A Model of Interactive Choice

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1. Introduction

In this paper the problem of interactive choice is considered. The relevant definition is as follows: by interactive choice we mean the process of exchange of economic or symbolic goods between several social actors (economic agents). In individual choice problems we have only one actor, in social choice problems we study very large groups of social actors. So, specific questions of interactive choice include:

- how actors interactively adjust their individual values and preferences?

- how adjusted, reconciled, and approved values, preferences, and prices emerge as a result of economic or symbolic exchange?

These questions were studied by many authors and in many contexts. However, we can mention, at least, two distinctive approaches to the problem of interactive choice. The first *utilitarian approach* originates from the conventional economic theory (see, e.g., Mas-Colell, Whinston, Green (1995); Varian (1992); Kreps (1990); Gravelle, Rees (1992)). Its characteristic features: endogenous marginal utilities of economic agents and exogenous market prices of exchanged goods fully determine the result of interactive choice. Equilibrium prices and volumes of goods are determined by an existing market and depend on the type of this market (perfect competitive, oligopolistic, monopolistic, etc.). The second approach originates from social psychology and sociology. Unlike the economic exchange theory which "views actors (persons or firms) as dealing not with another actor but with a market (Emerson, 1987, p.11), the social exchange theory views the exchange relationship between specific actors as "actions contingent on rewarding reactions from others"(Blau, 1964, p.91). Homans describes social behavior as a continuous exchange process: "Social behavior is an exchange of goods, material goods but also non-material ones, such as symbols of approval or prestige. Persons that give much to others try to get much from them, and persons that get much from others are under pressure to give much to them.

This process of influence tends to work out at equilibrium to a balance in the exchange."(Homans, 1958, p.606).

Earlier G.Simmel wrote:"All contacts among men rest on the schema of giving and returning the equivalence"(Simmel, 1908, p.387). M.Mauss (1925) and B.Malinowski (1920, 1922) explained the *gift exchange* phenomenon as the key to the total system of social obligations.

This paper studies different forms and structures of interactive choice. The main idea is to consider these structures as dynamic forms which can transform into each other in dependence on conditions of social interaction. This is the main difference of the proposed approach from the conventional neoclassical approach of the economic theory in which all known forms of market exchange, i.e. perfect competition, oligopoly, monopoly, etc., are usually viewed as static and far from evolutionary changes.

So, our main goal in this paper is to develop the evolutionist model of interactive choice. The following problems will be considered: a dynamical model of elementary interactive exchange which helps to study conditions of existence of a stable equilibrium in the system of interactive exchange and different cases of the 'exchange failure': transformations and violations of this equilibrium due to transaction cost, moral hazard, and adverse selection phenomena. These are *cooperative forms* of interactive exchange. The next problem is to consider the *conflict forms* of exchange: oligopolistic (Cournot, Bertrand, Stackelberg) and monopolistic competition, a *venture* exchange.

The methodology used in these models is based upon the dynamical systems approach. We are not in favor of the game theoretical approach which is mostly confined to static representations of interactive choice phenomena and is far from truly evolutionist ideas. We are not prone to the utilitarian concept mostly used in microeconomic models. Our objective is to consider economic and symbolic forms of interactive exchange simultaneously. The dynamical systems approach is the proper methodology to solve this problem.

2. Elementary exchange

Let us consider an elementary exchange between a consumer and a supplier of a certain good. The following classification of goods is assumed here:

- ordinary economic goods (e.g., apples, bread, cars, etc.);

- extraordinary economic goods (innovative goods, collected goods, public goods, etc.);

- symbolic goods (see, e.g., *Bourdieu* (2000)) which encompass private opinions, beliefs, ideas, emotions in their informational context. This means we are interested in the process of exchange of these symbolic goods between two or more social actors.

We do not consider here mass ideologies, religions, political platforms and other social macro-phenomena which belong to another (higher) level of social exchange.

Let us consider the following examples.

Example 1. Economic exchange

Imagine a market, where a consumer and a supplier of a certain economic good (e.g., apples) are met. The consumer has his (her) own experience of purchasing apples, as well as some a priori subjective evaluations of this good. Similarly, the supplier spent certain resources while supplying apples to this market and therefore has some a priori ideas about the supply price of this good. The subsequent events can develop according to the following scenarios:

– the economic exchange is successful: after several attempts to to discuss the market price of this good the consumer and the supplier arrive to an agreement in frames of which they determine the equilibrium price and the equilibrium volumes of demand and supply of this good;

– the economic exchange is fatal: all attempts to reach an agreement are futile; the consumer and the supplier cannot determine the market price of the exchanged good which is satisfactory to both of them.

So we can fix the following variables which characterize this exchange system: volumes of demand and supply of an exchanged good; prices of demand and supply; the market price of this good.

Example 2. Symbolic exchange

The situation of elementary symbolic exchange is slightly more complicated. Suppose we study a certain belief and the symbolic exchange system includes an actor who offers this belief and an actor who takes (consumes) this belief. Again we fix variables relevant for this type of exchange: the subjective price of supply and the subjective price of demand for this belief, the supply and demand volumes of the belief exchanged. The first difficulty: how to measure these variables? We know that scales of symbolic goods are highly subjective, as well as symbolic evaluations for different people. However, we know many cases of a successful symbolic exchange in which people were able to reach an agreement about market prices of exchanged symbolic goods.

