, the market can change in unpredictable ways.

There is much that economics can learn from other social science disciplines, especially systems thinking, which evolved from the work of biology and physical sciences,

² Alan Greenspan, “The Map and The Territory”, Penguin, 2013.

³ Gillian Tett, “Crash Course: interview with Alan Greenspan,” Financial Times, October 26/27 2013, page 19.

⁴ Roman Frydman and Michael Goldberg, “Beyond Mechanical Markets”, Princeton University Press, 2011.

especially von Bertalanffy⁵, Simon⁶ and others. As early as 1956, Simon had the insight that observed behaviour was better explained by learning theory (from psychology) than economic theories based on rational behaviour. He postulated that organisms adapted to uncertain environments through ‘satisficing’ under imperfection information, rather than ‘optimize’. He cast “*serious doubt on the usefulness of current economic and statistical theories of rational behaviour as bases for explaining the characteristics of human and organismic rational behaviour.*”

Building on Bertalanffy’s work, open systems have the following general properties: “*importation of energy from the environment, the through-put or transformation of the imported energy into some product form which is characteristic of the system, the exporting of that product into the environment, and the re-energizing of the system from sources in the environment. “Open systems also share the characteristics of negative entropy, feedback, homeostasis, differentiation, and equifinality*”⁷.”

The above characteristics describe well the character of open financial markets, with huge uncertainty. The theory of negative entropy states that systems survive and maintain their characteristic internal order only so long as they import from the environment more energy than they expend in the process of transformation and exportation. This explains well the Ponzi scheme of modern leveraged finance.

The feedback mechanism is the process of change and interaction, whereby exchange of goods, services and information between market counterparties enable them to adapt to their environment. Open systems are never at rest (homeostasis) but under continuous adaptation to changes from internal and external shocks. Equifinality asserts that systems can reach the final destination from different initial conditions and by different paths of development.

As Katz and Kahn shrewdly observed, mainstream economics and other traditional organizational theories have tended to look at human organizations as closed systems due to the need for specialization, which necessarily compartmentalize thinking (*ceteris paribus*), but this tended to look at internal organizational function, but ignored how much organizations interact with their environment and context, namely, feedback processes that are essential to survival.

More recently, systems thinkers such as Brian Arthur has argued for Complexity Economics⁸: “*Complexity economics sees the economy as in motion, perpetually “computing” itself— perpetually constructing itself anew. Where equilibrium economics emphasizes order, determinacy, deduction, and stasis, complexity economics emphasizes*

⁵ L. von Bertalanffy (1950) The Theory of Open Systems in Physics and Biology, Science, vol. 111, p23-29

⁶ Herbert A. Simon (1956), “*Rational Choice and the Structure of the Environment*”, Psychological Review, vol.63, p. 129-38.

⁷ D. Katz and R. L. Kahn (1966), “Common Characteristics of Open Systems”, chapter 2 in The Social Psychology of Organizations, Wiley, pp 14-29

⁸ W. Brian Arthur, *Complexity Economics: a different framework for economic thought*” Oxford University Press, 2013

contingency, indeterminacy, sense-making, and openness to change. In this framework time, in the sense of real historical time, becomes important, and a solution is no longer necessarily a set of mathematical conditions but a pattern, a set of emergent phenomena, a set of changes that may induce further changes, a set of existing entities creating novel entities.”

How do systems thinking, Heisenberg's uncertainty principle and the derivative notions of indeterminacy, uncertainty, precision, and observer–observed interaction apply in modern financial markets and central banks?

Haldane and May (2011) has applied some of this thinking to managing systemic risks in banking ecosystems. They argue that financial innovation designed to optimize returns to individual institutions with seemingly minimal risk may have huge effects on the stability of the system as a whole. Their analysis of “*oversimplified models of financial ecosystems carr[y] potentially far reach implications for the design and implementation of public policy*”, including the following:

- Setting regulatory capital/liquidity ratios – these are used to strengthen the financial system as a whole by limiting the potential for network spillovers
- Setting systemic regulatory requirements – current prudential regulation has become increasingly risk-based using Basel II risk weights, but these risks are calibrated for institution-specific rather than systemic risk. Furthermore, these risk weighting ignored feedback mechanisms and interaction between different risks.
- Netting and clearing derivatives – netting and central clearing attempts to simplify complexity, provided that the central clearer is not itself a “super-spreader” of risk
- Shaping the topology of the financial network – two characteristics – diversity across the financial system and modularity within the system are key to overall stability.

