Nail in the Coffin

How Not to Bid the Market Goodbye

Credit led to the 'disappearance' of the market; **Elie Ayache** ponders how we should make preparations for its return

I am guilty.

I am guilty of overspecialization in a domain that depends too much on the existence, and persistence, of the market. Worse, my domain of specialization and the objects I produce *presuppose* the existence of the market: *I specialize in the pricing of derivatives that one must replicate by trading their underlying*.

I used to trade such derivatives on the floor and to hedge them on the spot — literally *pricing* them as the dynamic option trader and hedger that I was — and today my company produces models for *valuation* of derivative instruments based on their replication strategy: what I like to call "derivative pricing models" (with a slight abuse of language regarding the confusion between "pricing" and "valuation").

Indeed, the word "pricing" is ambiguous, as it leaves it undetermined whether the pricing capacity in fact belongs to the model or ultimately to the market. On the one hand, the gerund expresses an intentional act and suggests an ordered sequence of actions that we imagine is devolved to the engineer, or quantitative analyst, in charge of pricing the derivative: as in the word "mak-*ing*" or "build-*ing*" or indeed "hedg-*ing*." On the other, the root word "price" obviously implies the market. I accept this ambiguity and I wish to uphold it. Having once been a derivative trader and acting now as a derivative modeler, I would thus doubly and fully qualify for the status of derivative *pricer*.

I am guilty of having so facilely leaned on the underlying market, both as *underlying* of my derivatives and as the underlying assumption of an existing *market* in which to actively rebalance the hedge of my derivatives. Indeed, my models fall in the category that a recent analysis, in the *Financial Times*, describes as "spreadsheet-based models, which involve making various assumptions that *still* rely in some form on market activity" (my emphasis).[1]

Yes, I plead guilty of "market activism" and I apologize if my modeling assumptions *still* rely on minimum market activity, when obviously a lot of derivative pricing models out there no longer care about the existence, let alone the activity, of the underlying market.

I apologize if I have to reject the derivative valuation problem so quickly when no underlying market is in sight, and if I have to tell you: "Sorry, no. I am unable to price derivatives if I cannot replicate them by actively trading their underlying."

I regret that I did not engage my company in the CDO pricing enterprise, and I feel sorry, as a consequence, to have to show such indifference today to the agony of those who ache and long for the return of . . . the market activity. I feel not only indifference, but also total estrangement to their pain, as I have been long excluded from the wonderland of those who, until recently, have been pricing CDOs lightheartedly and feasting over models with no foreseeable replication strategy.

How derivatives are original

Never has my derivative business better deserved its “derivative” label than during the period of success, and literal explosion, of CDO pricing. How secondary and derivative and marginal indeed must have sounded a business that could add liquidity to the market only if prior liquidity was assumed, and which could price and trade the derivative only if its underlying was supposed to be priced and liquidly traded! How unoriginal must it have sounded at a time when the challenge was to heroically price CDOs without any tradable asset in sight, against which to calibrate the model, or any other way of re-immersing the fancy copula functions and correlation assumptions the pricing was based on in the market! So much so that the habit gradually came over me to no longer call “derivative pricing” any pricing method that did not rely on dynamic replication and the prior, originary assumption of a liquidly traded underlying. If my pricing business was of the “derivative and unoriginal” kind and all my *values* lay in giving up all originality to the market, then *theirs* were something totally different. Let us indeed reserve the derivative appellation for those who accept the implication of *being derivative*, both in the financial and ethical senses.

Yet my derivative inclination (or should I say, declination?) has paid off. At least intellectually and philosophically. As boring and unoriginal as the idea to replicate derivatives may sound, what happens if you follow its thread is nothing short of a marvel.

Let me tell you how.

If you replicate the derivative, you *implicate* the derivative trader, and by this I mean that for him to be so much as able to stand on the derivatives market floor and to quote a derivative price, he must first insert himself in the price process of the underlying. He must *trade* the underlying. To be able to form a derivative price (even following his theoretical model), he must first implicate himself in the market. Only because the pricing of derivatives presupposes market activity (the trading of the underlying as replication strategy) is it able to result in market activity, and the derivatives pricer-hedger able to trade the derivative. The reason why derivative pricing technology can fulfill the term “pricing” in both the sense of the market immersion (the root word *price*) and the sense of the technological procedure (the pric-*ing*) is that it presupposes a price (of the underlying) in order to generate a price (for the derivative).

What is the emblem of option markets? The option volatility smile. So my claim here is that we wouldn’t have had the option volatility smile if we didn’t have the notion of implied volatility, and we wouldn’t have been able to imply volatility if we didn’t have the Black-Scholes-Merton option replication algorithm that implicates us in the market before it implies anything like volatility.

For him to be so much as able to stand on the derivatives market floor and to quote a derivative price, he must first insert himself in the price process of the underlying

Why is that? And why aren’t we able to generate volatility smiles without being implicated? Why aren’t we able to generate them with the help of option pricing models that do not expressly rely on dynamic replication? Because *implied volatility* is not just a piece of information — some abstract parameter that would speak to observers watching the market from outside the same way option prices would speak to fellow observers who would also be watching the market from outside yet might be less inclined for statistical concepts. Just as the option price produced by Black-Scholes-Merton is not just any theoretical and detached value but a *price* that the option trader can sustain as price-in-the-market on account of its replication by the underlying price, the option implied volatility, which is just the reflection of the fact that the option price *is a price*, therefore can act as *input to the model* — and if indeed implied volatility must emerge, in the end, as the only real output of Black-Scholes-Merton, now that the option price is considered a market given –, is not just any volatility or statistical parameter, but the parameter that the trader will subsequently feed in the model to compute the hedging ratio. If the *pricing* of options (in our combined market/model sense of the word) works, using Black-Scholes-Merton, because the replication algorithm readily implicates the trader in some sort of price process (namely of the underlying), then the implying of volatility, using Black-Scholes-Merton, conversely works because it is the process of implication of the trader in the *price process of the option* and because the trader has predispositions to being so implicated by his being *already* located on the floor and *already* implicated in the price process of the underlying.

In sum, the option volatility smile is the result of a sequence whereby (1) option value was bound to the replicating strategy (and the range of option prices considerably constrained), (2) the trader was implicated and located on the floor, and, (3) the option price was liberated from the model’s bond, yet the option trader was left “attached” to the replication strategy. The option volatility smile is the *return* to (free) option market prices after securing the technological frame of implication by replication *of the dynamic trader*. In the option volatility smile, the derivative pricing technology thus fulfills the double purpose of a technology now involving man and of delivering — although through a return — prices (not values).