The choice of attributes of a certain good and the unit of measurement of the volume of this good are the main problems of individual choice which are studied in another paper. Here we can only shortly dwell on these problems. We suppose that any symbolic good is described by a certain finite set of its attributes which are subjectively relevant for a concrete individual. The volume of a symbolic good is always quantified by situations in which at least one of these attributes is present. We remark that sets of attributes of the same good can greatly differ for actors taking part in the exchange process.

What is essential for us is that any economic or symbolic good has a certain *subjective price* for a social actor or an economic agent. For example, we can imagine the subjective price of an economic good ('how much this good is valued in eyes of a consumer or a supplier') or the subjective price of a symbolic good (e.g., a certain belief).

Our goal here is to consider the phenomenon of the *market price* of an exchanged good. This market price emerges in the process of market transactions via reciprocal adjusting of subjective prices of a consumer and a supplier.

So let us consider two social actors: a consumer and a supplier of a good A. Denote by A^c, A^s the volumes of demand and supply, respectively, by p_c, p_s - the subjective prices of an exchanged good, and by p^c_m, p^s_m - the market prices of an exchanged good for a consumer and a supplier, respectively.

We argue here that the subjective prices for a consumer and a supplier depend on the volumes of demand and supply of an exchanged good, i.e.

$$p^*_c = p_c(A^c), \qquad p^*_s = p_s(A^s), \tag{1}$$

and the functions $p_c(\cdot)$, $p_s(\cdot)$ can be both decreasing and increasing in dependence of the type of an exchanged good. For a 'normal' economic good, the subjective price of a consumer typically decreases as the volume of demand A^c grows up; and the subjective price of a supplier typically increases as the volume of supply A^s increases. For a symbolic good, the typical picture is different: the subjective price of a consumer increases as the volume of demand A^c increases, and the subjective price of a supplier can increase or decrease as the volume of supply increases.

Let us consider in detail equation

$$p^* = p^*_c = p_c(A^*) = p^*_s = p_s(A^*).$$

There are many cases in which this equation does not hold, i.e. there is no such price p^* that leads to existence of this equilibrium. This means that the cooperation-based exchange is failed for current subjective price curves $p_c(\cdot)$ and $p_s(\cdot)$. Reasons for this situations can be different. Typically, people have different views, motivations, and subjective prices of the same good (economic or symbolic). Therefore, their subjective prices curves $p_c(\cdot)$ and $p_s(\cdot)$ may not intersect. Re-adjusting the subjective price scale is the first attempt to arrange this situation. For instance, it means that a consumer readjusts his(her) subjective price scale from $p_c(\cdot)$ to $P_c(\cdot) = \phi(p_c(\cdot))$, where $\phi(\cdot)$ is a monotonic positive transformation. If there exists such equilibrium demand and supply volume A^* that $P_c^* = P_c(A^*) = p_s^* = p_s(A^*)$, then everything is OK and the coordination of prices scales ends successfully. If, however, all attempts to readjust prices scales fail, then the cooperation-based exchange is not possible and the participants of the market exchange are obliged to find other types of exchange (e.g., the conflict-based exchange).

So far we have a certain exchanged good and two main participants of the exchange process: a consumer and a supplier of this good. We proceed with the remark that there are two main types of interactive behavior: a *cooperative* type of behavior and a *conflict* type of behavior. It is impossible to assert that one of these two forms is basic, archaic, or primordial and another one is less basic and more artificial. We stress here that these two forms are included in a unique *evolution process*. We mean here the evolution of forms of interactive choice which are considered below in this paper.

It is from mere convenience that we begin with the cooperative types of interactive choice. Here a consumer and a supplier 'model' the market price of an exchanged good. This means that the interactive choice is carried out via and mediated by a certain common value, the market price p_m of an exchanged good, which is formed in the interactive exchange process. In the general case, $p_m^c \neq p_m^s$, i.e. the market price for a comsumer p_m^c is different from the market price for a supplier. However, we begin from the simple case $p_m^c = p_m^s = p_m$, where p_m is the common market price of an exchanged good.

The next idea: a consumer and a supplier 'regulate' the volume of demand (A^c) and supply (A^s) of an exchanged good, respectively, in order to diminish differences between their subjective price of this good and its market price, i.e.

$$\dot{A}^c = k^c(p_c(A^c) - p_m), \quad k^c > 0, \quad (2)$$
$$\dot{A}^s = k^s(p_s(A^s) - p_m), \quad k_s < 0. \quad (3)$$

where $\dot{A}_c = dA^c/dt$; t denotes the time variable in the considered system.

The interpretation of these equations is as follows: if the subjective price of an exchanged good for a consumer is higher than the current market price of this good, then the volume of demand for this good increases; and vice versa, if the subjective price of an exchanged good for a supplier is higher than the current market price of this good, then the volume of supply of this good decreases.

Let us give the formal justification of dynamic equations (2)-(3) from the criterion of profit maximization for a consumer and a supplier.

