ANTIFRAGILERS AS INSTITUTIONAL DEVICES TOWARDS AN AUTOPOIETIC ANTIFRAGILITY

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Abstract:

Paper aims to develop, from a conceptual point of view the concept of antifragility, as property of dynamic systems. The main direction of such development is focused to introducing of a new concept in the economic debate, namely, the concept of antifragiler. An antifragiler is that structural device of a system which ensures the actual functioning of the antifragility property. To this end, paper examines, for the first time in the dedicated literature the concept of antifragiler, from a logical, methodological, and institutional point of views, trying to connect it to the already known concept of antifragility and, thus, to find its role, functions, and mechanisms. Finally, a brief examination of the institutional ways to be endowed with antifragilers is provided.

Keywords: antifragility, uncertainty, antifragiler, institutional system, risk, perturbation

JEL Classification: B41, D80, P40

Preamble

The paper approaches one of the most recent and (as it seems) productive concept in the field of systems structure and functioning: antifragility.[56] Antifragility (Taleb, 2012) is a property of a system or process that allows it not only to off-set external (and internal) perturbations, but more than that, even to gain from those perturbations. Thus, although antifragility joins the large conceptual family of system properties aimed at to avoid, predict, handle, off-set, etc. perturbations, like: homeostasis, robustness, resilience, inertia, hysteresis, and so on, it is, in fact, special from the following perspective: perturbations could even be deliberately searched, in order to improve the system by gains mentioned. On the other hand, antifragility acts by intermediation of appropriate devices, usually of structural nature, that treat the perturbations involved – identification, classification, selecting the way of handling, and the way of gathering presumed gains. I shall name such kinds of devices antifragilers.[57]

Objectives of the paper

Paper has three objectives to be achieved: a) introducing the concept of antifragiler; b) identifying the functions of an antifragiler; c) examining an institutional model endowed with antifragilers.

Methodology used

Methodology used in the paper is, principally, of logical kind. However, taking into the account the necessity of extending the concept of antifragiler to economic structures, systems, and processes, examinations of institutional nature will be used, too, when appropriate.

Research organization

The research provided in the paper is organized as follows: 1) a short description of the concept of antifragility (Dinga, 2018) as structural property of dynamic systems (including the institutional ones); 2) proposing of the concept of antifragiler as device through which the dynamic systems (de

[56] The concept of antifragility (or of antifragile system) has been introduced by Nassim Nicholas Taleb in his work, translated into Romanian, *How to Live in a World We Don't Understand*, Allen Lane (Penguin Group), 2012.

[57] The term antifragiler is built up by analogy with the term resilientor, which is associated to the property called resilience.

Bruijn, Größler, & Videira, 2020) exert their property of antifragility; 3) identifying the basic elements required to design of an antifragiler; 4) analysing the features of an institutional system from the perspective of the concept of antifragiler.

Antifragility as structural property of systems

As evoked above, antifragility is a property of a generic dynamic system (no matter its nature) which is aimed to fight the perturbations, either internal or external, exerted on that system. A perturbation is understood as an impulse, either predictable or not predictable, which causes a shifting of the system from its cruise trajectory. For moment, I am not concerned with the signification of such a shifting – it could be either beneficial or maleficial (nonetheless, such a qualification is, in fact, crucial, as we shall see next, because antifragility has precisely the role to convert the potential maleficial into actual beneficial). When a system is object of an (either actual or potential) perturbation, it can have the following „strategies" to handle it:

- avoiding of perturbation – such a strategy could be name as *by-pass*;
- withstanding of perturbation – such a strategy could be name as *robustness*;
- suffering of perturbation but recovering of its previous state – such a strategy could be name as *resilience*;[58]
- gaining from suffering (or accepting or even searching) of perturbation – such a strategy could be named *antifragility*.