Market ontology

As such, we may say of the volatility smile that it is not just a historical or logical outcome, but that it bears ontological weight, and fundamentally so. My claim, in a recent publication,[2] has been that the derivatives market really comes to being with the volatility smile (which made its historical appearance in October 1987), and thus the volatility smile is not to be regarded as just the emblem of the options market but as its per-

manent mark: it *is* the options market. To add a Derridian twist to this Heideggerian mix, we may recall the view according to which what is derivative is in fact originary and what seems originary never in fact presents itself as such, as if for the first time, but is the effect of what has always been written and engrammed and spaced (both in time and space) — what has always been reiterated and sent and dispatched. And thus we may declare that the market at large (and not just the derivatives market) *begins* with the volatility smile and that the volatility smile "is" not just the options market and does not just *present* the options market, but that it is *the* market.

Indeed, I, for one, wouldn't locate the market in the underlying and its postulated, or observed, price process. Nor does the market reside, to my mind, in the assumption that the underlying can be actively traded in order to replicate the derivative. These are only the seeds that will help create the inaugural event of the market. And it shouldn't bother us that, in order to create the market, we should presuppose a pre-ontological concept of the market — namely, the underlying price process and its trading activity — for, in categories of this degree of magnitude and originality (the categories of being and of the market, which it may even be improper to call "categories" or to characterize using categories at all[3]), it is not surprising that we should have a prior understanding of that which we want to define. To be able to address the question "What is being?" we should already "stand in an understanding of the 'is'," writes Heidegger. "We are always already involved in an understanding of being," he declares.[4] And just as the question of being couldn't be asked by itself, as if from outside, but only from out of the site where the understanding of being can readily take place — in other words, it can only be asked by the being who alone can understand being — just so the question of the market ("What is the market?") can only be asked by the trader who already stands in the understanding of the market, the trader who is already dynamically implicated in the price (and pricing) process.

Heidegger concluded that the question of being couldn't be answered from first principles but only from within the hermeneutical circle of being. Likewise, we conclude that the question of the market can only be answered from inside an interval, or a difference, which posits the market at its start and finds the market at its finish. This is why derivatives, which proceed from the market (of their underlying) and end in the market (their own), are suited to bootstrap the definition of the market. And this is why the market will be neither the price process of the underlying (even suitably enhanced with a stochastic generator) nor the pattern of options prices (which certainly existed long before Black-Scholes-Merton and will exist long after), but will be situated in the way that the second derives from the first *yet at the same time* departs from it. The market, or the category of *price*, will be captured right at the moment when the option value becomes a price by virtue of being sustained by a *price* and by market activity (the price of its underlying, the activity of its dynamic hedger; for there is no other way of being a price than by following from a price), and when, almost at once, it fully appropriates its nature of price, or freedom to float, and escapes the given model (or representation, or fixed grid of states of the world: what Heidegger would call the domain of "calculation") under the form of the volatility smile.

This transit from *price* to *price* is not a trivialization, because the dynamic trader remains caught in between. With him, the market enters the domains both of technology and ontology. As for the notion of price, it doesn't emerge from my definition as something substantial and well-rounded (something like the solution of a nice general equilibrium problem), but as something differential and almost at once "broken," something that no sooner emerges from a given market representation and the corresponding replication than it escapes the context and the representation to go join its own market and create its own context. This Derridian (as opposed to logocentric or representational) conception of price is only attainable through the derivatives market and it is embodied in the volatility smile. Definitely, such a conception is more desirable than the orthodox, logocentric one, because it better suits the inherently dislocated and incomplete and disseminated (dare I say, exchanged?) nature of the market. So the "essence" of price, or the "essence" of the market, transpires in the volatility smile (if I may revert to this Heideggerian, non-Derridian, term — but isn't the ontology of markets, which, following Derrida and because there is nothing, in the market, but derivatives and differentials, I now interpret as the *ontology of derivatives* markets, the domain where Heidegger's being and Derrida's *différance* might finally be reconciled?).

What follows, from my derivative inclination, is thus nothing short of a total rethinking of the market, not from an orthodox economical or econometric point of view, not from a sociological point of view, but from the point of view of fundamental ontology. Call it a reopening of the question of the market, as philosophy is a place of questioning, not of finished answers.

Recalling the Black Swan

Notice that the reason why the volatility smile is so apt to "represent" the market is that it combines at once the model and its failure, the heritage of Black-Scholes-Merton (the implied volatility and replication) and the departure from Black-Scholes-Merton (whose historic beginning was in October 1987), in a word, because it combines at once the *context* (fixed states of the world and replication strategy) and the *change of context* (or the Black Swan event which creates its own possibilities). The implicated trader stands in the middle, of course, as "replication" can only mean "replication-by-him" and "implied volatility smile" can only mean "smile-for-him." The volatility smile thus stands for the market because it is the permanent mark of the Black Swan (when the latter is interpreted as the context-changing event) and because the Black Swan, or the radically new, or the radically other, is ultimately definitional of the market. Under the *volatility smile*, which is equivalent, in my philosophy, to *derivative pricing* (if only because it contains the pric-*ing* — i.e., the technology — and the *price* — i.e., the market), are thus subsumed: the market, the context change, and the Black Swan — three notions I now consider interchangeable.

All this, in the end, is due to *derivative pricing* and to following its thread — derivative pricing as a domain where the word "derivative" and the word "pricing" have been given their fullest sense

and from which, as you recall, I had excluded any "pricing method which did not rely on dynamic replication and the prior, originary assumption of a liquidly traded underlying." So the question may now be asked: What would be the consequence for the relative dispositions of the market and the Black Swan, and how would their "terms and conditions" be affected and reshuffled, if we considered a "derivative pricing" and a "Black Swan," which, for a change, would have issued from the *absence* of dynamic replication?

This brings me to the present credit crisis.

The late Black Swan

What were the terms of the Black Swan, according to Nassim Taleb?[5] Its extreme improbability, its extreme impact, and the fact that it could only be explained after the fact. According to my criticism of Taleb, all three attributes could be compressed in one: the defining characteristic of the Black Swan — namely, its capacity of changing the context.[6] Events that induce context changes are not, strictly speaking, improbable; they fall *beyond* probability (so they are im-probable in this sense), because probability can only be defined relative to a given context. They certainly carry a large impact, because *reinterpretive* events of this nature "are *crises*, moments that decide the course of a life and its meaning."[7] And they can only be explained after the fact because they create the very possibilities that will have led to them — that is, they bring about their own context and create their own causes.