Consider a sequence of choice decisions made by a consumer for N sequential time intervals $t = 1, \ldots, N$. The criterion of profit maximization in N time intervals can be written as follows:

$$\sum_{t=1}^{N} \Delta A_t^c \left(p_c(A_{t-}^c + \Delta A_t^c) - p_m\right) \to \max_{\Delta A_t^c,\, t=1,\ldots,N}. \quad (4)$$

The sense of this criterion is as follows. In the period t a consumer must choose the value ΔA_t^c, i.e. the increment of the volume of consumption for the good A, taking into account the current difference between the subjective and market price of the good A at the instant t: if the subjective price of consumption p_c is higher than the market price p_m at the instant t then it is reasonable to increase the volume of consumption for the value ΔA_t^c (doing so he(she) receives an additional profit $\Delta A_t^c(p_c(A_{t-}^c + \Delta A_t^c) - p_m)$).

Then from criterion (4) we obtain the following first order condition which describes the optimal choice of a consumer at the instant t:

$$\Delta A_t^c = -\frac{p_c(A_t^c) - p_m}{p_c'(A_t^c)},$$

In the continuous time this first order condition is transformed into

$$\dot{A}_t^c = -\frac{1}{p_c'(A_t^c)}(p_c(A_t^c) - p_m). \quad (5)$$

Remark that equation (5) coincides with (2) for $k^c = -\dfrac{1}{p_c'(A_t^c)}$. We note also that for ordinary economic goods $k^c > 0$. However, as a rule, the derivative $p_c'(\cdot)$ is not known precisely and therefore it is reasonable to consider equation (2) with an arbitrary coefficient $k^c > 0$.

For justification of equation (3) which describes the dynamics of the volume of supply for the good A, let us use the criterion of maximization of the subjective profit of a supplier:

$$\sum_{t=1}^{N} \Delta A_t^s \, (p_m - p_s(A_{t-}^s + \Delta A_t^s)) \to \max_{\Delta A_t^s,\, t=1,\dots,N}, \tag{6}$$

From this criterion, as before, we obtain the following first order condition:

$$\dot{A}_t^s = -\frac{1}{p_s^{'}(A_t^s)}(p_s(A_t^s) - p_m). \tag{7}$$

Remark again that equation (7) coincides with (3) for $k^s = -\dfrac{1}{p_s^{'}(A_t^s)}$ for ordinary economic goods with increasing supply functions: $k^s < 0$.

We consider the following mechanism of the market price correction: if the volume of demand exceeds the volume of supply then the market price increases, and vice versa, if the volume of supply exceeds the volume of demand then the market price decreases:

$$\dot{p}_m = \alpha(A^c - A^s), \qquad \alpha > 0. \tag{8}$$

This simple rule was mentioned already by Walras but since that remained at the level of an empirical observation. There exist different markets with their proper rate of adjustment of the market price to discrepancies between demand and supply volumes: from the null up to the instant reaction of the market price to a disbalance between demand and supply. We can discuss only some rational rule of economic behavior in this context. One of such rules which gives (8) is described below.

Remark that any disbalance of demand and supply volumes leads to exchange loss: demand is higher than supply - unsatisfied demand loss; demand is lower than supply - excess supply loss. For the total absence of exchange losses, we need to fully equalize volumes of demand and supply. However, economic agents with bounded rationality have limited chances to furnish this equality. Economic agents have not full information about demand and supply curves and the equilibrium market price. All that is known to agents is the current demand or supply volume and the current market price level. Moreover, economic agents have some information about local behavior of demand and supply curves in a certain neighborhood of the current demand and supply volumes. In other words, agents can estimate derivatives of demand and supply curves at the current instant of time. Therefore we can write:

$$\begin{aligned}\Delta A_t^s &= \Delta p_m^t \frac{1}{p_s'(A_t^s)} \\ \Delta A_t^c &= \Delta p_m^t \frac{1}{p_c'(A_t^c)},\end{aligned} \tag{9}$$

where

$$\Delta p_m^t = p_m^{t+1} - p_m^t,\ \Delta A_t^s = A_{t+1}^s(e) - A_t^s,\ \Delta A_t^c = A_{t+1}^c(e) - A_t^c,$$

$A_{t+1}^c(e), A_{t+1}^s(e)$ are expected demand and supply volumes, respectively, at the instant $t+1$.

Naturally, economic agents try to satisfy the equivalence of expected demand and supply volumes (in order to diminish expected exchange losses to zero), i.e.

$$A_{t+1}^c(e) = A_{t+1}^s(e),$$

Hence we obtain

$$\Delta A_t^s - \Delta A_t^c = A_t^c - A_t^s$$

ans with account of (9)

$$\Delta p_m^t = -\frac{A_t^c - A_t^s}{\dfrac{1}{p_c'(A_t^c)} - \dfrac{1}{p_s'(A_t^s)}},$$

For the continuous time, we obtain from here the following locally optimal rule:

$$\dot{p}_m = -\frac{A^c(p_m) - A^s(p_m)}{\dfrac{1}{p_c'(A^c)} - \dfrac{1}{p_s'(A^s)}} \tag{10}$$

Remark that (10) coincides with (8) for

$$\alpha = \left(\frac{1}{p_s'(A_t^s)} - \frac{1}{p_c'(A_t^c)}\right)^{-1}. \tag{11}$$

In (11) we suppose that the demand and supply curves are continuously differentiable with respect to the corresponding arguments.