The application of complexity economics or adaptive ecosystem thinking into finance raises some important issues as to system stability. Beale and others⁹ have argued that financial regulators have a fundamental dilemma: does maximizing individual bank stability lead to system stability, and how much diversity can be allowed? Their model results suggest that diversity in asset allocation can help system stability. More recently, Kobayashi (2013)¹⁰ has studied both **asset allocation and bank interconnectivity**, which suggested that “*the use of negatively correlated assets will be quite effective in reducing systemic risk by lowering the probability of collective fundamental defaults*”. Furthermore, he discovered that the most infective bank, or the topologically most

⁹ Nicholas Beale, David Rand, Heather Battey, Karen Coxson, Robert May and Martin Nowak< “Individual versus systemic risk and the Regulator’s Dilemma”, Proc. Natl. Acad. Sci. USA 108, 12647 (2011)

¹⁰ Teruyoshi Kobayashi, Network versus portfolio structure in financial systems, The European Physical Journal B (2013) 86: 434

influential bank need not always to be the safest. Under certain circumstances, the most infective node is required to act as a firewall to prevent large-scale collective defaults.

What are the implications of such system-thinking research on central banking?

First, central banks evolved as the most important institution to provide system stability. Up until the abandonment of the gold standard, holdings of gold were the negative correlated asset that was the anchor of system stability. Today, there is no firm anchor, since most of the foreign exchange reserves are based on reserve currencies that have debt to GDP ratio in excess of 100 percent of GDP, and with the exception of Japan, net foreign exchange liabilities.

Second, the central bank can provide stability because of two functions – (1) an anchor of the stability of external value of the currency (2) anchor of internal stability, through both monetary stability and financial stability.

Since we agree that the exchange rate should not be targeted for trade purposes, the tools available to the central bank to achieve system stability are its balance sheet, its open market operations that seek to influence the short-term interest rates and its macro-prudential tools that can restrict what the banks can do, such as leveraging.

In short, when central banks use their balance sheets to affect other balance sheets, there is an underlying “asset allocation paradigm” that has systemic implications. The wrong asset-liability allocation can have large systemic results. And current policy is to fix excess debt with more debt, but ignored the asset side of the balance sheet, which is outside the purview of central banks. Hence the need for real sector reforms.

However, whether central banks can use their policy tools would depend on the efficiency of the monetary policy transmission mechanism. As an IMF working paper noted¹¹, some emerging economies have a relatively ineffective monetary policy transmission owing to weaknesses in their domestic financial system and large informal sector. But, open economies like India can have a substantial monetary policy transmission through the exchange rate channel.

With all due respect, I find the Bernanke quote that “We are a dual-mandate central bank: We put equal weight on price stability and maximum employment; those are the goals given to us by the Congress” quite intriguing, because the transmission mechanism between central bank policies and employment is highly tenuous.

Soros’s view of dynamic disequilibrium

Greenspan’s rediscovery of human nature in economic behaviour has resonance with the views of George Soros. He used his boom-bust theory of financial crises¹², which focus

¹¹ Rudrani Bhattacharya, Ila Patnaik and Ajay Shah “Monetary policy transmission in an emerging market setting”, International Monetary Fund Working Paper WP/11/5, January 2011

¹² George Soros, “*The Future of Europe*”, Remarks delivered at the Global Economic Symposium, 1

on the process of change, involving reflexive feedback loops between the objective and subjective aspects of reality.

Due to the fallibility of human cognition of an uncertain and rapidly changing environment, open social systems have negative or positive feedbacks in human interaction (commonly observed in markets). Mainstream economics assume the norm is negative feedback, which is return to equilibrium. In Soros's theory, which is observed in real life, equilibrium is one of two theoretical extremes. "*Reality ranges from near equilibrium to far from equilibrium conditions, but the distribution of cases does not follow a regular bell curve; it tends to cluster around the two extremes.... A situation can be considered stable or unstable. But people's opinion can shift quite quickly. This leads to the "fat tails" observed in market volatility.*"

Central banks are beginning to realize that we need a much more complex way of thinking about financial market behaviour than using DSGE models that do not incorporate the financial sector. The Bank of England has recently been working on the balance sheet imbalances that may impact on financial crisis¹³. In the run up to GFC, Bernanke¹⁴ (2005) and King¹⁵ (2009)) argued that the excess savings of China and other emerging market economies (EMEs) led to large net capital flows to advanced economies that resulted in loss of monetary control – the so-called 'savings glut' view.

There is another broad school of thought, led by Borio and Disyatat¹⁶ (2011) and Shin¹⁷ (2012) argue that credit within the global banking system generated very large *gross* capital flows. The imbalances were due to a global 'banking glut'.

The Bank of England paper suggests that there was in fact a strong interaction between the 'savings glut' and the 'banking glut' that created the conditions for the crisis. In Soros's words, the reflexivity between the two create dynamic pro-active conditions, which central banks are now trying to solve with unconventional monetary and complex macro-prudential policy

October, 2013 in Kiel, Germany, available at www.georgesoros.com.

¹³ Yaser Al-Saffar, Wolfgang Ridinger and Simon Whitaker, *The role of external balance sheets in the financial crisis*, Bank of England, Financial Stability Paper No. 24 – October 2013

¹⁴ Bernanke, B S (2005), 'The global saving glut and the US current account deficit', Sandridge Lecture, Virginia Association of Economists, Richmond, Virginia.

