

## *Financial innovation and system design*

Mario Tonveronachi  
University of Siena, Italy

Paper to be presented at the conference on "Reforming the Financial System: Proposals, Constraints and New Directions", organised by Ideas, January 25-27, 2010, Muttukadu, Chennai, India.

### *1. Introduction*

According to the G20 "financial markets will remain global and interconnected, while financial innovation will continue to play an important role to foster economic efficiency." (G20 2009a, p. V). Recent official declarations, reports and legislative proposals on financial re-regulation are consistent with this statement.

The President of the Financial Stability Board has made it clear that "[r]egulation must not prevent innovation, which is necessary if we are to improve product choices for consumers and an expanded access to credit" (Draghi 2009, p. 8); hence "the goal will be to strengthen the resilience of the system without hindering the process of market discipline and innovation that are essential to the financial sector's contribution to economic growth." (Draghi 2008, p. 7).

Increased freedom of action and advances in financial theory and computing power are generally taken as explaining the recent wave of financial innovations. Synthetically, these advances sum up to methods that are considered capable to *fine* measure and price risks. Hence the unbundling and re-bundling of risks and the huge expansion of new financial products and institutions. Their contribution to economic growth is seen as coming from the improvements in risk management they are able to disseminate all over the economic system.

This is not to say that official authorities are not aware of the dangers coming from innovation. According to the Secretary of the Treasury Geithner (2009) "[t]he central objective of reform is to establish a safer, more stable financial system that can deliver the benefits of market-driven financial innovation even as it guards against the dangers of market-driven excess." In the same vein the G20 Pittsburgh Communiqué had already asserted that "[w]e agreed ... [t]o make sure our regulatory system for banks and other financial firms reins in the excesses that led to the crisis. Where reckless behavior and a lack of responsibility led to crisis, we will not allow a return to banking as usual." (G20 2009b).

All this means that financial fragility does not come from innovation per se, but from excesses that the existing regulation and supervision could not or did not want curb. The result is that the existing financial design is considered as basically sound and that only some adjustments are needed.

After millions of high-brow man-hours spent in the last thirty years designing regulatory schemes we may be sympathetic with the reluctance to restart from scratch. However, since the official position is based on the conviction that the *laissez faire* approach to financial risks must be maintained, it is a terribly difficult task for regulators and supervisors to strike a balance between the freedom to innovate and the dangers coming from it. More so if we follow the widely accepted view that it is unavoidable for regulation to lag behind innovations coming from the private sector. It is commonly held that most innovations are introduced by private operators as a response to regulation in order to elude the costs and the loss of profit opportunities coming from it. This lagged dynamics is considered inevitable for every regulatory structure we may envisage.

In what follows I argue that the lag-behind theory is not an accurate description of the past experience since the most relevant innovations, or their scope, has been the result of active policies pursued by the public authorities. These policies are not just the sum of responses to innovative private actions; they point to a specific financial design based on the freedom to create and absorb financial risks. We must then look at innovations not as single products or institutions, but as being the result, or at any rate a coherent part, of that design. I then argue that the excesses which the official authorities consider as the main culprits of the current crisis are in effect part of the physiology and not of the pathology of the wanted financial morphology. As a consequence, no regulatory reform can be effective without radical changes in the system design. Finally, a general outline of an alternative approach to regulation is presented.

## *2. Financial innovations and past experience*

When dealing with the topic of controlling financial innovations two main awkward questions usually open up. First, among the complex universe of innovations we should be able to pick up the ones that, on balance, are harmful for the economic system at large. Second, since the received wisdom tells us that many of them were successful attempts to elude regulation, we should be comfortably sure not to waste public and private resources repeating a useless lag-behind game.