Thus, the elementary exchange can be described by the following system of equations:

$$\begin{aligned}\dot{A}^c &= k^c(p_c(A^c) - p_m), \quad k^c > 0, \quad (12) \\ \dot{A}^s &= k^s(p_s(A^s) - p_m), \quad k^s < 0, \quad (13) \\ \dot{p}_m &= \alpha(A^c - A^s), \quad \alpha > 0, \quad (14)\end{aligned}$$

where the coefficients $k^c = -\dfrac{1}{p_c^{'}(A_t^c)}$, $k^s = -\dfrac{1}{p_s^{'}(A_t^s)}$, $\alpha = (\dfrac{1}{p_s^{'}(A_t^s)} - \dfrac{1}{p_c^{'}(A_t^c)})^{-1}$ in the optimal case.

Consider a stationary point of this system: $A_*^c = A_*^s = A_*,\ p^c(A_*) = p^s(A_*) = p_m^*$. To study stability of this equilibrium, let us consider a neighborhood of the stationary point (A_*, A_*, p_m^*). Denote $a^c = A^c - A_*,\ a^s = A^s - A_*,\ q^s = p_m - p_m^*$. Let us demonstrate how we can linearize system (12)-(14) in the neighborhood of the stationary point taking for illustration equation (12):

$$\dot{a}^c = \Delta k^c\,(p_c(A_*) - p_m^*) + k^c(A_*)\,(p_c^{'}(A_*)a^c - q^s),$$

where Δk^c is the increment of the coefficient $k^c(A^c)$ in the neighborhood of the stationary point.

Since $p_c(a_*) = p_m^*$, we obtain

$$\dot{a}^c = k^c(A_*)(p_c^{'}(A_*)a^c - q^s).$$

The linearized system takes the following form:

$$\dot{q} = Jq, \quad q = (A^c - A_*,\ A^s - A_*,\ p_m - p_m^*), \tag{15}$$

where

$$J = \begin{pmatrix} k^c \frac{dp_c}{dA^c} & 0 & -k^c \\ 0 & k^s \frac{dp_s}{dA^s} & -k^s \\ \alpha & -\alpha & 0 \end{pmatrix} \tag{16}$$

and coefficients k^c, k^s, α and derivatives $\dfrac{dp_c}{dA^c}, \dfrac{dp_s}{dA^s}$ are computed at the stationary point A_*, A_*, p_m^*.

Stability conditions for a stationary point can be written as follows:

$$\begin{aligned} k^c \frac{dp_c}{dA^c} + k^s \frac{dp_s}{dA^s} &< 0 \\ \frac{dp_c}{dA^c} - \frac{dp_s}{dA^s} &< 0 \\ k^c k^s \frac{dp_c}{dA^c}\frac{dp_s}{dA^s}\,(k^c \frac{dp_c}{dA^c} + k^s \frac{dp_s}{dA^s}) &< \alpha(k^s)^2 \frac{dp_s}{dA^s} - \alpha(k^s)^2 \frac{dp_c}{dA^c} \end{aligned} \tag{17}$$

These conditions are satisfied if $dp_c/dA^c < 0,\ dp_s/dA^s > 0$, i.e. in the case of an ordinary good. Then the stationary point (A_*, A_*, p_m^*) of (12)-(14) is the stable focus.

Remark that conditions (17) enable us to study the *the Lyapunov asymptotical stability* of the stationary point A^*, A^*, p_m^*. In the sequel we always use the Lyapunov definitions of stability and asymptotical stability of stationary points.

For ordinary economic goods the above conclusion coincides with the analysis of stability of the partial microeconomic equilibrium carried out by L.Walras and A.Marchall. However, in situations when the supply curve has a negative slop ($dp_s/dA^s < 0$) or the demand curve has a positive slop ($dp_c/dA^c > 0$), the obtained stability conditions (see (17)) can be violated. It is well known that Walrasian and Marchallian approaches to the analysis of stability of a stationary point in this situation lead to completely different results and conclusions. Our analysis generalizes Walrasian and Marchallian approaches (because in (12)-(14) prices and volumes change simultaneously) and enables us to formulate more general results.

For extraordinary economic goods and for symbolic goods, there are completely no results about stability of the exchange equilibrium. It seems that the above analysis is the first attempt to formulate precise stability conditions of a stationary point of the exchange process with extraordinary economic goods and symbolic goods. The main problem here is that the demand curve for these goods has a positive slope (see, e.g., Brodsky (2010)) and therefore stability conditions (17) are not satisfied in many situations. There is no stable equilibrium for the market of innovative goods or collected goods: every consumer wants to have as many of such goods as possible (in order to replace with them old types of goods or to complete a collection). For symbolic goods, this situation is even more probable. Suppose a certain belief spreads in a society and we are interested in the exchange process between a supplier of this belief and a consumer of it. The first observation: the stronger is this belief, the more valuable it is for a consumer of it and the higher is the demand for it from this consumer. The second observation: typically the exchange process in this situation ends with the *total consumption*: the whole disposable volume of this belief is consumed. The history of ideas abounds with examples of *total conversion*: from total disbelief to total and absolute belief.

