



Research Note
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Finance: Communicating the Incommunicable

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Abstract

The market dislocation of the past few years has had numerous contributing factors, none of which has been more under scrutiny than the financial engineering practices within large financial institutions. Firms have been going off at tangents to what their remit as considerate social entities are, and in its place found public scorn and international disdain for their practices. This paper looks at the public understanding of science as a field of inquiry and how communicating findings to the public is important for finance, researchers and the global economy. It uses the economy as a backdrop for what happens when this is not the case. It looks at the theories of public understanding of science to focus on why it is more important to clearly convey research findings to explicit and implicit stakeholders than to increase the bottom line.

Public Understanding of Science

The 15th century rise of the Medici illustrated the potential power of a large organized banking operation. They had picked up on the mistakes of the Florentine houses and developed techniques posited by Fibonacci and experimented with by the Shylocks of Florence and Venice. Foreign exchange, bankers certificates of deposit and bills of exchange were forebears to the modern way of financing trade. The system of assets and liabilities is centuries old but through practices propagated by the Medici they found themselves into the main stream, into the very essence of everyday life. Bankism is embedded in the very fabric of every item, nay of every person of every country such is the reach and permeation of finance. What subject is more important today than finance yet is less well understood. The degree of public ignorance about finance is one of the explanations of the crisis we are currently experiencing however there is an opposite side to the equation. Financial engineering is an applied scientific field of research which aims at controlling market exposure for a market participant. It is from here the instruments which caused the credit crisis emerged and it is from here we shall examine the issue.

Ziman wrote on the knowledge gap between the general populace and the world of science (Ziman 1991). As has been discussed above, people have a poor understanding of science and trivial matters which are of direct relevance, Ziman expands on this and comments on people's lack of understanding causing them to act irrationally and, in defiance and ignorance, turn their backs on science. The most important finding of the Bodmer research program was that "science" is not a well-bounded, coherent aspect which can be understood. Every attempt should be made to convey and educate the recipient populace about the findings of research. A simple deficit model of public understanding is inadequate because it is concerned with interpreting the situation with respect to public ignorance or scientific illiteracy. Trying to answer and address formal scientific knowledge through this model does not take into account peoples own understanding and social context. He identifies four principles of public understanding:

- *Incoherence*: scientific knowledge is not something which is drawn from stable models (textbooks, schooling) but an actively constructed, dynamic concept which is built and drawn upon depending on circumstance.
- *Inadequacy*: scientific knowledge and information is selected based on relevance and interest.
- *Incredibility*: expert knowledge is not accepted passively but is accepted based on interest and situation.
- *Inconsistency*: professional controversy adversely affects the publics understanding of a field.

The Oxford survey drew it's sample from the general populace in Britain and was concerned with the publics understanding of science (Durant, et al. 1989). The survey showed although many people have poor understanding of scientific research, they still make sound decisions on practical scientific questions and situations. The survey further shows a positive correlation between the degree of scientific knowledge and interest in it. A process of formal schooling to address deficiency places a great deal of weight on formal scientific knowledge whilst the survey shows people are able to make sound decisions even if there is lack of formal understanding. Deficiency models do not take into account people's tacit understanding of affairs and how these are used to logically deduce a sound decision in everyday scenarios.

Wynne used a study of Cumbrian sheep farmers to draw insight into public reception of scientific knowledge imparted by experts (Wynne 1992a). His studies indicate the public uptake of science is dependent on the value public groups place in scientific organizations and their representatives, this he calls the *social relationship*. The social relationship is brought about by knowledge and is bound by identity and implication. Similarly to Ziman, Wynne notes that the public is able to reflect on informal knowledge to bridge the gap between themselves and the experts. The reflexive nature of the public is something which the scientific community can draw upon to increase public uptake.