The current financial crisis has attracted attention to innovations such as derivatives, off-balance sheet vehicles, hedge funds, private equity firms, etc. However, an historical perspective tells us that in very few cases we can speak of new products and institutions; what is really new is their dimension relative to the size of the economies they should serve. For instance, repurchase agreements are far from being a novel phenomenon; however, their recent magnitude in the U.S. financial system is unprecedented, summing up to more than half of the intra-sectoral borrowing (D'Arista 2009), and "matched by huge increases in trading volumes relative to underlying real activities" (Turner 2009). They thus hugely contributed to the explosion of leverage and counterparty risk. We can always find physiological explanations supporting the existence of repos as well of the types of contracts and institutions that

are considered as innovations. Most of them imply risk mitigation techniques that most analysts find it difficult to oppose when judged from a micro-financial perspective. Moreover, when innovations were aimed at circumventing regulation they often won because those same rules were flawed. The point is whether large quantities introduce qualitative changes.

The second question concerns the idea that regulators and supervisors fought and lost against the superior fire-power of the financial industry. Again, a careful historical reconstruction may drive us to a different scenario. Putting it boldly, we hardly find in the past regulatory environments an instance in which a new product, market, institution or operational practice was either not permitted under the existing rules, or the result of a discretionary decisions by supervisors, or the product of their forbearance.<sup>1</sup> Moreover, the lag-behind theory does not explain why the usually vast discretionary powers of supervisors, or in any case a prompt action by regulators, did not intervene to stop what now they affirm being circumventing and potentially dangerous innovations. Let's make it clear the type of world we live in.

In an ideal Arrow-Debreu world a set of rules would include all possible states of nature, perfect contracts and no elusion. Since in the real world uncertainty impedes the knowledge of all future states of nature, a necessarily incomplete set of rules is explicitly bases on principles and it is always accompanied by discretionary powers attributed to supervisory authorities. Supervision then assumes a crucial role: not only it controls compliance to rules, but it may also bend them to the necessity of rendering effective the stated principles when unexpected 'states of nature' occur. When the necessary action goes beyond supervisors' discretionary powers it is their duty to put the question to regulators, who should react. This is standard doctrine and should be standard practice.

Lord Turner, the president of the British Financial Services Authority, recently affirmed that "what occurred was not just a crisis of specific institutions and regulations, but of an intellectual theory of rational and self-equilibrating markets" (Turner 2009). Although I would stress the convergence of the world of ideas with specific interests, I agree with Turner that supervisors share responsibilities with academics, regulators and politicians, even to the point of stating that their room of manoeuvre was restricted by the dominant ideology.<sup>2</sup> On the same vein we should, however, add that little blame must be put on a financial industry that was only exploiting the freedom it was allowed to use, also for lobbying.<sup>3</sup>

---

<sup>1</sup> See for instance Kregel (2010). With reference to the recent crisis, examples are the permission granted by U.S. authorities in the '80s to trade structured products, their inaction after the (first) sub-prime crisis of structured consumer debts (BCBS 2004) and the loose requirements for consolidation that permitted institutions like SIVs to become unregulated off-balance sheets institutions.

<sup>2</sup> As Strachan (2009) puts it, the lack of "supervisors' ability to take the punchbowl away from the party".

<sup>3</sup> For the U.S. Igan, Mishra and Tressel (2009) show that financial lobbying for mortgage lending "is associated *ex-ante* with more risk-taking and *ex-post* with worse performance" (p.5).

What Lord Turner and official documents do not make enough clear is why products, institutions and practices that appeared to be per se useful and quite inoffensive acquired a Malthusian exponential growth up to the point of becoming what Warren Buffet calls 'weapons of financial mass destruction'. What we have experienced is basically a grand repetition of the junk bonds crisis: 100 million dollars of ill-judged risky assets do not constitute a systemic threat as, on the contrary, 100 trillions do. This is a critical point when we come to discuss modifications to the existing regulatory scheme.

### 3. *The financial design*

The above arguments lead us to look at innovations neither as single phenomena, eventually to sum up (Frame and White 2004), nor wearing micro-spectacles. We should try to look at the complete design, at the system they express and contribute to shape.