3. Market failures

3.1. Transaction costs

The model of an elementary exchange which was considered in the previous section describes the ideal situation of interactive choice based upon the cooperative type of behavior. There are, however, many situations of a 'market failure' in which this ideal model of cooperative market behavior does not work properly or even does not work at all. As a result, social actors and economic agents are obliged to find other forms of interactive choice based upon conflict types of behavior.

Here we begin to consider these situations of a market failure. The first situation of transaction costs is common in economic analysis but is not yet conceptualized in detail for social interactive choice. In the previous model only two main participants of the interactive exchange were considered: a consumer and a supplier of a certain good. Here we introduce a third participant: an intermediary between a consumer and a supplier who charges a certain price (a *marge*) for his(her) services.

This situation of interactive exchange can be described by the following model in which the variable $t > 1$ describes the effect of transaction costs, i.e. the influence of a marge on the consumer price:

$$\begin{aligned} \dot{A}^c &= k^c\,(p_c(A^c) - t\,p_m), \quad k^c > 0,\ t > 1, \\ \dot{A}^s &= k^s\,(p_s(A^s) - p_m), \quad k^s < 0, \\ \dot{p}_m &= \alpha\,(A^c - A^s), \alpha > 0. \end{aligned} \tag{18}$$

A stationary point in (18) is defined by the following conditions: $p_c(A^*) = t\,p_s(A^*),\ A^c = A^s = A^*$.

The analysis of these conditions leads us to the conclusion that *transaction costs* lead to a decrease in the volumes of demand and supply and to an increase in the consumer price. The market equilibrium shifts from "competitive"point E_1 to the point E_2 (Fig. 1). Let us demonstrate that this equilibrium is stable. The matrix of the linearized system has the following form:

$$J = \begin{pmatrix} k^c \frac{dp_c}{dA^c} & 0 & -tk^c \\ 0 & k^s \frac{dp_s}{dA^s} & -k^s \\ \alpha & -\alpha & 0 \end{pmatrix}$$

Let $a_1 = k^c \frac{dp_c}{dA^c},\ a_2 = k^s \frac{dp_s}{dA^s}$. Then the characteristic polynom of the considered system is : $|\lambda E - J| = \lambda^3 - \lambda^2(a_1 + a_2) + \lambda(a_1 a_2 - \alpha k^s + \alpha + k^c) + (a_1 \alpha k^s - a_2 \alpha t k^c)$. Hurvitz's stability conditions can be written as follows:

$$\begin{aligned} -a_1 - a_2 &> 0 \\ -(a_1 + a_2)a_1 a_2 + a_2 \alpha k^s - a_1 \alpha t k^c &> 0 \\ a_1 k^s - a_2 t k^c &> 0 \end{aligned}$$

These conditions are satisfied for any $t > 1$. The equilibrium point E_2 is stable.

Thus, transaction costs in the system of interactive exchange lead to a stable shift of the competitive equilibrium: lower volumes of demand and supply, higher price levels for most consumer goods.

3.2. Moral hazard

Another case of the 'market failure', the situation of 'moral hazard', can be also explained from principles of dynamical modeling of the interactive choice exchange. This situation is frequent in the system "Principal (consumer)-Agent (supplier) when an economic agent (a supplier of a certain good) is inclined to artificially increase real volumes of supply of this good taking advantage of incomplete information in the system of interactive exchange. This situation can be described by the following model:

$$\begin{aligned} \dot{A}^c &= k^c\,(p_c(A^c) - p_m), \quad k^c > 0, \\ \dot{A}^s &= k^s\,(p_s(A^s) - p_m), \quad k^s < 0, \\ \dot{p}_m &= \alpha\,(A^c - h\,A^s), \quad \alpha > 0,\ h > 1. \end{aligned} \tag{19}$$

Here A^s is the actual volume of supply, $h\,A^s > A^s$ is the demonstrated volume of supply, h i a certain unobservable parameter.

The equilibrium point in (19) is defined from the equation $p_c(h\,A^*) = p_s(A^*)$.

The study of this condition enables us to conclude that in the situation of moral hazard volumes of demand and supply decrease, as well as the price level. Stability of a new equilibrium E_2 is verified in analogy with the transaction costs case.

Fig.2. Equilibrium with the effect of moral hazard

3.3. Adverse selection

In the previous two cases of market failures, i.e. 'transaction costs' and 'moral hazard', a certain shift of the market equilibrium from the pure competitive point is observed. However, in the case of 'adverse selection' there is no market equilibrium at all. So the case of 'adverse selection describes much more serious violation of the pure competitive exchange based upon the principle of interactive cooperation. The situation of 'adverse selection' is typical for *incomplete markets* when a consumer cannot differentiate goods of different quality and is obliged to form his(her) subjective prices with an account of a priori suggestions about the market structure. The classic example of the situation of adverse selection is provided by the market of 'lemons', i.e. used cars which can be of a high quality or rather bad ('lemons'). In the paper by Akerlof (1970) it was demonstrated that in most cases this market degrades and vanishes because only suppliers of 'lemons' continue to sell their goods on this market. The reason for this degradation consists of impossibility to form a common market price for consumers and suppliers on this market. As a consequence, there is no market equilibrium in the situation of 'adverse selection'.