The sheep farmers were given advice from scientists, *experts* from the government on agricultural and farmland close to the Sellafield nuclear reactor. It was inconsistent and confusing, and was playing up privately held sentiment with respect to the nuclear facility so close to farmland. The experts had very little domain knowledge and their ignorance and arrogance further perturbed the farmers. This coupled with the fact that the Ministry of Agriculture and scientists were all explaining themselves in a similar manner indicated the institutional and intellectual organization did not recognize its own domain and institutional deficiencies. Its own *body-language* was irreflexive. Wynne argues, abstractly, the whole affair is a defense of social identity. Each party blamed the other for not recognizing and considering specialist knowledge with respect to the situation. The main point, he continues, of this study is that social dimensions should be a level from which scientific explanation, and the factors guiding credibility and the *understanding* process are derived.

Wynne's argument builds upon Ziman's point of building interest. Research bodies need to realize the multi-dimensional nature of their enterprise, and how reflexivity on their part is key to the social purchase and uptake of scientific achievement. The solution thus lies in *institutional reflexivity* (Wynne 1993) where there is specific stakeholder analysis done before engagement. Engagement should not recourse onto more science. The solution lies not in the use of the same ambiguous, deterministic techniques but in looking towards the lay public as a model for self-reflexivity (Wynne 1992b).

Durant, recently, addressed some concepts and ideas put forth in public understanding of science literature. He described that this research, save for a few notable contributions, had been working on bridging a knowledge gap however the deficiency model between the public and experts had in effect erected a hierarchical, ontological gap in its place (Durant 2008). This gap, he argues, has come about from social science trying to preserve the autonomy of the lay actor. The main contribution of his seminal work is the move of public understanding of science to *public engagement with science*. This protraction of the original inquiry is resonated amongst the public understanding of science community, where there is call to bring science and society closer together through "scientific citizens" (Irwin 2001) and "scientific communities" (Elam & Bertilsson 2003). He posits an important counter-argument to institutional reflexivity: if the status-quo of the originating organization is incompatible with institutional reflexivity, then any and all efforts to bring it in line with a "normative conception" will face "insurmountable difficulties" (Durant 2008).

Lewenstein presented a study of corporate objectives and public communication of science in his study of private life insurance companies and public health campaigns. The three corporates he studied were the largest industrial life insurance companies in the continental United States during the period 1908-1951, the remit period of the study. There had to be a balance between entrepreneurial irresponsibility and the pernicious tainting of discussion of public health campaigns. One can draw assimilation between the work done by the three corporates and what is required in this day and age. The corporates went out of their way to engage with the public and raise awareness of science and public health. The motivation, according to Lewenstein, for this was fourfold; (1) legislative reform; (2) increase in profits; (3) ideals of social reform; and (4) frequent meetings with policyholders (Lewenstein 1992a).

The leaders of these companies were seen to be helping the public with their efforts as social problems of the time were perceived to be problems of morality. This sense of corporate and social responsibility was one echoed in the Armstrong hearings on the life insurance industry. These hearings were opened in 1905 by the New York insurance commission and concluded that

"organized wealth under private management must, if it is going to be allowed to exist at all, assume certain public responsibilities."

Quite a profound statement coming at such an early industrial age. Lewenstein comments that public communication of science was a key factor in the success of the health campaigns undertaken by the corporates, and that this communication was not a charity, nor a responsibility of the States educational or central Government functions; it was a key element in achieving corporate goals.

Ernst Dauer provides further points for discussion. He served as chairman of the Household Finance Corporation, a division of the American Finance Association. He held an exploratory round-table discussion with association members on the problems involved in improving public understanding of consumer credit (Dauer 1953). He mentions his sector has come under scrutiny as the public uptake of financial products has increased, both in terms of products per person and household coverage. The discussion mentions the need for fostering better understanding within the whole economic system of consumer products. They felt the role of consumer credit had not been given a proper treatment by the Government or educational institutions, and that it was only in adversity, light was being shone in their direction.

They continue, codifying subject matter and tutoring students in finance is second to the problem of actually educating the populace. They feel the subject is of such importance it should be included in all students of finance, business and economics should be educated obligatorily rather than on an elective basis. Restricting access to such courses, on consumer finance, has proven counter-productive to the interests of the economy and these courses should be offered en-masse thus gaining reputation both here and abroad. Restrictive conferences are not the best place to try and educate the populace, rather there should be engagement from the grassroots level up, allowing for wider coverage.