As the trading/writing of derivatives (or the derivatives market) was independently recognized to be the archetypical process of context change, anyone riding it (that is to say, trading in it) was deemed able to write, or to prescribe, the Black Swans of the market, instead of predicting them. As a matter of fact, this "replication" of the Black Swan took place outside probability and following only the thread of writing and its risk (i.e., following capacity not possibility) in much the same way that Pierre Menard was able to write Cervantes' *Don Quixote* with certainty yet without foregoing the element of risk.[8] By saturating the given context with dynamic replication and by his capacity of trading/pricing the derivative in its own *trading room* — i.e., at variance with its late theoretical value (the one ensuing from the replication algorithm) — the derivatives trader was able to eliminate probability and to dedicate himself to the changes of context.

Through the writing/trading stance, the derivatives trader puts himself in phase with the change of contexts; therefore, he is able to address it at once in all the three forms in which it projects itself on our familiar representational schema: the improbability, the impact, and the backward narrative. Or rather, the trader establishes himself *beyond* prediction through trading — that is, beyond probability and the need of causal explanation — and cares only about the difference that trading can make — that is to say, the difference he can earn or lose. He cares only about the impact. However, he does not recede in stoicism or resign himself to static hedging, as Taleb recommends; he does not withdraw from the forward-looking game of change and exchange. On the contrary, he embraces the dynamics of writing/trading.

All of this was made possible, mind you, thanks to the initial thread of replication, which allowed us to reformulate derivative trading as market implication and context change.

And now we ask: What happens if the thread of dynamic replication is missing — the thread that allowed us (1) to price the derivatives in the market and (2) to envisage their trading as continual change of context, or as continual Black Swan (which allowed us, in other words, to continually write the Black Swan)? What could ever happen, what could be the history-changing event — what could be the Black Swan — of such a market?

The words of Josef Ackermann and the credit crisis

The first, rather strange, answer is that there would be no market and no Black Swan. Without replication, there would be no context, no context change, and no thread of changes of context; in other words, there would be no writing, no trading, no market, and even no *price*, in our sense of the bootstrapping of market and price from the derivatives market and from derivative pricing. Or rather, the crisis (this reinterpretive event), when its time should come, would be something beyond the market and the Black Swan: an extreme state of affairs such that, to be able to reverse it and get back to familiar ground, one should cry and scream for the return, first, *of the Black Swan* as we know it, and, second, of the market!

Never has such a scream sounded louder and clearer to my ears than through the words of Josef Ackermann, chief executive of Deutsche Bank. The headline of an interview he gave to the *Financial Times*[9] says he "urges banks to reveal losses from credit crunch." Ackermann's declarations are so symptomatic of this unusual catastrophe, where even the features of the "familiar" Black Swan are not recognizable (as if the Black Swan itself had suffered from the crunch and had been mutilated beyond recognition), that the passage deserves to be quoted in full:

"'The crucial question in the next few days and weeks is, how do you mark your positions? I can only hope that we do not muddle through — that we mark them to market,' Mr Ackermann said in an interview with the *Financial Times*.

"'That gives the reassurance and the stability

Without replication, there would be no context, no context change, and no thread of changes of context; in other words, there would be no writing, no trading, no market, and even no price

>

back to the system. Because people will say OK, we have seen people that have their positions marked properly, and . . . hopefully markets will recover and some of these price levels come back.'

"Mr Ackermann's comments come as investment banks in Europe and the US are grappling with loans and other assets on their balance sheets. The price of these assets [...] has been hit by the turmoil in the credit markets and a crisis of confidence among investors.

"The question of how to value such assets to market is particularly pressing for Wall Street banks such as Goldman Sachs, Morgan Stanley, Lehman Brothers and Bear Stearns, which are due to report their third-quarter earnings in the next few weeks.

"Mr Ackermann said audit firms and central banks were discussing how to deal with the write-downs, adding that 'there is no common policy yet.'

"But he stressed that a decisive write-down should help restore confidence: 'Analysts and investors will understand that, and actually will welcome that, and then we have the worst digested. If we continue to muddle through with uncertainties, and no one trusts the valuations, then we have a serious problem of credibility.'"

What arrests me in the picture of the credit crisis, as it transpires in Ackermann's words, is that it doesn't reveal a Black Swan properly so called, but that it shows aspects, or shall I say, "body parts," that are remindful of the Black Swan's late figure and may not be fully manifest, even to Ackermann himself. So it is a kind of psychoanalysis that I will now undertake, not of Ackermann's subconscious, of course, but of our whole collective consciousness as it comes alive in Ackermann: our perception of what the market is and what it should be (not to say, with a touch of regret: of what the market *used to be*). I shall attempt a rereading of Ackermann's words with old themes from the Black Swan in mind. You may call it an autopsy of the Black Swan, or a decomposition of the Black Swan, as I will show that not even its vital functions will have made it through the credit crisis, or if they have, not in the anatomy we are accustomed to.

The lost market

First, regarding the supposed improbability of the event, one must note that we are dealing here with a certainty rather than anything else, since the crisis has no doubt already happened, and Ackermann's declarations, for that matter, do not tend to explain the event or name its causes through the backward narrative that is customary of the Black Swan, but are all directed and tensed toward the future, and very dramatically so: "The crucial question in the *next* few days and weeks . . . ," "*hopefully* markets will recover . . .," "there is no common policy *yet* . . .," "analysts and investors *will* welcome that . . .," etc. On the contrary, the Black Swan part that has gone missing and that everybody is so desperately looking for is neither the probability nor the cause, but the impact! "Please *give us* the impact; please reveal the losses," implores Ackermann, for only then will the Black Swan be recomposed, and correlatively, the market.

The market used to beget Black Swans; today, a Black Swan is waiting because the market is unavailable

Consider that the whole epistemology of the Black Swan is being subverted here. Traditionally, the probability of the Black Swan is the part that we don't know (and might never get to know because it is simply undefined when the event is of the context-changing sort), and the impact is what we can know and what we should try to focus on. "This idea that in order to make a decision you need to focus on the consequences (which you can know) rather than the probability (which you can't know) is the central idea of uncertainty," writes Taleb.[10] So the credit crisis strikes me as a *perverted* Black Swan, if anything, at least to the extent that the probability of its happening is perfectly known and even equal to 1, while its impact is what's so uncertain. ("Don't muddle through with uncertainties.")