In the case of an incomplete market a consumer needs to modify his(her) subjective prices taking into account the presence of goods of different types (e.g., of a high and low quality) on this market. In particular, in the model of market of 'lemons' the price of consumption demand depends not only on the total demand volume but also on the subjective estimate of the percent of 'lemons' γ^c on this market. If this estimate γ^c increases then the volume of demand decreases.

More formally, suppose that supply volumes of ordinary goods (A) and 'lemons' (L) are equal to Q^s_A and Q^s_L, respectively; the volume of consumer demand equals Q^c. The prices of demand and supply are $p^c(Q^c,\, \gamma_c)$, $p^s_A(Q^s_A)$, $p^s_L(Q^s_L)$; and the current market price equals p_m. Then the considered market is described by the following model:

$$\begin{aligned} \dot{Q}^c &= k^c\,(p^c(Q^c,\gamma^c) - p^m), \quad k^c > 0 \\ \dot{Q}^s_A &= k^s_A\,(p^s_A(Q^s_A) - p_m), \quad k^s_A < 0 \\ \dot{Q}^s_L &= k^s_L\,(p^s_L(Q^s_L) - p_m), \quad k^s_L < 0 \\ \dot{p}_m &= \alpha\,(Q^c - Q^s_A - Q^s_L), \quad \alpha > 0, \end{aligned} \tag{20}$$

where the coefficients k^c, k^s_A, k^s_L, α, as before, can be obtained from the first order optimality conditions in the locally optimal case.

A stationary point in (20) is defined by the following conditions: $Q^c = Q^s_A + Q^s_L$, $p^s_L(Q^s_L) = p^s_A(Q^s_A) = p^c(Q^s_L + Q^s_A, \gamma^c) = p^m$. Let us demonstrate that these conditions cannot be satisfied under some natural assumptions about demand and supply functions on this market.

In fact, since the price of high quality goods is higher than the price for 'lemons', for any Q we obtain:

$$p^s_A > p^s_L \qquad (21)$$

$$\frac{dp^s_A}{dQ} < \frac{dp^s_L}{dQ} \qquad (22)$$

Condition (22) means that the volume of supply of high quality goods diminishes more rapidly along with decreasing market price values as compared with the supply volume of 'lemons'.

Under conditions (21)-(22), we obtain $Q^s_L > Q^s_A$. Therefore the subjective estimate of the percent of 'lemons' γ^c increases and the market demand curve shifts below an initial position $p^c(Q^s_A + Q^c_L, 0)$. We conclude that the market price p_m decreases and the volume of high quality goods Q^s_A decreases more rapidly than the volume of 'lemons' Q^s_L. Therefore the subjective estimate of the percent of 'lemons' γ^c increases further and the market demand curve $p^c(Q^s_A + Q^s_L, \gamma^c)$ shifts even lower, and so on. As a result, consumers and suppliers on this market cannot reach an agreement about the market price p_m and the market itself degrades: only sellers of 'lemons' continue to supply their goods for this market.

Let us emphasize the special role of subjective expectations of consumers on this market - the estimates γ^c. Incomplete markets belong to transitional forms of interactive choice from competitive markets (cooperative forms of exchange based upon common values) to noncompetitive markets with conflict forms of interactive exchange and the special role of subjective expectations of agents.

4. Conflict-based interactive choice

In the previous sections models of interactive choice based upon cooperative exchange and common values were considered. The phenomenon of 'adverse selection' stems from impossibility to form the market price p_m - the common value shared by all participants of interactive exchange based upon cooperative types of behavior on incomplete markets. We emphasized the special role of *expectations* of consumers for the evolution of incomplete markets.

In this section devoted to the conflict-based interactive choice the role of expectations of social actors becomes central.

The role of expectations in social exchange is very important. In modern psychology crucial results are obtained concerning the value dynamics in small groups of individuals who lost mutual understanding which cemented previously interactive exchange. In these situations the interactive exchange in these groups enters a new phase with the central role of reciprocal behavior expectations of this group's participants. If these expectations are confirmed and approved then a new interactive exchange equilibrium emerges which is not based upon common values but uses expectations' equilibrium and group itself is divided into several sub-groups with homogenous value models. If, however, these reciprocal behavioral expectations are not confirmed, then the phenomenon of intra-group aggression emerges with the conflict of different value models and attempts of elimination of alternative value centers. As a result of this evolution, a new interactive equilibrium can emerge in this group based upon the mechanism of power with only one value centrum.