We conclude this section on the public understanding of science with the description of four models of public communication. We have alluded to a couple of these above however we would like to detail them, facilitating the discussion which follows. A key point of consideration is that of success. There is no consensus on the goal and the constitution of *improved* public understanding of science (Lewenstein 2003). As public communication of science is a discipline, scholars have been exploring the very nature of “public communication”, its meaning, activities and constraints (Schiele 1994). We shall not digress into this schism however it is noted there exists varying beliefs on the effectiveness of different models.

Various studies conducted by the scientific community have resulted in various measures of *scientific literacy*. The innate recourse to the elitist scientific community and the lay public, dictates a lack of understanding and knowledge in the public which public communication of science methods aim to tackle. This recourse is known as the *deficit model*, a deficit which needs to be filled and ex-post everything shall be “better” (Ziman 1991). The largest concern with the deficit model lies in its lack of context. The questions posited in surveys and studies are context-less, whilst studies have shown people learn best when theories and facts have relevance to their own lives (Bransford 2000). The following three of the four models we are considering have been developed in action to the deficit model, as frameworks for understanding, measuring and addressing the problem (Lewenstein 2003).

The notion of the cognitive being, a psycho-socio processing entity is formalized in the *contextual model* (Lewenstein 2003). This model acknowledges that an individual is not a machine which receives and processes information in a stationary procedure, rather it is a complex being which draws upon multiple inputs to draw inference and deduce *sensible* answers. A contextual model provides guidance for message construction about science in certain contexts i.e. describing fluid flow for explaining traffic flow on highways. A common area where contextual models have been applied is health campaigns, something which we find in the study presented above by Lewenstein into life insurance companies during the first half of the 20th century. This canning and contextualization of theory has been seen as a more elaborate version of the deficit model. Critics argue a contextual model simply extrapolates a concept problem and a contextual response to this to explain themselves (Wynne 1995).

Local knowledge is the start point of the *lay expertise model*. This local knowledge is referred to as *lay knowledge* (Wynne 1989). The model draws on the class gap between the scientists and the public, describing the arrogance of the elite with respect to their own understanding and how they fail to realize the requirement of contingent information to make personal and policy decisions in the real world. This model acknowledges lay knowledge and formulates communication activities accordingly. These indigenous knowledge systems may not have had scientific validation however have been accepted socially so need to be accommodated within the public communication sphere (Ellen & Harris 1996). Opponents of the lay expertise model describe it as being “anti-science” on its privilege of lay knowledge over formal-

ized knowledge (Labinger & Collins 2001). Critics argue, quite rightly, specialized and formal knowledge is harder to acquire and maintain, breeding a natural gap between the expert and the lay. They feel the lay expertise viewpoint is one of political snobbery towards the elite, aiming at empowering the masses. This point is furthered in the models practical application not specifying how to incorporate the lay knowledge into public communication formalization.

We have seen above how Durant moved the thought of public communication of science towards public engagement with science. This social concern forms the base of the *public participation model*. This model's activities aim to engage the public and thus increase trust in science (Lewenstein 2003). These activities are a "democratizing" of science - switching control from the elite to the lay (Sclove 1995). Common engagement activities include consensus conferences, citizen juries, deliberative technology assessments, science shops and deliberative polling (Hamlett 2003). The concern, similar to the lay expertise model, of the public participation model lies in its political stance. It takes a particular viewpoint and adheres to it vehemently, in essence addressing politics rather than public understanding (Dornan 1990). On the flip side, proponents deny their approach is critical of science.