Regarding the property of antifragility (Dinga E. , 2018), its predicates of sufficiency are the followings:

(a) structuralness: the property is located deeply in the structure of the entity concerned. Structuralness provide the entity with permanency, continuity, and predictability of antifragility functioning;

(b) autopoieticity: the property has its own property to self-replicate and evolve. The own property of autopoieticity of antifragility is one of the most relevant attributes of the concept in case.[59] In essence, the antifragility's autopoieticity implies the followings;

- a *phenotype* (Danchin, Binder, & stanislas, 2011)to be self-replicated in the antifragility evolution – I shall propose in this paper the antifragility's phenotype be the antifragiler;
- a *genotype* (Frommlet, Bogdan, & Ramsey, 2016) (or gene) that suffers the "mutation" – I shall propose in this paper the antifragility's genotype be the institutional structure within which the phenotype is working and replicated;
- a "*mutation*" – I shall propose in this paper the mutation be exactly the perturbation (located either inside or outside the entity concerned);
- a *criterion* to validate the integration of mutation in the replicated phenotype with that mutation incorporated – I shall propose in this paper such a criterion be the positive difference between beneficial effects and maleficial effects of suffering the perturbation in case. To be mentioned that, in fact, the validation based on the proposed criterion leads both entity and its environment to a co-evolutive process.[60] Such a co-evolutive process implies a mechanism based on the

[58] Other concepts for such behaviour are named also *inertia* or *homeostasis*.

[59] To be mentioned that the autopoieticity of antifragility is completely ignored by date in specialty literature. It will be extensively treated in the doctoral thesis of author.

[60] The co-evolution in the antifragility's autopoieticity will be not developed more here. The idea will be resumed in another scientific intervention.

compatibility of reaction norms from entity to its environment and, reciprocal, from environment to the entity.

Based on the above mentioned findings about the antifragility property of a generic system (entity, process, phenomenon, event, and so on), Figure 1 synoptically synthesises them.

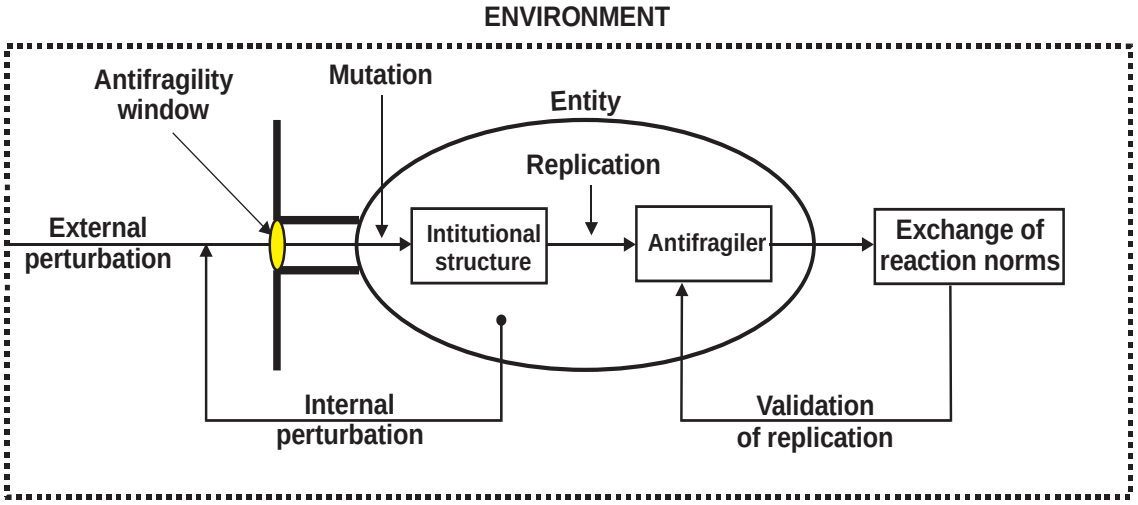

Figure 1 - Autopoietic replication of the antifragility.

Source: Author

Discussion:

- the antifragility window represents that perturbation (either internal or external) which could not be off-set by the other properties of the entity concerned (as robustness, resilience and so on) and, have exerted their impact of that entity. Of course, such perturbations could have been deliberately searched by the entity itself from specific reasons, for example to gain from them. Any case, some perturbations pass through antifragility window towards the entity;
- the perturbations in case affect the genotype of the entity, that is, its institutional structure (Bendell, 2014), thus generating a mutation in that genotype;
- the mutation inserted into the genotype will be held in the phenotype replication, that is, in the antifragiler replication;
- now, the replication of phenotype must be tested through the reaction norms exchange between the entity and its environment. Like in the biological case, the mutation can be ”accepted” by the environment or can be rejected, so the new version of the entity is invalidated.

