Proference: Behavioural Mix Between Propensity and Preference on Financial Market

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Abstract

The origin of economic preference is still disputable inside general economic theory and, especially, inside microeconomics (more specifically, regarding financial market functioning). The invariant vs. adjustable nature, or the objective vs. subjective character of the economic preference are within the core of conceptual, methodological, and instrumental debates and controversies. The paper enters this polemic with a new proposal, namely a model which builds, for the behaviour on financial market, the concept of propensity (coined by Karl Popper), from the objective/invariant side, and the concept of preference, as a behavioural mix which could be named as proference. To this end, the normative framework of society, viewed as a cultural geodesic will is aimed at to give the relative stability to the preference which, in turn, will act in an adaptive way on the cultural geodesic, in an evolutionary circular causality. Therefore, a new mechanism of financial market functioning – which could be named as Proference-Based Market Hypothesis (PBMH) – is proposed and (in its essential features) discussed. The main findings of the research are: a) although the economic preference is, generally, idiosincratic, however it is (necessarily) anchored to a quasi-objectified (not objective!) pillar, namely, to the cultural geodesic of the society as a whole; b) any economic preference is adaptive, and its adaptivity is so that it enters a co-evolution process with the cultural geodesic; c) in fact, on the financial market we always meet the preference, never we meet neither the propensity (that is, the cultural geodesic per se), nor the preference (that is, the idiosyncrasy per se); d) the concept of preference should be taken over by the financial theory and introduced into the logical and quantitative models of the financial market.

Keywords: Proference; propensity; preference; financial market; behaviour.

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1. Objectives, Methodology, and Organization

The main *objective* of the paper is to identify a (relatively) stable anchor for the economic preference, taking into account the fact that the dominant paradigm in economic modelling (homo œconomicus, which originate in neoclassical economic theory) simply decrees the given state (i.e., the invariance) of preference, without providing a ground justification in the matter. The recent progress recorded by behaviorism (including neurosciences and even phenomenology), led me to keep the issue within the subjectivity, more exactly, within the psychology (both cognitive and behavioural). Therefore, I come back to the ancient (from Aristotle and Empedocles) concept of propensity, 're-invented' by Karl Popper in relation

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to the objective probability of the singular event. The logical principle that connects the propensity to preference I called proference and instituted as the basic (rather elastic than plastic) anchor for the economic preference.

The *methodology* used in getting the objective is the logic, more exactly, what is known as theoretical rationality based on internal coherence, consistency, and completeness of the judgments. Therefore, neither empirical tests are performed, nor historical assessments are convoked. The two excluded perspectives (in other circumstances, of usefulness) are aimed at securing the deductive (or abductive) approach to the issue of interest, which can (or should) provide greater clarity and plainness to the proposal.

As the *organization* of the paper, section 2 formulates the *question* to be answered, namely the very origin of the economic preference. In section 3, a detailed phenomenology of the concept of *propensity* is provided, in order to establish it as the ultimate background on which the preference arises. The way (*mechanism*) through which the preference is forged by propensity is explained in section 4, while section 5 introduces and logically examines our concept of *proference*. Finally, section 6 summarizes the main findings, proposals, and conjectures the paper put into scientific debate on the economic preference.

2. The Question to be Answered

The financial market is a generic name for the set of nominal economic flows performed inside an economic system (usually, a national system). By nominal economic flows are understood those economic flows which are relatively autonomous from both real and financial economic flows. The financial market (either as external direct source of financing or as money speculation area) constituted a special attraction for economists (and, at least equally, for psychologists) from theoretical, methodological, and instrumental perspectives, and, perhaps, it is the economic „object" which enjoyed the most models (including quantitative ones) in the economic field. Since, at least, Keynes (see his concept of *animal spirits*), the concept of preference – or, deeper, the credence (*Nota bene*: the most scientists use the term belief, a few of them use the term faith, but David Lewis uses the term credence which, in my opinion, is much more appropriate) – constitutes the *axis mundi* around which the financial behaviour is designed and the economic agents' actions are performed.