And why is it so uncertain? Not because of the opacity of knowledge and our inability to pick a probability distribution with which to make a forecast (as used to be the case with the late Black Swan), but because of the absence of a *market* against which to mark the loans and other credit derivatives that banks have on their balance sheets. Not because of the future (whose truest and severest face is the Black Swan), but because of the present and what is commonly most present in the present (so present that it is called "spot"): the spot market and the present market price (except that the market is not present in the present case, but has completely absented itself).

The market used to beget Black Swans; today, a Black Swan is waiting because the market is unavailable.

So again, this is all about the affiliation between the market and the Black Swan, except that the peculiar disposition of the credit crisis throws this affiliation in new light. Recall that the "healthy" Black Swan was a constitutive necessity in the market, because the market was construed as the ultimate context-changing engine, or the ultimate Black Swan-writing thread. This, by the way, was the reason why derivatives, whose trading room and life cycle thrived on the change of context, were so apt at "replicating" the Black Swan and prescribing it.[11] The market generated its Black Swans (October 1987), yet at the same time it provided us with the tools to get along with them: the writing/trading of derivatives. There was even a stage, in my exposition of the healthy association between the market and the Black Swan, when the hypothesized absence of jumps and of Black Swans was shown to *disrupt* the trading thread, as variance swaps and other brands of variance derivatives could not thrive in their own market (i.e., independently of the vanillas) or change the context on the vanillas (i.e., serve as independent calibration input) if we expected no jumps. From that I had concluded that we would have no market if we had no jumps.

The situation of the credit crisis features a similar intertwinement between the market and the Black Swan, except that it is based on absence throughout, rather than presence. (So, strictly speaking, we're neither talking of the market nor of the Black Swan, in the present credit crisis; we're talking about something else.) Here, the impact is missing — that is to say, the Black Swan is missing — because the market against which to measure the losses is missing. Conversely, we are told the market is not expected to reappear until the positions are marked and the write-downs are taken. This is another way of saying — perhaps even more pressingly than before — that we won't have the market (back) unless we have a jump.

"*Hopefully* markets will recover" when the impact is known, "and some of these price levels come back," says Ackermann. "People should take the write-down now and, if markets come around again, they can mark it up again," says Tom Jones, vice-chairman of the International Accounting Standards Board, to the *Financial Times*.[12] Consider the humble, almost pathetic, attitude toward the desired comeback of the market, in both appeals. Nothing is less assured, indeed, than that the market will hear Ackermann's or Jones's cry and return.

The write-down

This looks like a catch-22 situation between the impact and the market, and we can push its logic even further by noting that even knowledge is not involved in it, in the last instance. Surely enough, it seems to be all about knowledge, at first: "I don't know what my loss is because I don't know the market exit price." The problem is, the market is not of such nature, in the present credit crisis, as to be known or unknown. It simply doesn't exist. When markets exist and prices trade, it may be indeed a question of knowledge to wonder what the future price might be. (This is why quantitative analysts apply stochastic processes and probability theory to market prices.) Or it may be the contrary: a question of opacity of knowledge and of inscrutability of the market's underlying probability distribution (the Black Swan). But when there is *no* market to begin with — what I have called, in my market-oriented perspective, the Black Swan of all Black Swans[13] — this can't be a question of knowledge to wonder, first, what the market might be and, second, what the price might be.

What I am saying here is that the question of what the price may be or will be (i.e. the very idea that the price may be something or other [contingency] or simply the idea that the price will be something [the future]) is conditional on the prior existence of the market, not the other way around. *The market is the condition of possibility of contingency and of the future* (this is how radical my fundamental ontology of markets can get), not the other way around. For comparison, if, in some absurd way, being didn't exist, how could one wonder whether a thing might *be* something or other?

As a matter of fact, has any jump actually occurred in the credit crisis?

For someone whose only job is to trade the underlying, the Black Swan has the underlying price as the only metric, so the question of the impact is tautologically the same as the question of the market price. The price jump is itself the impact. For someone who trades a derivative written on that underlying, the Black Swan event is the occurrence of such an extreme jump in the underlying price (e.g., October 1987), and the impact is more or less measured by the settlement value of his derivatives against such an extreme underlying price, because chances are his derivatives will end up so completely out of the money or completely in the money following the market jump that no time value is left. Not mentioning that the replication cord between derivative and underlying *will help* re-establish the market following the abyssal fall (that is to say, establish the impact), because to trade derivatives that are replicable by a traded underlying is *equivalent to trading both the underlying and its volatility*, and this means that not only the underlying price is out there in the market but also its volatility, and it is not long before traders who are long volatility (if derivatives are traded, such people must exist) start showing bids in the underlying to rebalance their hedge and arbitrage the volatility. (By contrast, in markets with only underlying and no derivative, nobody might feel the urge to buy back, as everybody might be selling to everybody in a panic.[14] Yes, derivatives do introduce in the market what I would like to call, almost in the moral sense of the word, some *measure*.)

But to go back to credit, what is the underlying here? What is the physical state variable? What is the metrical space in which the impact, or the event, can ultimately be measured? Simply, the state of default or no default of the issuer. This is no metric, mind you (it is a Boolean), and as a matter of fact the market doesn't trade in it; it trades in an intermediate leaf. It trades in a metric that measures the risk premium that market participants put on the eventuality of this ultimate event — for instance, the CDS spread. So the Black Swan of credit (if I may still call it so) differs from the usual metrical Black Swan at least to the extent that its impact is not at once *ex-pressed* (literally, vented out) by the very movement of the very same market. As a matter of fact, has any jump actually occurred in the credit crisis? Aren't we all still looking, even longing, for a jump to reveal itself and record itself? If CDS credit spreads had registered a massive surge and resumed their trading, then there would be no problem and the impact would be this market jump. To the contrary, the "jump" here is of another nature and of a higher order. It is not a jump toward a number (higher spread, lower price); it is a jump toward a state of *no market* (and, therefore, no number). Or maybe individual credits will resume their pricing-trading after all; but then credit correlation (i.e., the very CDO market that everybody is missing) will not. (As Alan Greenspan confides to the *Financial Times*,[15] credit default swaps are "here to stay" and had demonstrated their capacity to diversify risk. As for collateralized debt obligations, Greenspan says they "will never get back to the levels and structures that they were, because

>

now everybody knows you cannot price them.")

Parallel to the intercalation of an intermediate leaf (which is missing today) between the physical event and its metrical impact, there is the intercalation of the "accounting leaf" between the impact and its ultimately felt consequence (i.e. the loss). In the metrical situation where the impact is measured by the underlying and the derivatives market is the prescription against the Black Swan, the loss is immediately recorded in the market and immediately felt by the trader. The market jump is his loss. If we look more closely at the credit situation, by contrast, we note that the missing impact is first of all the accountant's predicament, not the trader's. In other words, we're not primarily looking to restore a market that has gone missing, but for the write-down to register in our accountancy books.