The autopoieticity of the antifragility, as well as the concept of antifragiler are not yet discussed in the specialty literature, they being proposed by this paper for first time. Of course, the very mechanism of such an autopoieticity of antifragility needs more developments, but for the purpose of the paper – which particularly aims to introduce the concept of antifragiler – the above short discussion seems to be enough.

Antifragilers – concept, typology, role, and functions

The antifragiler, as established above, constitutes the phenotype of the property of antifragility. More exactly, the antifragility is replicated if and only if all of its antifragilers are replicated too. The

reduction of antifragility replication to the antifragilers replication could be considered as a reductionist way to handle the property of antifragility. In fact, it is not precisely so.[61] For:

- it is not the case that a macro state is explained by a micro state, as happens in the reductionism;
- antifragilers are not entities at a lower level of existence or organization of antifragility, but precisely structural components of antifragility. That is, by explaining antifragility autopoieticity by the components of such an antifragility is not, again, of reductionism procedure;
- in fact, antifragilers are not introduced as components whose aggregation generates antifragility (as reductionism does), but such an introduction is made in order to explain how antifragility could replicate itself, that is, from a functional (or, better, from a mechanism view) of antifragility.

Therefore, what is an antifragiler? I propose the following definition: an antifragiler is a *structural device of an entity (system, process, phenomenon, or event) which by its functioning and replication provide that entity with an autopoietic antifragility*. A question arises here immediately: could antifragility exist without antifragilers exist, too? My response is affirmative, for:

- the property of antifragility is functioning, of course, based on structural devices that have the potential and procedures to gain from perturbations, but such devices must not certainly be replicable as such (for example, they could act for a single iteration or even could be destroyed by that very functioning);
- therefore, autopoietic antifragility is only a species of antifragility.[62]

It results that the role of antifragiler is to ensure the antifragility perpetually, that is, by its own replication (although under the impact of mutation exerted on the structure of the antifragility itself). In other words, precisely by delivering antifragility, the antifragilers replicate themselves roughly identical, under the condition of validating by the environment of entity in case. Here it must be said that the potential of antifragility to gain from perturbation[63] applies also on antifragiler,[64] that is:

- the mutation exerted on the structure of entity shifts the antifragiler from its previous state;
- the new version of antifragiler enter the confrontation with the entity's environment and, by intermediation of reaction norms exchange between entity and its environment, is (possible) validated;
- the validation of the new version of antifragiler, which contains the mutation, constitutes the gain of antifragiler from perturbation, because by the validated replication, the antifragiler in case still holds its role in providing antifragility for the entity in case.

Generally, antifragilers can be of the following kinds:

(a) based on the way in which they take advantages from perturbations:

(a.1) antifragilers without conversion (ANC) – which take advantages from perturbation *without changing their nature*. For example, if the perturbation consists in an unexpected change of exchange rate of currency, then the advantages taken represents an amount of currency gained. Or, when an unexpected change of the market price for the product controlled by the entity in case brings an advantages of monetary nature too, like an additional revenue from selling that product;

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[61] More than that, it is not a bad thing to apply the reductionism. In fact, the more developed a discipline is , the bigger is its degree of reductionism. For example, the axiomatized disciplines have the biggest degree of reductionism.
[62] Of course, the devices acting within an non-autopoietic antifragility cannot be anymore called antifragilers, but only antifragility devices.
[63] Elsewhere, I have treated the fructifier that accomplishes such a function to capture, for the entity, benefits brought by the perturbations.
[64] Moreover, the captured gain is exerted primarily on antifragiler and only secondarily on antifragility.