As the preference is so profoundly inbred into the axiology of individuals and seems to drive, as a hard background, the financial behaviour, it is legitimate to search the deeper layer of preference. Where the preference comes from? How elastic or, by the contrary, how plastic is the preference, and based on what such elasticity or plasticity is working? In other words, is the preference, in turn, driven by something different from itself, and, especially, more primitive than itself? In the reminder, I shall handle exactly with such a question.

3. Introduction – Basic Concept

Since in this study we will propose a (causal) link between the concept of (possible, adaptive) preference and that of propensity, we make a brief presentation of the concept of propensity and, related to it, of the objective probability of the singular case (as we consider happening in economics, where we do not have - in fact, it is not possible to have – repeatability of an event).

The (modern) concept of propensity (even if not the term as such, which is, of course, subsequent and relative to the concept) is already known from Aristotle, who built his physics (wrong, as Galileo further proved) based on the necessary tendency of entities (objects) to go to their natural places. Without explicitly establishing a link between tendency and environment (or rather, the set of conditions in which a phenomenon occurs), Aristotle nevertheless captured the relationship between the type of entities in question and the type of tendency of motion, that is, he intuited a very interesting concept called today the (relative) propensity of entities (either objects or events). Subsequently, Thomas Aquinas argued that human inclinations represent the substratum of human action (Simboli, 2017).

Historically, in modern times, the concept of propensity has emerged as a result of the fact that in quantum theory, where we have what is called genuine indeterminism (Johansson et al., 2009), we need an objective probability of the singular case. As it is well known, in the standard („orthodox") view, there is only one type of objective probability, namely frequency probability. This is, however, a probability of a repeatable case (i.e., on as long a sequence of repetitions as possible – ideally, an infinite one).

The first systematic proposal of a theory of propensity belongs to Karl Popper (1959) (*Nota bene*: it seems Popper actually wanted to find an explanatory model for interference and superposition phenomena in quantum phenomenology) and can be described as follows:

- an entity (object, event, process) has an internal inclination, a disposition, a tendency to move from one state to another one;
- this tendency is an inherent (that is, necessary) property of that entity, a property called *propensity*. Economic theory (both micro and macro) uses the concept of propensity but in a much simpler sense – as a marginal numerical value that expresses, from a causal point of view, the variation of an economic variable in relation with an another one – for example, in microeconomics: marginal propensity to consume: $c = C'_V$, where c is the marginal propensity to consume, C is Keynesian consumption (or consumption function) of type Keynesian, that is, $C = a + c \cdot V$, and V is the current income, C'_V is the partial derivative of the consumption function in relation to the current income; in macroeconomics: the marginal propensity to import, similarly calculated, as a partial derivative of the import function in relation to national income. Therefore, the concept of inclination/propensity currently used in economic theory has no probabilistic connotations, but is just a (not very appropriate) name for a marginal calculation.
- propensity is not an absolute property; it manifests itself, objectively, in the singular case, only in accordance with the conditions in which the event concerned takes place;
- the propensity thus considered is considered as being the (objective) probability of the singular case (event);

- the absolute propensity (which cannot be known as such, but only by its manifestation as a disposition of the targeted entity) is invariant precisely as a result of its „declaration" as absolute. The problem here is that being invariant, even if we accept the derivation of the objective probability of the singular case from the relative propensity, we cannot return from probability, this way inferred, to propensity. Here we have a species of the so-called inverse probability problem – more generally, the problem of obtaining the probability distribution from the sequence of results generated by the repetition of the experiment. We can draw the obvious conclusion that propensity (at least, the absolute one) is robust (or inert) to counter-factuality. Even more important is to point out that propensity cannot be conditional because conditionality (e.g., as we know it from probability theory) is given by a fixed event in the event field of the probability space in question, not all the conditions for the manifestation of the probability of an event (also fixed). However, in the case of propensity, the relative propensity or the one objectified in (as Popper argues) objective probability of the case of the singular, depends on the absolute propensity and the whole framework of experimental conditions (that is, on the whole disposition of the „propensity field").