Having been raised and trained in the *derivative pricing* business (and by this I mean, as you recall, the valuation-cum-trading of derivatives whose underlying is actively traded), it wasn't at first apparent to my mind that the loss of a derivative position might be any different from its market measurement. And it is with all the greater surprise, and even amusement, that I read, in an article in the *Financial Times* entitled "So What Is It Worth: Financiers and Accountants Wrangle over Credit Pricing," the following: "Regulators have quietly indicated that they will keep a close eye out for any sign that commercial banks are trying to flatter their accounts in the forthcoming results by failing to use 'fair value' accounting approaches when this would be appropriate." "Fair value for financial instruments," the article continued, "means exit — or sale — price, which should in theory be equivalent to market value but, for some complex products or in illiquid markets, might differ drastically." The problem, reported the authors of the article, is that "in the most esoteric corners of the credit markets, which have been at the centre of the summer woes, it is often much [harder] to determine a price, because *there is no market*" (my emphasis).[16] Finally, the suspicion that the world of accounting could be consistently foreign to the world of markets reached its peak in my mind when I read the following exclamation of Michel Prada, head of the AMF, France's bourse regulator, also cited in the same article: "How in the world can all these [accounting] rules be of any use if one is not able to determine the price of a product?" (I wonder too.)

And when I read, further below, the recommendation of Bill Michael, head of audit for financial services at KPMG in the United Kingdom, as to what needed to be done ("The primary effect is clearly to take a loss if there is one to take, no matter what the basis of accounting or the structure of the instrument is")[17], it further struck me that that which we are all missing and all looking for, in the present credit crisis, has definitely nothing to do with knowledge, but *simply with writing*.

Recall that the market doesn't exist; therefore, the question cannot be of knowing where the market is. Subsequently, the question is not of knowing what our losses are, either. It is all a matter of dry, un-epistemic, almost lifeless and impersonal writing. All we have to do is *write down* a number for our loss: probably the reason why the operation is called a "write-down." The loss has to be written and engraved; we have to mutilate and scar the flesh of our accountancy books with the write-down; we have to take this self-inflicted pain, in order that the market may come back. We have to perform it, not know it.

Writing to the market

All of which brings me to where I wanted to come — namely, to the conclusion that the market has never had anything to do with knowledge but only with writing, either for better or worse, either in presence or in absence.

When the market is present and further pricing is successfully added to initial pricing by the endless play of derivative and underlying, Black Swans occur as changes of contexts and the writing/trading of derivatives, or the immersion in the derivatives market, emerges as the technology with which to positively replace knowledge, prediction, and probability. The derivatives market emerges by necessity[18] and the improbability of the Black Swan is countered by the trading capacity of the derivatives. But when the market is absent and the impact is the missing part, it is another kind of writing that becomes a necessity, a writing that has equally nothing to do with knowledge or prediction for the reason, first, that we are now in the domain of certainty and the event has already occurred and, second, that it is meaningless, in the absence of a market, to try to guess where the market might be.

Could the market be hiding somewhere and the question only one of finding out where or how far away from us? For, if this were the case, why not assign different probabilities to the different places that the market might be hiding, and work out an "average" place where the market shall be expected to rise again? Measure the absurdity of this.

The market, we said, was the condition of possibility of probability and expectation. So how could probability or expectation be applied to the whole market? We are being misled here by a spatial metaphor. That there should be no market (as seems to be the case with the credit crisis) is not a reason to think that we — who used to be immersed in the market and busy trading in it — are suddenly kicked outside the market and *consequently* able to observe it from outside, or worse, able to imagine it hiding behind a curtain and subject to our probability. Immersion in the market, replication of the derivatives, implication of the dynamic trader — all this may have contributed indeed to replace possibility with capacity and to eliminate probability in favor of a meta-contextual pricing tool that withstands the changes of contexts;[19] but this certainly is no reason to think that, in the absence of a market, probability should come back and — what's worse! — apply to the market! Am I not, then, founded in thinking that this fancy probability, supposedly in charge of finding the market and replacing it, is actually the same as that under which Ackermann says he expects, or rather *hopes*, the market will recover? ("Hopefully markets will recover," he says. Note that the word *espérance*, or "expectation" in French, has the same root as *espoir*, or "hope.") Or might the problem of disappearance of the market be severer than probability altogether and actually point, beyond probability, to the unavailability of the whole context in which the market might recover? In other words, aren't the whereabouts and the possible comeback of the market opaque to our knowledge for the reason that it would take

nothing short of a Black Swan (i.e., an improbable, context-changing event) to bring it back? Maybe so. But then, we would find ourselves in the rather inverted situation where we wonder what the prescription for this positive Black Swan might be, at a time when the derivatives markets, which had once served as a prescription for (or rather, against) the negative Black Swans of the market, is itself missing.

We come here to the crux of our argument. We certainly cannot bring the market back *with* probability. If probability was dissolved in the liquidity of the market and altogether replaced by market capacity and trading capacity, it cannot come back, now that the whole medium of the market is missing. If the writing/trading of derivatives has replaced probability and demonstrated the capacity of addressing the Black Swan,[20] then that which would be capable of addressing the Black Swan of all Black Swans, the disappearance of the market, ought to be a form of writing too. Except that this form of writing now has to be writing *without* trading or exchange, if only because the trading medium, the market, is what's precisely missing. It cannot be writing inside the market — a process of risk and of changes of context that would accompany the market's own changes of context, in much the same way that Pierre Menard had accompanied, with risk, the im-probability and im-possibility of the *Quixote*[21] — *so* it must be writing of a new kind: writing *to* the market. We should write to the market without expecting anything in return, or in exchange. How could we *expect* anything, when the whole category of probability and expectation is gone, and how could we expect anything in return or in exchange for our writing, when it is the whole *exchange* (i.e., the market) that we are imploring to return?

The impossible gift

Ours is an impossible situation indeed because we are thrown beyond the category of the exchange and beyond expectation or even possibility. We wish to get out of our present predicament (the loss of the market), yet the state we yearn and aim for, the return of the market, cannot be conceived as a possibility — a state of the world that we would expect and attach a probability to — because all probability was lost with the loss of the market; and it cannot be a return, something that is returned to us in exchange for what we give, because all exchange was lost with the loss of the market.

How even to describe our situation?