(a.2) antifragilers with conversion (AWC) – which take advantages from perturbation *by changing their nature*. For example, an increasing of the tax on import will be convert into developing own technologies to produce the previously imported goods and services that now have become more expensive;

(b) based on the mechanism through which they take advantages from perturbations:

(b.1) antifragilers with direct taking over of advantages from perturbations (ADTI) – which take advantages from perturbation by themselves, without any intermediation of other antifragilers of the entity in case;

(b.2) antifragilers with indirect taking over of advantages from perturbations (AITI) – which take advantages from perturbations by using a chain of impact that involves two or many antifragilers working in that entity, so, eventually, the gain from perturbations being integrated by the entity in case.

Table 1 shows the typology of antifragilers (extracting four kinds of antifragilers by the concomitantly applying of the two criteria of classification), while Figure 2 suggests their general functioning.

Table 1

The typology of antifragilers

		Mechanism	
		ADTI	AITI
Way	ANC	A(DTI-NC)	A(ITI-NC)
	AWC	A(DTI-WC)	A(ITI-WC)

Source: Author

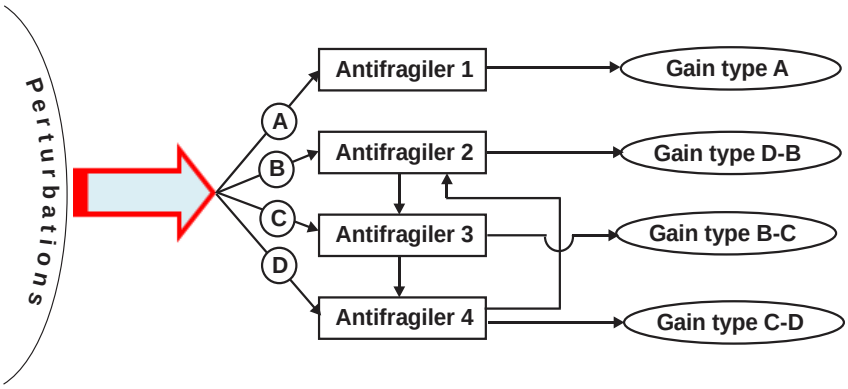

Figure 2 - Mechanism of antifragilers working

Source: Author

How to design an antifragiler?

To design an antifragiler means to design a process that must simultaneously verify two conditions: a) have the potential to fructify the perturbations in favour of entity concerned, no matter their nature, intensity, duration and other peculiarities; b) have the potential not only to be not destroyed by perturbations, but also to gain for itself from them, including the maintaining (or

even improving if possible) its capacity to replicate itself in connection with the entity's environment, by the above mentioned of the co-evolution entity – environment.

(a) This potential/capacity is, in fact, the essence of the concept of antifragility (Dinga E. , 2020) itself. It can be ensured, via entity's (deep) structure, based on the following conditionalities:

- a list of possible (although unpredictable at all) perturbations, with the corresponding impacts which, in turn, are assigned to intensity, duration and other relevant features that perturbations could carry out;
- a list of feasible reactions (responses) which the entity concerned should perform for any case of perturbations;
- a connection list (or algorithm) which assign a unique entity's reaction to each perturbation with given characteristics;
- a list of appropriate procedures to be pursued for each case that could occur. Figure 3 synoptically show this conditionality.