Let us examine some of the theoretical, ontological and epistemological aspects of the concept of propensity.

Compared to the basic elements, presented above, regarding Popper's conception of propensity as the basis of the objective probability of the singular case, we also note the following:

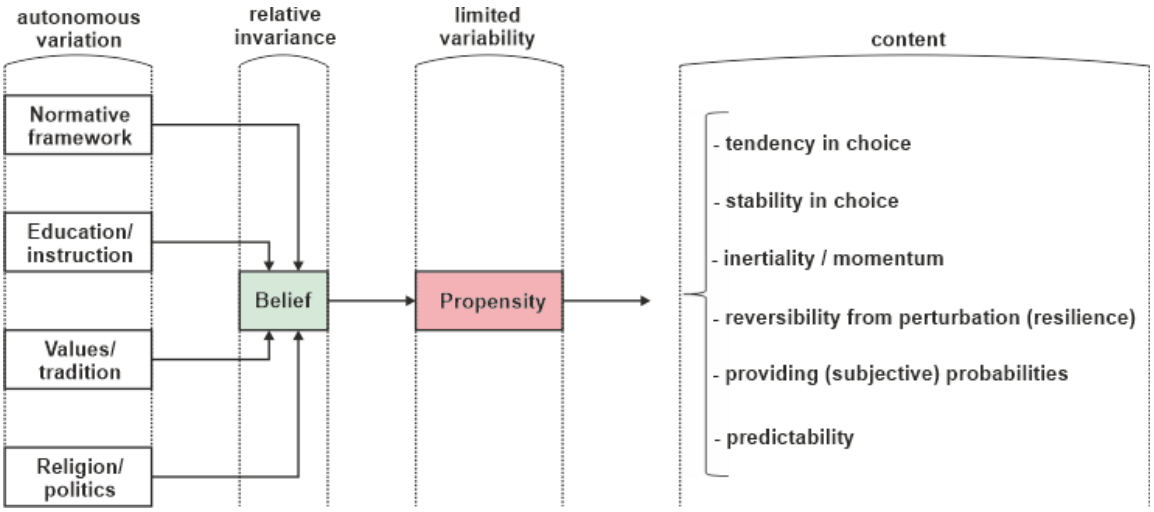
- in essence, Popper finds propensity in objects (like Aristotle) although he relativizes it to experimental conditions, not considering it as being an absolute necessity;
- the relevance of the probability shifts from being a property of the sequence of results obtained after the repetition (possibly infinite) of an experiment, to being a property of the (unrepeatable) conditions of the singular case; the latter property is called (by Popper himself) *dispositional property*. Note that in the case of the sequence of results (which, as we know, generates the objective frequency probability), the experimental conditions must be kept invariant for each repetition of the experiment, otherwise the limit of the sequence of results of the experiment will not "deliver" the probability. Even if the sequence is not infinite, if the invariant maintenance of the experimental conditions is achieved, what is obtained is certainly the objective frequency probability, even if, due to the non-continuity to infinity of the sequence, it has an approximate character;
- propensity is, compared to probability, the qualitative or intensive or active factor; more precisely, the propensity does not itself have a numerical value (which would possibly verify or violate Kolmogorov's axiomatic framework), but is a disposition to generate such a numerical value in the objective probability of the singular case. Probability, once identified, has, however, to check Kolmogorov conditions;
- it seems that Popper, without accepting the repetition of the experiment (since he was referring to the singular case) did, however, make a connection with the frequency probability in the sense that, given the relative propensity, we must have no doubt that if we repeat the experiment, we would obtain a value of the frequency probability equal to that deduced from the examination of the relative propensity (i.e., the absolute propensity "guided" by the dispositional framework of the experiment). Although he virtually accepts the possibility of a sequence of repetitions of the

experiment, Popper does not specify whether it must be infinite (being virtual, an infinite experimentation is possible), or finite, and if it is finite, it does not specify whether the sequence must be long (how long?) or short;