There is a difficult passage, in the concluding part of Paola Marrati's book on Derrida, that, I think, can help us put some words on what we are trying to do, or trying to write (to the market). "It is here," writes Marrati, "that writing's ethical dimension is opened up."[22] "That which does not return," she writes (and by this we understand "that which falls beyond the economy of the exchange and breaks with its tradition"), is the "definition of another concept that has become steadily more important in Derrida's work: that of the gift."[23] My personal angle on this is that the "letter" we are trying to write to the market begging it to return, namely, the write-down that we have to take completely outside calculation – and by this I do not only mean that we technically have no way of computing our losses because the market, the exit price, is precisely missing; but I also mean it in the ethical sense, namely, that we shouldn't take the loss and record the write-down with a calculating mind, expecting something in return –, this letter is but a *gift* to the market.

Not only does the gift have to be severed from the economy of exchange and calculation, when it is *truly* understood as a gift, but it ultimately has to be severed from truth itself (let alone knowledge). Even if we give without explicitly asking for a return, the mere appearance of the gift begs for restitution and return. "From the moment the gift appears *as such*, as a gift," writes Marrati, "the circle of economy is engaged." And thus she recommends that "the 'departure' that would be imposed by another thought of the gift as regards the tradition is also a departure from phenomenology and ontology, therefore, from manifestation and appearance, from the 'as such' of phenomena as the site of truth." The truth of the gift doesn't belong to the order of the phenomena. "Truth is too much of a piece with manifestation, with being, with intentional or unconscious signification, to suspend this return," writes Marrati. "Between the gift and truth, therefore, there is no possible reconciliation."[24]

Hence, the departure from tradition that is needed, in order to *truly* write to the market in the hope that it will receive our gift and return, is a complete departure from representational thought and from the thought of appearance of the market (or its disappearance or reappearance, it hardly matters which). Ackermann's discourse is still locked in the economy of appearance and manifestation. He still thinks of the market as a phenomenon that might be recovered and reappropriated, that might fill an absence and fulfill an expectation back again. As a result, his words propagate an infinite unsettlement rather than strike a sharp check; they generate a doubling of our trouble rather than its eradication. "Hopefully markets will recover," he says, thus applying the category of hope and expectation to the markets, when the markets, in the normal situation, are themselves the vehicles of probability and expectation. "Don't muddle through with uncertainties," he says, thus revealing that the situation is not one of uncertainty, but of people hesitating to write their way through the uncertainty and get their record straight, of people basically *uncertain about the uncertainty*. "If no one trusts the valuations, then we have a serious problem of credibility," he says, thus implying that the problem of credit valuation is now doubled up by a problem of credibility.

Expecting the expectation, being uncertain about the uncertainty, having no credibility on credit

Expecting the expectation, being uncertain about the uncertainty, having no credibility on

>

credit, this is the potentially infinite — almost hysterical — duplication that threatens phenomenological thought (what Marrati calls "intentional or unconscious signification") in matters concerning the loss of the market. The loss of the market is beyond phenomenology and ontology. (Again, consider that what is lost here is the market that would normally allow us to register the loss: what is lost is the loss itself.) So what we are trying to accomplish here, what we are aiming for (this return of the market), is literally *impossible*. It is something for which, as Marrati writes, "the category of the possible is ultimately insufficient."[25] The return of the market is not a state of the world among other states of the world; it is not a possibility.

We are not longing for a future possibility, but for the return of the possibility of possibility (the market). Nor are we contemplating the return of the market as something that might or might not happen, a contingency, but the return of the very possibility of contingency (the market). This higher-order "category" (if I may call it so) that we are looking for, the category that abstracts possibility and contingency, is simply the *future*. We are simply longing for the return of the future. It is the future that we are missing. We want the future to resume its course. Now, is that a possibility or an impossibility? It certainly is a necessity, even an emergency.

"If the gift has to be severed from all phenomena," writes Marrati, "it has thus also to be severed from phenomenological temporality [. . .], all modes of temporality necessarily engaging a reappropriation."[26] "Thus defined," she continues, "the gift is placed under the sign of the *impossible*." However, this "impossibility of the gift, the gift as the impossible, is not of the order of the ineffable or the unthinkable but is, on the contrary, the excess and the immeasurability without which there could be no thinking as such."[27] "This thought of the gift, of the impossible, of the measureless gap that sets in motion thought in all its forms, that continually calls out to an elsewhere," she declares later, "again finds its privileged paradigm in writing."[28]

In this, we come to see again that the gap, or the window, that we need to open beyond possibility — to literally open *in impossibility* — in order to re-establish the lost connection with the market and with the future, is of the order of writing, not of epistemology. This excess over possibility and contingency, where the gift finds its proper space and "impossibility," is a "space beyond certainty that is the 'place' of ethics," writes Marrati. This, she intimates, is the place of the "perhaps."[29]

"A gift, if there is ever a gift, *is* not necessarily: *perhaps* it doesn't exist, *perhaps* it never will; the dimension of the gift is irreducible to all objectivizing observation, to all subjective mastery."[30] The "perhaps" is the category that Marrati, following Derrida, situates beyond possibility and contingency. "It opens the gap between the possible as a modality of time anchored in the present, the possible as what will (or will not, it hardly matters which) be certain in a future present, and *a modality of time severed from all form of presence and manifestation*" (my emphasis).[31] For Derrida, Marrati tells us, the "perhaps" is the "most just category" for thinking the future.[32] It is a renunciation of epistemology and ontology which opens on to the ethical dimension of the future. "For the future, there has to be a notion of the impossible that is not an impossible in itself but the excess of a time [. . .] that always escapes prediction, mastery or calculation," writes Marrati. And further: "The impossible as a category of an *unassured possible* is the most just category for thinking the future, the gift, the event or the other" (my emphasis).[33]

The unassured possible and the assured impossible

With this, I have all the elements I need to describe the unusual combination of modalities exhibited by the credit crisis (what I have called the "inverted," or "perverted," Black Swan) and the even more unusual combination of modalities involved in its cure. The normal Black Swan was deemed improbable because it fell beyond probability. As writing, the derivatives markets appeared to be the way to treat this improbability. The credit crisis is an inverted Black Swan: it is a certainty, not an improbability, and we are all looking for its impact. However, we discovered that what was needed in order to recompose this Black Swan was nothing short of the market itself, which was itself missing. The return of the market is not a possibility or even a contingency. It is an impossibility that can only be addressed by an impossible gift: by writing. Indeed, what is really missing here is the future, and the impossible, we are told, is the most just category for thinking the future. Thus, our gift to the market, our writing *to* the market, the write-down, is impossible, yet we have to do it. We have to execute it in the "blind" ethical space of writing — "the place of the without-return"[34] — which is in excess of phenomenology, or ontology, or the thought of the market as an appearance. We have to take the loss outside calculation and without expecting anything in return, not even the market. In this highly unusual combination of moods (it is impossible, yet we have to do it), we would be merely trying to reverse the sequence that got us into trouble in the first place. To the impossible writing which is today a necessity to us (failing which the future will not come back) there corresponds, indeed, a symmetrical impossible and a symmetrical inscription, lying at the outset of the crisis. For I wish to argue that the credit crisis was not only certain from the moment it happened; it was a certainty *before* it happened. It was *written* all over our face. It was "an accident waiting to happen," says Greenspan in the same interview. Yet nobody believed it would happen. It was impossible, yet it was certain.