From this perspective the heroes, or the villains, were officials dressed with academic gowns. We can understand why Milton Friedman was furious for not being allowed to speculate on the sterling exchange (Millman 1995); less so who afterwards let him to do that. The complete opening to international capital flows, domestic de-regulations and the specific prudential re-regulation were active decisions taken by the authorities. Their new regulatory mantra was: let private operators free to create and assume the types and quantities of risk they want since they know better than us. We have only to defend illiterate savers and investors, and stop their ignorance weakening market discipline. Hence our action should be limited to act as a proxy of a prudent *pater familiae*. When putting its money into a bank the poor chap thinks it is safe; hence we must stop banks to de-capitalise (also to save money when public safety nets exist). When putting its money in the capital markets he knows he is assuming risks; we must only try to assure transparency and a level playing field.

To this effect the economy must be a fully connected system. All international and national barriers impeding the full working of arbitrage had to be eliminated. Since the advances in financial modelling and processing power permit a fine measure and pricing of risks, financial transactions must be transformed in tradable assets and transferred, wherever possible, to exchanges. This is how the new mitigation techniques permit an effective risk management, with risks absorbed in wanted types and quantities and spread all over the system. Cash, as gold, is a relic of pre-modern times. The true liquidity is the one expressed by markets that price assets at high frequency.

In this context banks should necessarily adopt the originate-to-distribute model (securitisation), thus limiting their traditional operations, especially regarding their uncompetitive grip on small firms and households. The general push towards the large size in banking observed in the last decades, often promoted by the same authorities, is consistent with this model. As it was consistent with it to adopt stricter regulations

for traditional banking operations, while leaving non banks intermediaries, and trading activity more in general, substantially unregulated and subject to the so-called market discipline. Risk measurement and capital hedging became the hallmark of banking regulation.

This increased interconnection has not been confined within the financial system since finance is not confined within the financial industry. Non-financial firms are primary actors in the derivative business beyond their hedging necessities; much of the shadow banking comes from conglomerates with a prevalent commercial nature; capital contiguity between the real and financial sector increased; and households assumed an increasing dose of risks. As a consequence unregulated financial positions gained importance. All this is part of the physiology of the system, not of its pathology.

Obviously the above is the sketch of the pure system that the authorities had in mind, not precisely the system that the financial industry actually pursued and realised (look for example at OTCs). However, cleansed of all distortions and excesses to which the official wisdom tend to attribute the causes of the present crisis, that is the basic model of finance towards which the actual system has been increasingly pushed to converge in the last three decades. Its basic feature is what I have called the fine measurement of risks. Not only the financial sector's efficiency, but its overall stability critically rest on being those measures a good approximation of *ex post* realizations. This sensitivity, or fragility, is not only, or mainly, due to the fact that financial operators take their decisions following what they consider to be the best methods they have; the crucial point is that the authorities leave operators free to create and assume risks and then fix regulatory requirements according to those measures.

This design is also based on two beliefs. Disturbances come to the financial sector in the form of exogenous shocks and the authorities can manage the overall stability by a sort of division of labour. While regulation tries to ensure that each intermediary is resilient by pricing and hedging micro-risks, macroeconomic policies should ensure that the financial system is shielded by external economic instabilities (economic cycles) by reducing their impact so as to make it coherent with the micro-hedging of risks. Basel II and the accompanying Core Principles for Effective Banking Supervision are the clearest example of this approach.

#### *4. What went wrong?*

With an economic system, not just the financial sector, left free to create, absorb and allocate financial risks, the boundaries of its paper-value creation, i.e. ultimately the creation of endogenous instability, crucially depend on risk measurement. While fighting the war against the freedom of central banks to extract seigniorage, the private system was left without analogous limits. The attempts to limit banks in that respect, or better mainly their banking book, only caused the financial pyramid to be let free to expand elsewhere, but in a highly interconnected system.

We have then to look at two profiles. First, being the 'new' system so sensitive to risk measurement, the point is how much of its physiology is linked to potential risk-mispricing. Second, how much of the huge expansion of finance is physiological or, on the contrary, converts a quantitative phenomenon into a negative qualitative one.