- propensity is a latent disposition that is activated when the experiment is performed (*Nota bene*: obviously, no experiment, singular or not, can only take place in context, i.e. within given and known dispositional conditions). We recall that, relatively recently, Econometrics has begun to take into account the so-called latent variables (unobservable variables but which can be inferred, through the econometric model, from observable variables). However, the significance of the concept of latent variable in Econometrics has nothing to do with the latent nature of propensity, except perhaps by the (superficial) fact that both the propensity and the latent variable are unobservable. Econometrics does not take into account the dispositional context when, based on estimating parameters of past correlation kinematic functions, it claims to make predictions. The extrapolation of a trend (so-called phenomenological extrapolation) ignores the fact that the trend itself (in the present terminology, the relative propensity of the phenomenon in question) can be (and is necessarily) modified by the future context, i.e., by the new dispositional property in which will conduct that event. But this is not the biggest "sin" of Econometrics, but the fact that (often worryingly) it deals stochastically with phenomena that are deterministic in their essence. Probably, as after the neo-classical Econometrics, the Bayesian Econometrics was developed, after the latter a Propensity Econometrics should be developed (that is, based on propensity probabilities or, more precisely, on the relative propensity of the singular case);
- propensity is a basis on which the objective probability of the singular case can be built (as we will show below, the objective character of probability refers exclusively to either the fact that we have frequency probabilities or – as Popper explains (Popper, 1959) – we have the possibility, not necessarily updated, to obtain frequency probabilities. Indeed, Popper argues that the justification for deriving the objective probability of the singular case from propensity is that if we performed a sufficiently long sequence of identical experiments – that is, under the same experimental conditions – we would most likely obtain a probability value equal to propensity. Here is a particularly difficult problem, unclear in the literature: if propensity is not necessarily a number, how is the transition from propensity to probability that is instead a number? Even if we accept the propensity as the basis of the objective probability of the singular case, we still need an operator (of mathematical type) to correspond (biunivocally?) the propensity with the probability that it generates;
- in fact, Popper adopts two positions on his theory of propensity: a) the initial position, in which he associates the propensity with the (potential) repeatability of the considered event; b) the subsequent/late position, in which it associates the propensity with the set of conditions (at the level of the Universe, at the limit) in which that event occurs;

Popper considers that, ultimately, speculative/metaphysical estimation of propensity is inevitable. In this sense, it is curious that, initially, Popper believed that propensity could not be applied in the social sciences, although later it seems that he gave up this „prohibition" (Runde, 1996). ***Figure 1*** shows the abstract concept of propensity.

Figure 1. The abstract concept of propensity



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4. Relationship between propensity and preference

In my opinion, the preference (*Nota bene*: we are here interested by the economic preference, but the idea can be easily generalized for any preference of generic human being) is simply the external manifestation of the propensity. More exactly, once the dispositional property of an entity (for example, of an economic agent who acts on financial market) arises, the propensity is hypostasised through preference. From an epistemological point of view, it seems like the propensity is the noumenon, while the preference is the phenomenon (if we want to stay inside the Kantian terminology). The specific way in which the relationship between propensity and preference take place can be described as follows:

(i) propensity (of economic agent), which is based on his/her belief (or credence) is considered as given (or, almost so), although totally invariant;