In the economic exchange the situation is similar. Those well known forms of imperfect competition (oligopoly, monopoly, monopolistic oligopoly, etc.) which are usually studied as static and void of evolution, in reality are dynamical and plastic structural forms of interactive exchange which can transform into each other in dependence on current conditions of economic interaction. Let us explain this idea on simple examples. Suppose in initial situation we have the market of perfect competition with an equilibrium market price and equilibrium quantities of demand and supply of a certain economic good. The neoclassical analysis of the market of perfect competition ends at this point but most market stories continue. Gradually, the quality of goods supplied at this market decreases: so called "lemons"appear, i.e. goods positioned as usual for this market but actually of a lower quality level. The market gradually turns into "incomplete": a consumer adapts his(her) demand volume with account of the probability to purchase a "lemon"on this market. As it was demonstrated in the previous section, this incomplete market gradually vanishes: all suppliers of high quality goods leave this market and only suppliers of "lemons"stay in it. The economic theory of incomplete markets ends at this point but real economic stories continue. The suppliers of high quality goods who left the market do not disappear but organize their efforts into a new market of goods with higher consumer quality. However, suppliers of "lemons"in the old market try to attract consumers and make efforts to improve quality of their goods. So, an oligopolistic market appears: two groups of suppliers compete for consumers and form their interactive choice on the basis of reciprocal expectations of volumes and(or) prices of supplied goods.

This interaction can be based upon the cooperative type of choice (oligopolistic collusion) or the conflict type of choice (price wars). The neoclassical analysis of an oligopolistic market ends here but real stories proceed further. In the case of the oligopolistic conflict a dominant supplier, a leader, appears in the course of time on this market who tries to dictate his(her) own market conditions (volumes and prices of supply) to other participants of this market. A specific type of oligopoly (Stackelberg's oligopoly) appears which is actually a transitional structural form towards the monopolistic exchange. The phenomenon of oligopolistic aggression from the leader causes gradual disappearance of all alternative centers of income on this market which enters the phase of a monopoly. The characteristic features of the monopolistic market are higher monopolistic prices and lower volumes of supply as compared with the perfect competitive market.

The neoclassical analysis of a monopoly ends here but in reality the following scenario can evolve. Lower volumes of supply and higher prices on the monopoly market create a new market: in the shadow of the monopoly new suppliers appear who aim at seizure of an unsatisfied segment of consumer demand due to lower prices as compared with the monopoly price level. In the economic theory there is no conventional term for this type of a market which exists "in the shadow"of monopoly monsters and actually is created by the monopolistic aggression. Those alienated forms of market existence, the economic underground, aim at creation of innovative goods and are real "motors of progress". A typical example: evolution of software firms in computer business which, as a rule, began from scratch. The *venture* business ought to be conceptualized as a specific market structure with such characteristic features as the absence of equilibrium volumes and prices for an innovative good, the special role of subjective factors in market dynamics, etc.

Thus, we can observe the whole spectrum of market structures which can evolve in time and transform into other structures depending on circumstances of interactive choice:

- A: competitive market
- B: incomplete market
- C: Cournot oligopoly
- D: Bertrand oligopoly
- E: Stakelberg oligopoly
- F: monopoly

- G: venture

Below we consider imperfect competition structures of exchange. Let us begin with the analysis of oligopolistic markets. The neoclassical models of oligopoly are well presented in many textbooks (see, e.g., [8-9]). They are static (both variables and parameters of these models do not depend on time) and void of any evolutionist idea. Here we consider other models of oligopoly: they are dynamical and based on expectations of social actors.

Cournot oligopoly

Consider two firms S_A and S_B which divide the whole market of some good. Suppose the market demand curve for S_A equals p_A^c and for S_B - p_B^c. Remark that in its decision making about supply volumes each firm considers an *expected market demand volume* for its goods which depend both on its supply volume and on an expected volume of supply of its counteragent.

For example, for the firm S_A the function of expected market demand has the following form: $p_A^c(A_s, B_s^e)$, where A_s is the volume of supply of the firm S_A and B_s^e is an expected volume of supply of the firm S_B. Suppose that the marginal costs for the firm S_A equal c_A and for the firm S_B - c_B.

Consider the mechanism of coordination of interactive expectations in the system $S_A - S_B$. Making choices about his supply volume A_s, the agent S_A maximizes his expected profit:

$$p_A^c(A_s, B_s^e)\, A_s - c_A A_s \to \max_{A_s}, \tag{23}$$

where B_s^e is an expected supply volume of the agent S_B, p_A^c is the market demand function for the good A.

From criterion (23) we define the *reaction function*:

$$A_s = f_A\,(B_S^e). \tag{24}$$

In analogy for the agent S_B:

$$B_s = f_B\,(A_s^e). \tag{25}$$

Interactive expectations A_s^e, B_s^e of agents are corrected on the basis of actual information about a supply volume of a counteragent:

$$\begin{aligned} \dot{A}_s^e &= \alpha\,(A_s - A_s^e), \quad \alpha > 0 \quad (26) \\ \dot{B}_s^e &= \beta\,(B_s - B_s^e)), \quad \beta > 0. \quad (27) \end{aligned}$$

Equations (26)-(27) describe the adaptive mechanism of correction of interactive expectations of agents.