Review and Discussion

In the preceding section we have detailed theorem of public communication of science, here we shall review and recap what has been presented. All of these theorem dictate divergent courses of action with minimal overlap between each other. Ziman has quite correctly identified the need for public education and information (Ziman 1991). His four principles of public understanding; incoherence, inadequacy, incredibility and inconsistency help facilitate a wider dialog on public communication of science, however they fall short of providing objective mechanisms to achieve positive communication. Wynne posits the social interaction and responsibility of scientists (Wynne 1992a). The clash of *social identities* is a novel concept, required for the comprehension of the wider co-habitual environment we live in. The scientists need to move into a self-reflexive mode à la the reflexivity of the lay public. Institutional reflexivity is a prerequisite within business, it should be carried out when engaging with the public.

Durant builds on the work done by Wynne, after presenting a critique of prior work within the field (Durant 2008). He claims an ontological gap has been erected where once a deficiency gap stood. This gap has been erected, he argues, due to social science trying to preserve lay autonomy. This is a quite clear breach of interest, as the body of research which should be acting in "best interests" is in actuality rolling over the problem, from one well understood into a whole new domain. Furthermore, Lewenstein and Duran highlight a concept, which we believe is crucial to efforts within this field of inquiry (Lewenstein 2003, Durant 2008). The culture within the public communication of science community has to change from a *communication* to an *engagement* culture. Engagement is key to achieving the goals set about by the research community. The key point here is that not only should there be a change of rhetoric but a complete change of culture as this is an engagement of hearts and minds, which first need to be won over before they become receptive to scientists. Scientists need to move on from thinking of the lay as being *dumb* and become inclusive in not only dialog but actions as well.

Lewenstein has shown how public communication of science can be crucial to meeting corporate goals (Lewenstein 2003). It should not be something we shun away but a tool we should work with to accurately and effectively communicate research work. Dauer brings a fresh perspective to the argument (Dauer 1953). His experience has shown simple codification of concepts and subsequent consumption are of secondary importance. The body needs to engage, communicate and educate the populace, which cannot be achieved through elective and restrictive tuition.

Having presented and recapped theorem, we shall now present a disciplinary treatment of public communication of science. Much has been made over the past couple of decades of derivatives and their impact on the world economy. We have seen worldwide condemnation for the use of derivatives and the leverage associated with them. We shall provide an example of market abuse using derivatives, initiated by humans. We shall proceed to highlight the common misconceptions with respect to derivatives and how the

irreflexivity of the financial industry is not in its best interest.

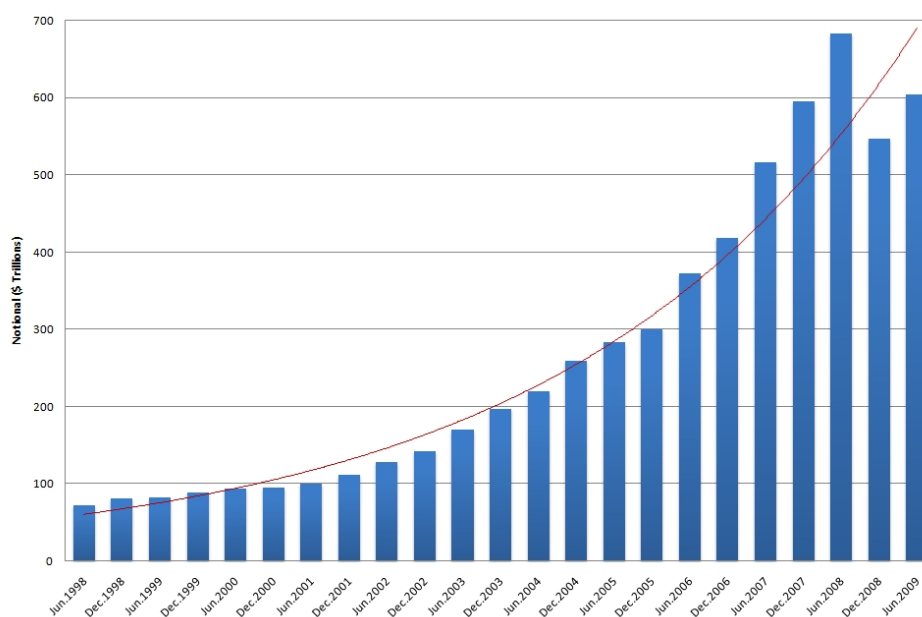
The Bank of International Settlements (BIS) maintains statistics on the world derivatives market. Central banks from the G10 group of countries and Switzerland report into the BIS which then produces annualized figures across the globe. Over the period June 1998 - June 2009 we have seen a marked exponential increase in notional value on the world derivatives market (see Figure 1). A derivative is a financial product which is used to manage adverse exposures in the market. The derivatives market is thus referred to as a risk-diversification utility. Pure derivatives products were used to hedge actual risks in the market, whilst with the birth of speculative trading, derivatives have been used on their own as a means of making money.