The philosopher Jean-Pierre Dupuy offers a book-length treatment of this novel and quite unusual brand of catastrophes that are "inscribed in our future" and everybody knows are inevitable, yet nobody believes will happen.[35] According to Dupuy, this brand of catastrophe is the product of technology. Technology has had a tendency to gain autonomy and to escape man's power. As a consequence, it has entrapped the individual in a system whose future evolution is objectively predictable from the outside yet is objectively beyond the control of the individuals themselves, looking at it from the inside.[36] Catastrophic examples Dupuy studies include global warming and nuclear war. He definitely should include the technology of credit derivatives in his list.

We have learned, by now, to separate the written from the category of knowledge, so it won't

in the least surprise us that the attitude toward these "written" catastrophes should, once again, have nothing to do with knowledge. The catastrophe is assured and we know it, yet we entertain no operational epistemic attitude, or belief, toward it. We don't *know* that it will happen or that it won't. We don't even know that it will happen with probability or improbability. One must be careful with the modalities, warns Dupuy. "When we say the catastrophe is assured," he writes, "we don't mean that it is highly probable, but that it is inevitable."[37] On the contrary, Dupuy explains, the devastating consequences of the catastrophe induce us, if anything, to think that it is highly improbable, even impossible.

My reaction to all this is that it is once again in writing, and completely outside probability, that the impossible shall find its certainty. And Dupuy can write an incredible book bearing the subtitle: *When the Impossible Is Certain*.

I don't know what to call this "assured impossible," acting here as the mirror image of the "unassured possible" that Marrati tells us is our way out of the crisis and the most just category for thinking the future, the event and the other. Certainly not a Black Swan. A Black Sign, perhaps?

The market as the radically other

Speaking of the event and of the other, another name for the Black Swan could be the "radically new," or the "radically *other*"; the Black Swan is the event we are essentially unprepared for. And thus we finally come, in the list of things that Marrati says we can't possibly think except in the category of the "perhaps" or the "unassured possible," to the figure of the other. As a natural generator of Black Swans, the market is the other incarnate. Traders do relate to it as their other, as a "greater being" that has autonomy. It is an object that "is both human and non-human," writes Karin Knorr Cetina, one of the most influential writers in the social studies of finance.[38] The market is detached from the individual, and it is not to be analyzed as a "network of firms or perhaps of traders as the social structural approach to markets does," warns Cetina, because it includes a "large component of anonymous behaviour." Yet, as an independent object, the market is what Cetina calls an "object of attachment." By this, she means that the market "binds anonymous masses of people together by focussing their attention on specific events in temporal synchronicity." An object-human relation of sociality thus develops in which "the self as a structure of wanting loops its desire through the object and back." "In this movement," Cetina writes, "the self is endorsed and extended by the object." The market becomes literally the partner in the trading game. "It is a generalized, collective other" and traders, reports Cetina, say about trading that "it is not a game of trader against trader but one against the market."

We don't know that it will happen or that it won't. We don't even know that it will happen with probability or improbability

Not only is the market the "only other" of the trading game, but it is the *perfect* other (as when we say a "perfect storm") because it is always different and always *other*. "The defining characteristic of a market," Cetina writes, "is its changing, unfolding character; its lack of completeness of being, and its non-identity with itself." And further:

"The lack of completeness of being is crucial: markets have their moments of fixedness in dealing prices for as long as these hold, but they must *simultaneously* be conceived as unfolding structures of absences: behind the momentarily fixed façade of prices they have *always already* begun to mutate, and at times explode, into something else. But this also means that markets are *as much* defined by what they are not (but might become) as by current states, that they are never quite themselves, and that, as objects of knowledge, they can never be fully attained" (emphasis added).

This parallels our definition of the market as something taking place in *différance* rather than in being and presence, as something that has to be written, and cannot be known.

And now, the market, this radically other, this perfect other that binds us all, has gone missing. So it is not just that we have to be constantly prepared for the coming of the other and for the unfolding of what the market *is not* – for this is what we should do when we normally trade in the market; this is what immersion in the market and the writing/trading capacity enable us to do already –, but the credit crisis has now added another fold to the absence and the otherness of the market, simply because the market *is no more* and we all have to urgently prepare for its comeback. We all have to prepare for the coming of the other in a doubled sense of the term. But this, according to John D. Caputo (an expert of Derrida's philosophy and the defensor of a deconstructive hermeneutics he calls *radical hermeneutics*), is impossible — what he calls the *aporia of the other*:

"How is one to prepare for the coming of the other? Is not the other, as other, the one for whom one is precisely not prepared? Does not preparation relieve the other of his or her or its alterity so that, if we are prepared, then what comes is not the other but the same, just what we were expecting? Would not extending true hospitality toward the other involve a certain unconditionality in which one is prepared for anything, which means that one is not prepared? Is the only adequate preparation for the coming of the other to confess that we cannot be prepared for what is coming? How then to be un/prepared, that is, prepared for the advance of one for whom we could never be prepared?"[39]

Welcoming the market back

How, indeed, to prepare for what we cannot expect (otherwise, it is no other) and — I must add — can expect all the less that the whole category of expectation is lost with the loss of that which we wish to recover so urgently, with the loss of the market? How else than in *not* knowing and *not* expecting? How else than in writing? "The idea for Derrida," writes Caputo, "would not be to try to answer or resolve this dilemma by some interesting theoreti-

>

cal move, but to experience all the difficulty of this *aporia*, all the paralysis of that impossible situation, and then to begin where you are and to go where you cannot go. The resolution for Derrida is not a matter of knowing [. . .]. The secret of the other, [Derrida] says, is caught up in a 'structural non-knowing, which is heterogeneous, foreign to knowledge. It's not just the unknown that could be known and that I give up trying to know. It is something in relation to which *knowledge is out the question*'" (my emphasis). [40]

The *aporia* of the other very quickly develops into the "*aporia* of hospitality" (Caputo). Not only are we not able to *expect* the market back or earn it back in *exchange* for something we do or we give, but more pressingly the question is: *Where* can we welcome the market back? Without the market and the trading place we used to dwell in and be immersed in as dynamic traders, we ourselves are without a place and completely out of place. We have no home to welcome the market into and we ourselves even no longer exist, since our being has lately consisted in being-in-the-market.