For the first aspect, the unbundling of risks has meant creating 'single bet instruments', such as the derivatives on interest rates, exchange rates, commodity prices and credit default risks. These instruments represent the defences that many institutions employ to mitigate their overall risk; they are finely priced and funded in proportion to their expected price volatility. This volatility (i.e. risk pricing) is then the crucial element for building up sustainable leveraged positions. As Kregel (2009a) has reminded us, forming expectations about the future price of such variables is one of those exercises to which Keynes attributed a high degree of uncertainty. Past experience has repeatedly shown the serious inherent limits of the methodologies employed by the operators, especially with respect to systemic phenomena. Hence the resiliency of the entire system critically depends on methodologies that are structurally unable to finely price the future, while they pretend to do so.

For the second aspect, the qualitative change due to quantitative expansions, let's make an example with reference to the sub-prime crisis. The securitisation process, starting from the originators to the CDOs squared, and adding the guarantees and CDSs on which it came to be based, is well within the physiology of the system. If risks had been correctly priced at each stage of the process the cost and conditions attached to sub-prime mortgages would have been so tight that a very limited amount of them would have been created. Why, then, a so generalised mispricing, especially for CDSs and guarantees, could survive and inflate for a so long period? We are told that markets self-correct; if they do, which type and what amount of signals they need? In the recent experience, when negative signals begun to affect the markets the mountain of rubbish was already systemic. We must be aware that the above example probably refers to the plain vanilla part of the 'modern' risk pricing. What about derivatives on interest rates, exchange rates and commodities? Moreover, the long history of carry trade shows that finance do not necessarily produce self-correcting stimulus.

Let's forget Mr. Prince and his musical chairs. Here the time dimension is as critical as the mispricing dimension, or even more so. When discussing regulation, Tobin (1984) gave us the example of drugs. If producers were free to sell untested drugs the market would expel those having net negative effects on health. The social consequences of a temporary market failure might, however, be so dire to recommend regulation on pre-testing. Let's expand Tobin's argument a bit more. The dimension of the total market failure might increase with lower, not higher, negative unit externalities since they could fail to send credible signals for a long time. This would allow a so generalised and repeated use of the dangerous (financial) drug to finally seriously affect millions of people.

The question is then not only if markets misprice, and they do; if they self-correct, and often they do not; but also how much time they take to eventually do it. The experience of the last thirty years shows repeated mispricing of risks, a frequent absence of self-corrections and long periods before corrections were imposed, hence a huge accumulation of distortions. All this led to endogenous increases of fragility that finally caused financial and economic crises.

The quantitative aspect is also relevant for intermediaries that are too big to fail. Kregel (2009b) has convincingly argued that the main justifications for large size rest on feeble foundations. Just a few words on one aspect related to innovation. According to Draghi (2007, p. 4) "[f]inancial innovation has increased the number of products available. Revenues in new business areas have surged. To capture them, the intensive use of information technology, and more generally the relentless exploitation of technological innovation, have become indispensable. This in turn implies high fixed costs that need to be spread over a large customer base. Whether this is achieved through an extensive retail distribution network that by itself represents an additional fixed cost or by catering to the needs of many large investors, for firms that act globally size has become a necessary condition for profitability." A simple question arise: how much of this relentless process of higher returns-innovation-larger size relates to the necessities of the economic system? If much of this dynamics were to come only from interests internal to the financial sector, the scope of many innovations and the size of intermediaries would both result as highly questionable.