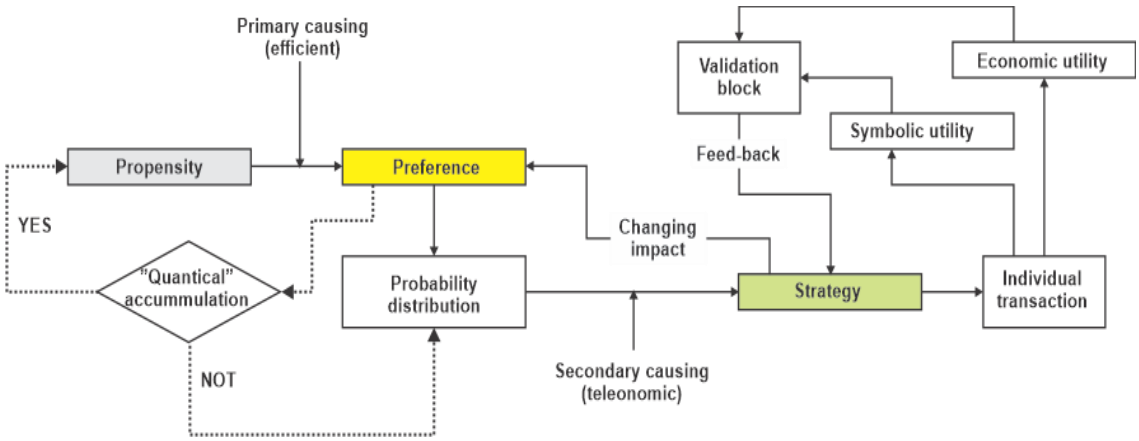
(ii) as efficient cause, the propensity will (necessarily) generates the preference, when and to the extent of dispositional property (especially of the environment, that is, of the financial market conditionalities);

(iii) preference infers, from propensity, the (objective) probability of the single case involved in this process;

(iv) the probability (*Nota bene*: more exactly, the probability distribution) will lead the economic agent to choose the trading strategy, which, in turn, will necessarily generate the individual financial transactions the economic agent operates on the financial market;

Figure 2 graphically illustrates the basic relationship between propensity and preference, including the further „road" of preference towards the individual financial transaction.

Figure 2. The basic relationship between propensity and preference on financial market



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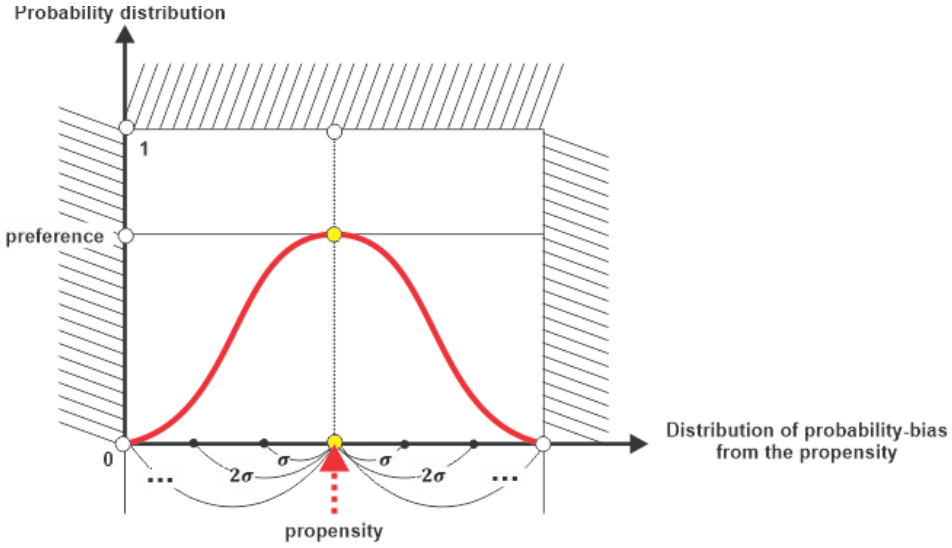
A crucial question is, of course, how to get the (objective) probability of singular event from propensity. In my opinion, the relationship between probability distribution and propensity could be represented as in ***Figure 3***.