¹⁵ King, M (2009), 'Speech at the CBI dinner', available at www.bankofengland.co.uk/archive/Documents/historicpubs/speeches/2009/speech372.pdf.

¹⁶ Borio, C and Disyatat, P (2011), 'Global imbalances and the financial crisis: link or no link?', *BIS Working Paper No. 346*.

¹⁷ Shin, H S (2012), 'Global banking glut and loan risk premium', Mundell-Fleming Lecture, presented at the 2011 IMF Annual Research Conference.

Central banks need to realize that their balance sheets are beginning to move centre-stage with the size of balance sheets amounting to over \$20 trillion and rising, roughly equivalent to 8 percent of global financial assets¹⁸, more than double that before the crisis. Using the framework of system or complexity economics, it would suggest that central bankers need to understand that they are operating in a complex environment of indeterminacy, uncertainty, and observer–observed interaction where central bank is no longer an independent stabilizer, but also a larger and larger part of the financialization game, in which central banks themselves are part of the systemic risk. In other words, the failure of current QE policies could have larger systemic, real-sector spillover effects than anticipated.

Unfortunately, we are already in the soup, and the key question is how do we get out of it?

In the face of such uncertainty and indeterminacy, I am of the school that central banks need to be flexible, but academics and policy makers alike need to think seriously about how to move out of the proactive, rising financialization and concentration, without a serious further crisis down the road. All the signs we identified pre-2007, such as declining risk spreads, volatile capital flows and rising debt burdens seem to suggest that the current low interest environment may be leading to a low level growth or recessionary environment.

Let me conclude by summing up what I think emerging market central banks should be concentrating on in ameliorating the negative spillover effects of current advanced country policies. My first worry is that combination of the withdrawal of QE and deleveraging effects of current regulatory reforms is pushing for a synchronized global slowdown.

My second concern is that the current toolbox of macro-prudential tools of regulatory reforms are, from the systemic thesis point of view, inconsistent. There are two elements of system stability – the diversity in asset allocation and interconnectivity – that are ignored in the current regulatory reforms or have not been addressed.

The risk-weight model inherent in Basel II is pushing homogeneity in bank asset allocation. This flies against the logic that system stability needs to have asset allocation diversity. As Samuelson used to say, free market theory is micro-efficient and macro inefficient. Banking assets are already half of total balance sheets, shadow banking one quarter and central banks' share is roughly one-twelfth. The system is moving towards a major maturity mismatch, with central banks pumping harder and harder to replace the liquidity. Central banks have become major financial intermediaries in inter-bank and mortgage markets.

Second, the interconnectivity suggests that we need to address these 'super-spreaders', but these need not be in GSIFIs. Centralized clearing houses, new financial technology

¹⁸ Financial Stability Board, *Global Shadow Banking Monitoring Report, 2012*.

platforms and any high connectivity hubs not in the usual regulatory purview could become the next ‘superspreader’.

These two points suggest to me that emerging market central banks should not be afraid of unconventional thinking different from advanced market conventional thinking. Diversity in asset allocation is critical to system stability. This means that the range of tools used by emerging market central banks can be much more experimental than before, because we have to have the humility that even the advanced country central banks are moving in uncharted territory.

To be realistic, national central banks understand their local conditions far better and therefore should be free to adopt a different range of tools to solve their domestic problems arising significantly from the spillover effects.

This paper carries a personal plea to global regulatory standard setters to be less ‘uniformity for uniformity’s sake’, because diversity may be the only way to go to ensure system stability.

I commend the IMF and Bank of Thailand for hosting this important seminar to discuss this important question.

Hong Kong and Bangkok,
31 October, 2013.

Key points:

1. World is an open adaptive system, broadly divided into two parts – G4, basically reserve currency countries and RoW, with RoW lending to G4 under Triffin condition.
2. Both sides blaming each other “Savings glut” vs “Credit Glut”.
3. Two Balloons – real GDP of \$72 trn, and financial assets \$269 trn, roughly 3.7 x – difference being leverage (gross vs net).
4. If we net out finance, then we get GDP real sector only and real sector balance sheets.
- netting hid gross leverage, below the line, netted out, SIV and offshore.
5. Two party game – cooperation or defection and bargaining.
6. How do you get system stability? Kahn and Katz.
 1. Finance is in a Ponzi scheme – its is absorbing nutrients or negative entropy from the whole system and spilling it out to the rest of world – hostage through TBTF.
 2. Early stages of Ponzi or financialization, positive impact on real sector; however,

beyond a certain point, negative impact and also adding systemic risk of failure or implosion.

EME will have to operate in a different game from G4 in order to survive and for system to be stable. (1) be flexible, because any fixed targeting is dangerous. (2) going similar route as G4 will be pro-cyclical (3) concentrate on real sector, not on finance –need real sector reform; because if G4 cannot do this on the real side, then for the system to be stable, non-G4 have to adjust more on the real side. (4) be prepared for very large systemic implications if G4 policies were to fail.