It is a hard and fast fact that the more risky a position the more it shall payout. Which is fine in the conventional sense where one can see leverage as being static however the implicit leverage in a derivatives position changes with time. A position which is risky to start off with can become even more risky with time. However this fact was consciously ignored. Herd mentality crept in, returns from derivatives transactions were vastly superior to other asset classes, and aversion to derivatives was usually followed by a swift walk out of the door!

We present the example of Greece and Goldman Sachs as patent of the lack of understanding of derivatives by the wider community (Chernov 2010). Swaps are derivatives instruments which typically swap fixed for floating cash flows et vice versa. Swaps should lead to a permanent reduction in spending, thus utilizing the comparative advantage of each party in either the fixed or floating markets. Greece's deficit caused it to fail ascension to the Euro in 1999. However, after some financial engineering with Goldman Sachs, Greece successfully joined the Euro in 2001. The swap agreement they entered freed up some capital for 2001 however in the long-run was a deferral of interest payments, moving interest payment from the present year to the future. As these swaps are maturing, the truth of the matter is becoming evident: the European Commission and European Central Bank have been affronted. What of corporate and social responsibility, as was highlighted by the Armstrong hearings detailed above?

Inclusive of the majority of proprietary trading activities, the final investor is the person on main street. They are the audience to whom the financial engineering community should have been communicating. Efforts within public communication of financial engineering have been tied at the waist to those of the firms proposing these products. This is a similar dichotomy to which Lewenstein alludes:

Figure 1: World Derivatives



“Deficit and contextual models often seem to equate “public understanding of science” with “public appreciation of the benefits provided by science to society”(Lewenstein 1992b)” (Lewenstein 2003)

The financial community must become reflexive in it’s interaction with the wider community it serves. This shall serve many purposes including gaining a better understanding of counter parties, allow for peer and reciprocal feedback into quality of research, enhance reputation, enhance influencing and lobbying skills and open up the field to collaboration (ESRC 2010).

Public understanding of finance can be addressed through raising awareness. Public media outlets should be utilized, propagating ideas and opening them up for debate. All this should be done in an effort to increase interest in the field of finance and research; however there is no way to canonically address this issue. We can at best try to raise interest but if the public does not tune in, then as per the correlation knowledge will still be deficient. In our discipline this would be a serious cause for concern as again policy and actions are being performed which only but a select few understand. Prudent financial activities should be fostered into individuals from a young age. Citizenship units within secondary schools should look to incorporate practical financial scenarios based-learning into their curricula.

Professor Niall Ferguson presents three reasons for the crisis we have just experienced; (1) uncertainty of the future, (2) human behavior and the (3) evolutionary nature of finance (Ferguson 2008). He argues no area of public engagement of finance is more advanced than behavioral finance, something which he feels should be supported by large and small market participants alike to bring to home concepts and theorem which finance uses. Behavioral finance is concerned with exploring psychological inference in the marketplace. It is used to deduce rationale around market participants’ behavior.

In summation, we feel communication activities in finance thus far have not included stakeholders and have been using schema from weak models i.e. the deficit model and the contextual model. The financial community should move towards a combinatorial approach, whereby elements of the four main models, and other activities, are combined to best suit a given situation. The status-quo needs to understand the public responsibility they have, and become reflexive in their dialog and interaction with the public. They should move to a public participation model where the lay are empowered into scientific citizens.

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