Figure 3. The propensity and the probability distribution



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5. The Concept of Proference

As „established" above, a logical connection between propensity and preference can lead to the construction of the concept of *proference* (from *pro*pensity and pre*ference*). The added value of such a concept consists in, at least, the followings:

- put into evidence that preference is originated, in fact, in propensity, which can be considered as the hard core of preference; therefore, all conditionalities as culture, values, religion, traditions, history, community of proximity and so on, are thought as being integrated in the concept of propensity;

- indicates that propensity cannot manifest per se, but only by hypostasising itself as preference; one of the consequences of such a state of affairs is that, by contrast of preference, the propensity is, comparatively, invariant (at least till a „quantic" accumulation of preference change). In fact, the preference is in the first line of challenging towards changing, while the propensity stays in the „back office". We can, also, assert that preference represents the observable of propensity, while the propensity is the „black-box" or preference;
- so, the concept of proference recovers the link (connection) between propensity and preference. Using the concept of proference allows to keep such connection (both from structural and functional perspective);
- both the (relative) variability of preference and the (relative) invariability of propensity are synthesized into the concept of proference (*Nota bene*: however, I think is not the case to go further and proceed by analogy between propensity and research programs of Lakatos, in order to get a kind of cognitive or, rather, praxiological paradigm here).

The way in which the concept of proference takes over the "classical" conditionalities in the society (which I want name as *cultural geodesic* of that society) is sketchy shown in ***Figures 4, 5***, and ***6***.

Figure 4. The proference functioning (I)

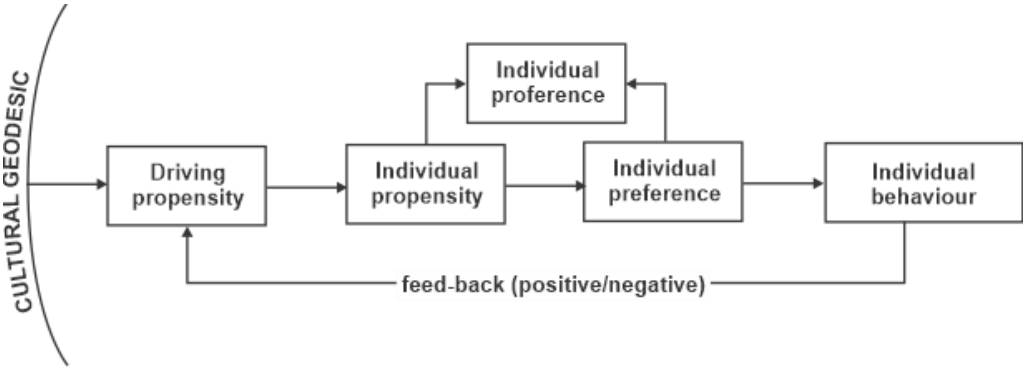

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Figure 5. The proference functioning (II)