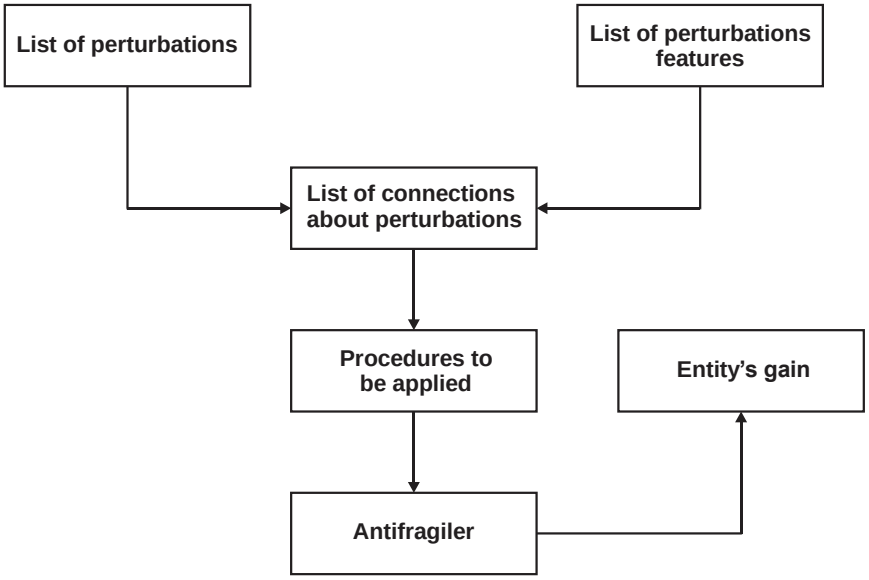

Figure 3 - First conditionality of antifragiler

Source: Author

(b) Instead, this conditionality is exactly my proposal in the paper, regarding the autopoietic antifragility by intermediation of the antifragiler. Designing such conditionality implies the followings:

- antifragiler must be able to filter the perturbations so that not to be shifted from its cruise trajectory (or standard functioning);
- as result, only the perturbations which antifragiler can handle will enter the entity;
- the entered perturbations are, then, processed so that obtain, from the antifragiler itself, some gains, advantages or fine tuning in order to improve its working in next iterations;
- thus, alongside the general fructifier of the antifragility property, here occurs a sui generis fructifier at the antifragiler level aimed at to improve this device.

Thus, to design an antifragiler means to design and institutionally implement the two mentioned conditionalities.

A model of institutional systems endowed with antifragilers

The autopoieticity model of antifragility property of an entity can be particularized for an institutional system (either public or private). This means that with the antifragilers designing must be designed to the institutional framework which will ”host” these antifragilers and, in addition, put them into a specific network which allow then to work together and, consequently, to extract the synergic effect from this cooperation. Based on the above discussion, I think to model an institutional system (Pineda O., Ghershenson, & Kim, 2019) which aspires to be endowed with autopoietic antifragility mechanism implies at least the followings:

(a) designing of the antifragilers, as described above;

(b) identifying of the external (that is, ”hosted” by environment) niche or niches for each antifragiler, which ensure on the filtering of the destroyer perturbations – these perturbations will be treated outside the antifragility, for example, by robustness, inertia, resilience, etc. devices);

(c) designing of the network of connections among antifragilers so the end of the antifragility property be accomplished;

(d) designing of the institutional procedure so that the antifragilers be replicated according their co-evolution with the entity’s environment.

Results and conclusions

Paper introduces a new concept linked to antifragility, namely the concept of autopoietic antifragility. Such an approach is not yet examined in the specialty literature. This concept necessarily generate the introduction of the successive concepts of: antifragiler – as phenotype of the autopoietic antifragility –, institutional structure – as genotype of autopoietic antifragility, co-evolution (Thompson, 2010) between the entity endowed with autopoietic antifragility and its environment (with its sub-concepts of niche, reaction norms, and validating criterion of the phenotype replication). Because their novelty, the antifragilers are more analytical discussed, including a bi-criterion typology of them. Other results address the issue of designing and implementing both the antifragilers and the institutional framework which could provide the sufficient conditions for the autopoietic antifragility properly function.

Further research suggestions

The topic addressed by this paper (the autopoieticity of antifragility) constitutes only a first step in the specialty literature in the matter of developing the concept of antifragility, which, in its nakedness, was proposed by Taleb. I have elsewhere developed other three or four such directions of research linked to the pure concept of antifragility, but strictly in relation with the present topic, I think at least three future directions of research could be approached by the interested researchers:

- the issue of co-evolution based on the iterative reaction norms process between the antifragile entity and its environment, in order to deeper clarify the question of validation criterion of antifragiler self-replication;
- identifying of the thresholds (if exists) between which the antifragility acquires and sustainably maintains the property of autopoieticity;
- further developing the concept of antifragiler especially regarding the public institutional systems and, correlatively, examining the public institutional network which provide the best chances for automatic functioning of the antifragility.

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