As the same official authorities admit, innovations have been utilised to increase the leverage (hence returns for shareholders) and not to improve the management of risks (or the resiliency of firms).<sup>4</sup> They now believe that they can rein in these "excesses" and monitor the systemic fragilities coming from firms being too big and too interconnected. I have argued that innovations based on a fine measurement of risks cannot improve the management of systemic risks. On the contrary, they increase systemic fragility, especially when regulatory capital has been designed to converge to the economic capital resulting from the private sector's best practices. Moreover, matching the freedom to create and disseminate financial risks with a regulation that is at most confined within the officially recognised financial sector, an unregulated shadow financial systems will remain part of the physiology of the system, probably gaining momentum if the newly proposed measures will increase regulatory costs. Pressed by the financial industry, regulation cannot be limited to give Lord Turner and his colleagues larger discretionary powers while leaving them alone to play an asymmetric game with financial firms on counter-cyclical capital and liquidity buffers, in deciding who is too big and interconnected and on how much to tax it, on bonuses, etc. The whole set of re-regulatory measures now proposed by G20, FSB and BCBS add to the already huge complexity and costs of regulation, but do not touch its structural

---

<sup>4</sup> According to the, then, Financial Stability Forum (2008, p. 5) "a wave of financial innovation ... expanded the system's capacity to generate credit assets and leverage but outpaced its capacity to manage the associated risks."

shortcomings.<sup>5</sup> This reminds us of the increased complexity added to the Ptolemaic system when trying to make it consistent with rebellious observations.

### *5. What to do?*

We have to rethink the system according to the needs to which finance should primarily respond. In so doing it must be clear that sustainable development and growth should be our priorities. It cannot be a priority that of modelling the system according to the interest of a minority of wealthy people, in developed as well as in less developed countries.

Briefly, we should limit the types and quantities of financial risks that the entire system, not just the financial sector, can produce and absorb. Borrowing from Keynes, we must aim at The End of Financial Laissez Faire.

Let me finish with few general points.

Regulation must embrace the entire system as finance does. It is of no use to regulate banks, insurance companies, etc., hoping that their constrained action will impose discipline to the entire system.

To contain risks, as Buiters (2009) succinctly puts it, regulators should agree on "a positive list of financial instruments and institutions. Anything that is not explicitly allowed is forbidden". When drafting this list we should balance the usefulness of instruments and institutions for the real economy with potential threats to the overall stability. To this end we must also keep under control the systemic dimensions of risks. As we have discussed before, systemic fragility depends not only on the types and combinations of risks, but also, and perhaps more crucially so, on the dynamics and the quantitative dimension of the financial pyramid and the systemic size of intermediaries.

We should not necessarily cancel 'new' financial instruments and institutions if they remain within the physiology of the system. However, they should be kept inside qualitative and quantitative boundaries of risks that private operators can manage and the authorities can control without resorting to illusory systemic cushions of safety. When this containment were regarded as not feasible, these products and institutions should simply not be allowed to operate.

The task of regulation should be to design a robust system while reintroducing the freedom to go bankrupt. Intermediaries should be constrained on the risks they can create and absorb, but left free on how to manage them. If they err, they fail. Systemically important institutions should simply not exist, not to be more strictly regulated and subject to exotic 'living wills'.

---

<sup>5</sup> See for example G20 (2009b), FSB (2009), BCBS (2009a, 2009b).

Therefore, a radical change in the approach to financial regulation is needed. Regulation should abandon the pretence to base the resiliency of the system on the ability to fine measure a wide array of idiosyncratic and systemic risks. It should stop with the illusion to hedge risks with rules on one instrument, capital, and many exhortations. It should discard a partial model that leaves unregulated positions multiplying risks. Regulation should directly aim at the systemic containment of risks. Bottom-up schemes, like the Basel Accords, focused on an illusory individual resiliency must be substituted by top-down ones, that is, in the old language, the prudential approach must be substituted by a largely structural one.

Let's see some specific proposals that are coherent with the above approach. Given the crucial role assumed by volatile assets financed by debt, regulation should be based on the distinction between leveraged and non-leveraged institutions. Leveraged intermediaries should not engage in trading. Leveraged institutions should be required to limit their maturity mismatch and subject to liquidity (in form of cash or public bonds) and straight leverage requirements. Both requirements should be an increasing function of size. Non-leveraged institutions should be submitted to portfolio and liquidity constraints, which would be graduated according to their stated function and size. Non financial firms should not be allowed to operate directly or via subsidiaries as financial intermediaries. The ownership and governance links among leveraged and non-leveraged institutions and non-financial firms should be weakened or cut.<sup>6</sup> No OTC instrument should be permitted. Derivative markets, especially those for commodities, should be submitted to quantitative rationing and/or to costs (in forms of margins and non-risky collaterals) that should sensibly increase with the gross exposure of each position.<sup>7</sup>