"The multiple questions surrounding the *aporia* of hospitality," writes Caputo are: "How to welcome the other into my home, how to be a good 'host,' which means how both to make the other at home while still retaining the home as mine, since inviting others to stay in someone else's home is not what we mean by hospitality or the gift."[41] This is how Derrida's deconstruction, or thematic of the radically other, opens on to the domain of the ethical. For us, this means that, in preparing for the comeback of the market and in welcoming it, we should be even more self-effacing than we already are, writing to it, like we do, without knowledge and without a hint of reappropriation. For it is ourselves that we would be basically welcoming back to *its* home; and if the home happens to be ours at present (and the words for us to write), it is only because the home is now empty and void.

"The advance or approach of the [radically other]," writes Caputo, "has an upsetting, overturning quality which leaves us a little scattered and lost for words; the other is higher, as when I say 'after you,' putting you first [. . .]. The structural secrecy of the other is affirmed in and by the 'after you.'"[42]

For this reason, I interpret Ackermann's words (unsettled and unsettling though they may be) as a self-effacing act of hospitality that resolutely takes place in ethics, and no longer in calculation. I interpret Ackermann as simply saying to the market: "After you."

ENDNOTES

1. Davies, P. J., Hughes, J., & Tett, G. (2007, September 13). So What Is It Worth? Financiers and Accountants Wrangle over Credit Pricing. *Financial Times*, p. 9.
2. Cf. Ayache, E. (2007, May). The Next Question Concerning Technology: Part II: A World Inverted. *Wilmott*, pp. 42–48.
3. To characterize being and being-there (*Dasein*), Heidegger prefers to use what he calls "existentials," rather than categories. To speak of something in categories, to categorize it, is to predicate something of it. *Category* really means "predication," writes Heidegger. "It is derived from the Greek verb *agoreuein*, meaning "to speak publicly in the market" (which here adds an interesting twist to our problem). As to the preposition *kata*, it means "from above down toward something," equivalent to our "about." (Heidegger, M. (2001). *Zollikon Seminars* (M. Boss, Ed.; F. Mayr & R. Askay, Trans.). Evanston, IL: Northwestern University Press; pp. 121–122.)
4. Cf. Heidegger, M. (1996). *Being and Time* (J. Stambaugh, Trans.). Albany, NY: State University of New York Press; p. 4.
5. Taleb, N. (2007). *The Black Swan*. New York: Random House.
6. Cf. Ayache, E. (2007, July). Author of the Black Swan. *Wilmott*, pp. 40–49.
7. Cf. Polt, R. (2006). *The Emergency of Being: On Heidegger's Contributions to Philosophy*. Ithaca, NY, and London: Cornell University Press; pp. 78–79.
8. Cf. Ayache, July 2007, op. cit.
9. Larsen, P. T., & Simensen, I. (2007, September 6). Ackermann Urges Banks to Reveal Losses from Credit Crunch. *Financial Times*, p. 1.
10. Cf. Taleb, op. cit., p. 211.
11. Cf. Ayache, E. (2007, September). Author of the Blank Swan. *Wilmott*, pp. 44–52.
12. Cf. Davies et al., op. cit.
13. Cf. Ayache, September 2007, op. cit.
14. One could argue that even in such derivative-less markets, some traders might be "replicating" derivatives in their trading strategies without knowing it, as if they had an innate sense of the volatility levels that have to be sold or have to be bought. Such traders might start bidding for the underlying after the fall.
15. Guba, K. (2007. September 17). Greenspan alert on homes. *Financial Times*, p. 1.
16. Cf. Davies et al., op. cit.
17. Cf. Davies et al., op. cit.
18. Cf. Ayache, September 2007, op. cit.
19. Ibid.
20. Ibid.
21. Menard's Quixote is im-probable and im-possible because it is beyond probability and possibility. Indeed, its writing is a certainty and Menard did not have the "possibility" of not writing it. For all that, he didn't write it without risk. (Cf. Ayache, July 2007, op. cit.)
22. Marrati, P. (2005). *Genesis and Trace: Derrida Reading Husserl and Heidegger*. Stanford, CA: Stanford University Press; p. 190.
23. Ibid.
24. Cf. Marrati, op. cit., p. 191.
25. Cf. Marrati, op. cit., p. 193.
26. Cf. Marrati, op. cit., pp. 191–192.
27. Cf. Marrati, op. cit., p. 192
28. Cf. Marrati, op. cit., p. 194.
29. Cf. Marrati, op. cit., p. 193.
30. Ibid.
31. Cf. Marrati, op. cit., p. 192.
32. Cf. Derrida, J. (1997) *Politics of Friendship* (George Collins, Trans.). London and New York: Verso.
33. Cf. Marrati, op. cit., p. 193.
34. Cf. Marrati, op. cit., p. 195.
35. Dupuy, J.-P. (2002). *Pour un Catastrophisme Eclairé: Quand l'Impossible Est Certain*. Paris: Editions du Seuil.
36. Cf. Dupuy, op. cit., pp. 65–66 and Atlan, H., Dupuy, J.-P., & Koppel, M. (1987). Von Foerster's Conjecture. Trivial Machines and Alienation in Systems, *International Journal of General Systems*, 13, 257–264; and Dupuy, J.-P. (1987). Individual Alienation and Systems Intelligence. In J.-L. Roos (Ed.), *Economics and Artificial Intelligence* (pp. 37–40). Oxford, UK, and New York: Pergamon Press.
37. Cf. Dupuy, op. cit., p. 141.
38. Cf. Cetina, K. K. (2000). The Market as an Object of Attachment: Exploring Postsocial Relations in Financial Markets. *Canadian Journal of Sociology*, 25(2), 141–168.
39. Cf. Caputo, J. D. (2000). How to Prepare for the Coming of the Other: Gadamer and Derrida. In J. D. Caputo, *More Radical Hermeneutics* (pp. 41–59). Bloomington and Indianapolis, IN: Indiana University Press.
40. Cf. Caputo, op. cit., p. 59.
41. Cf. Caputo, op. cit., p. 57.
42. Cf. Caputo, op. cit., pp. 58–59.

W