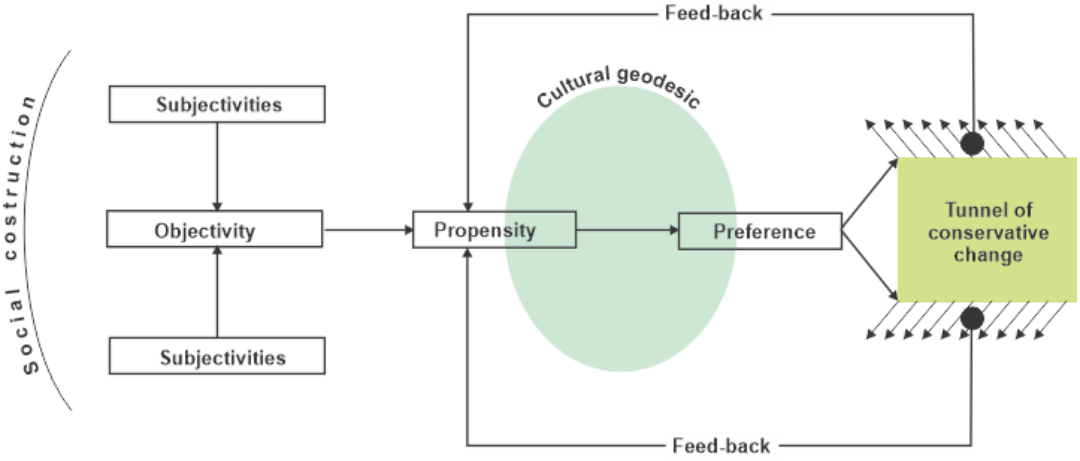

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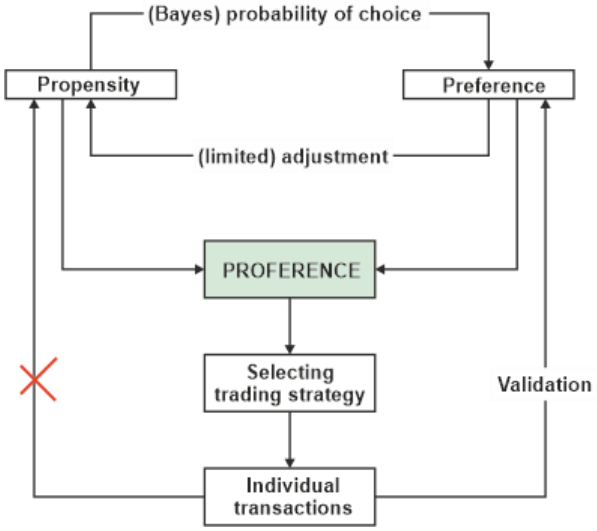
Figure 6. The proference functioning (III)



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6. Main Findings

The results of research can be systematised into two categories: a) value added brought; b) impact on the financial market modelling.

(a) Value added brought

Firstly, from the *financial theory* perspective, two novelties could be noted: (i) allows to introduce the propensity (focused on singular and unrepeatable events) into financial theory; (ii) creates additional framework for introducing into financial theory of the evolutionary model (which is not reduced to the current experimental behaviorism).

Secondly, from *financial methodology* perspective, two new proposals are provided: (i) improves (from logical view) the understanding of the mechanism of forming and adjusting economic preferences (especially connected to financial market); (ii) pushes to replacing the objective probabilities (appropriate to repeatable events only) with the subjective ones (preferable, Bayes-ian probabilities, but based on the propensity).

Thirdly, from the financial *empirical studies* perspective, three findings can be highlighted: (i) allows using of the adaptive preference, based on (limited, but possible, however) adjustability of propensity as hard core of the economic preference; (ii) allows empirical tests based on replacing the exogenous preference by the endogenous one; (iii) the preference is simultaneously considered as input and output in empirical experiments.

(b) Impact on financial market modelling

Firstly, regarding the impact on *principles/axioms* considered in the financial market modelling, the paper brings two results: (i) replacing axiom on the given (or, often, objective) propensity with an axiom on the adaptive/evolutionary propensity; (ii) passing from the *mathematical* homo œconomicus (as neoclassical economic theory claims) to the... *economical* homo œconomicus.

Secondly, regarding the impact on *conjectures* formulated in financial market modelling, two contributions are provided: (i) hypotheses or lemmas regarding the financial marketing

functioning should be focused rather on the pack propensity-preference, that is, on proference; (ii) the target of human agent on financial market should be moved from optimality to sustainability (economic survival), or the same, from maximal to sufficient.

Thirdly, regarding the impact on *tools* used in financial market modelling, two proposal are put at the researchers disposition: (i) inside proference, preference should not be treated as a catalyzer (that is, as being invariant), but as being affected by the process in which it is implied; (ii) introducing, alongside the negative feeds-back in adjusting the behavior on financial market, of the positive feeds-back, which allow an evolutionary escalating in the pack 'propensity-preference', that in the proference.

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