### *References*

- BCBS, Basel Committee on Banking Supervision (2004), "Bank failures in mature economies", Working Paper 13, April.
- BCBS (2009a), "Strengthening the resilience of the banking sector. Consultative document", December.
- BCBS (2009b), "International framework for liquidity risk measurement, standards and monitoring. Consultative document", December.
- Buiter W. (2009), "Regulating the new financial system", *Vox*, March 9.
- D'Arista J. (2009), "Leverage, proprietary trading and funding activities", *Political Economy Research Institute*, SAFER policy note n.1, November 18.

---

<sup>6</sup> I invite the reader to look at the ownership and participation structures of many banks as, for instance, may be easily found in the BankScope database. In most cases it is very hard to understand if they follow at all goals of organisational and allocative efficiencies.

<sup>7</sup> For a complete presentation of these proposals see Tonveronachi and Montanaro (2010).

- Draghi M. (2007), "Transformation in the European Financial Industry: Opportunities and Risks", *Center For Financial Studies, Presidential Lecture Series*, Frankfurt, November 22.
- Draghi M. (2008), "How to Restore Financial Stability", *Bundesbank Lecture Series*, September 16.
- Draghi M. (2009), "Financial Stability in the global environment? Learning the lessons from the market crisis", Keynote Speech at IOSCO's Annual Conference, June 10.
- Financial Stability Forum (2008), "Report of the Financial Stability Forum on Enhancing Market and Institutional Resilience", April 7.
- Financial Stability Board (2009), "Policy measures for improving financial regulation", September 25, downloadable from:  
[http://www.financialstabilityboard.org/publications/r\\_090925b.pdf](http://www.financialstabilityboard.org/publications/r_090925b.pdf)
- Frame W.S., White L.J. (2004), "Empirical studies of financial innovation: lots of talk, little action?", *Journal of Economic Literature*, XLII, 1.
- G20 (2009a), "Enhancing Sound Regulation and Strengthening Transparency", Working Group 1, Final Report, March 25.
- G20 (2009b), "Leaders' Statement: The Pittsburgh Summit", September 24–25.
- Geithner T. (2009), "Written Testimony of the Secretary of the Treasury before the Joint Economic Committee, Financial Regulatory Reform", November 19.
- Kregel J. (2009a), "Managing the impact of volatility in international capital markets in an uncertain world", *The Levy Economics Institute of Bard College*, Working Paper No. 558, April.
- Kregel J. (2009 b), "Observations on the problem of «too big to fail/save/resolve»", *The Levy Economics Institute of Bard College*, Policy Note 2009/11.
- Kregel J. (2010), "No going back: why we cannot restore Glass-Steagall segregation of banking and finance", January, mimeo.
- Igan D., Mishra P., Tressel T. (2009), "A fistful of dollars: lobbying and the financial crisis", IMF WP/09/287.
- Millman G. (1995), *The Vandals' Crown*, Simon & Schuster.
- Strachan D. (2009), "The Regulatory Response of the G20 to the Financial Crisis", ICFR Inaugural Summit, London, April 1.
- Tobin J. (1984), "On the efficiency of the financial system", *Lloyds Bank Review*, 153, July.
- Tonveronachi M., Montanaro E. (2010), "Restructuring the financial system. A synthetic presentation of an alternative approach to financial regulation", January, mimeo.
- Turner, A. (2009), "Responding to the financial crisis: challenging past assumptions", Speech at the British Embassy, Paris, November 30.  
[http://www.fsa.gov.uk/pages/Library/Communication/Speeches/2009/1130\\_at.shtml](http://www.fsa.gov.uk/pages/Library/Communication/Speeches/2009/1130_at.shtml).