This system can be written in the following form:

$$\begin{aligned} \dot{A}^e_s &= \alpha\,(f_A(B^e_s) - A^e_s), \quad \alpha > 0 \\ \dot{B}^e_s &= \beta\,(f_B(A^e_s) - B^e_s)), \quad \beta > 0. \end{aligned} \tag{28}$$

An equilibrium point of this system:

$$\begin{aligned} f_A(f_B(A^e_s)) &= A^e_s \\ f_B(f_A(B^e_s)) &= B^e_s. \end{aligned}$$

is stable if:

$$|\frac{\partial f_A}{\partial B^e_s}\frac{\partial f_B}{\partial A^e_s}| < 1. \tag{29}$$

In terms of the demand functions p^c_A and p^c_B condition (29) takes the following form:

$$|\frac{\partial p^c_A/\partial B^e_s}{\partial p^c_A/\partial A_s}\frac{\partial p^c_B/\partial A^e_s}{\partial p^c_B/\partial B_s}| < 4 \tag{30}$$

Thus, stability of the oligopolistic market is determined by the cross-elasticity coefficients for goods A and B.

The above analysis of Cournot oligopoly model can be considered as a simple illustration of the following general idea. Markets of imperfect competition are characterized by the special role of *subjective expectations* of agents (social actors) and the mechanisms of interactive coordination of these expectations. These mechanisms of coordination can be based upon the *interactive cooperation principle* (the case of Cournot oligopoly) or the *interactive conflict principle* (see below the case of Bertrand oligopoly). The introduction of expectations into the analysis of oligopoly markets substantially differs the proposed approach from the neoclassical study of oligolopy based upon actual supply volumes of different agents.

Bertrand oligopoly

In our opinion, the proposed approach is much closer to real world of interactive exchange, because the mere fact of simultaneity of decision making of different agents precludes them from any precise knowledge of supply volumes of their counteragents. Only in very degenerate situations of interactive exchange we can ignore interactive expectations of agents and use only supply volumes. In reality, economic firms get information about market consequences of their decisions (about supply volumes of goods) in hours and even days after these decisions. During this time, the market situation can change dramatically. Therefore, it is reasonable to consider interactive expectations of agents and mechanisms (adaptive or rational) of correction and coordination of these expectations.

Bertrand oligopoly model is the first example of the oligopolistic market with the conflict-based mechanism of coordination of expectations and actions of agents. Let us consider the following dynamical version of it. An expected profit of the first agent is equal to:

$$(p_A - c_A)A(p_A, p_B^e) \to \max_{p_A},$$

where p_A, c_A is the price and cost of production of the first agent, respectively; p_B^e is the expected price of production of the 2nd agent; A is the output volume of the 1st agent dependent on prices p_A, p_B^e.

From this criterion we obtain the price reaction function of the 1st agent:

$$p_A = f_A(p_B^e, c_A).$$

In analogy, for the 2nd agent, the expected profit is equal to:

$$(p_B - c_B)B(p_B, p_A^e) \to \max_{p_B},$$

and the function of price reaction:

$$p_B = f_B(p_A^e, c_B).$$

The price expectations are corrected in dependence on the price reaction of the counteragent:

$$\dot{p}_A^e = \alpha(f_A(p_B^e, c_A) - p_A^e), \quad \alpha > 0$$
$$\dot{p}_B^e = \beta(f_B(p_A^e, c_B) - p_B^e), \quad \beta > 0.$$

This system describes the adaptive coordination of the respective price expectations of agents. The stability condition for equilibrium points in this system is

$$\left|\frac{\partial f_A}{\partial p_B^e}\frac{\partial f_B}{\partial p_A^e}\right| < 1.$$

This condition is easily violated: if one of the firms overreacts to a change in the price of its counteragent, then this stability condition is not satisfied. This is the common feature of Cournot and Bertrand oligopoly models. However, there is a certain difference: even a small change in price for production of one of the firms can lead to a dramatic shift in consumers' preferences on this market and substantially change the balance of firms' interests. Let us consider the following example. Suppose one of the firms (A) decides to use the aggressive price strategy and abruptly diminishes the price of its production. Its counteragent (B) will know about this decision some time later. Currently, B continues to build its price expectations and price strategy on the basis of old information about the market. The result is evident: the firm A grasps a major part of the market and presses its counteragent (B) to the periphery of this market. The reason is also clear: a certain inertia in the mechanism of price expectations' formation of B. Our conclusion: only firms with an instantaneous price reaction can exist on the 'clear' oligopolistic market; otherwise the market interaction enters a new phase of the Stackelberg oligopoly with a 'leader' who enjoys a major market profit and 'followers' satisfied with small portions of consumers' demand and market profits.

Stackelberg oligopoly

This form of the oligopolistic exchange is transitional to the monopolistic market. Its characteristic feature is existence of a 'leader' who dictates its output to 'followers' and therefore grasps a lion's share of market profits. The role of expectations which is central for pure oligopolistic markets is de-facto eliminated by the leader. The mechanism of market conflict continuously leads to degradation of this type of a oligopolistic market and its transformation into the market of monopoly.

A 'follower' chooses the volume of his(her) output from the 'residual principle' on the basis of the output volume of the leader:

$$q_2 = f(q_1).$$

Using this fact and the market demand function:

$$p_1(q_1, q_2) = p_1(q_1),$$

the leader chooses the optimal output volume from the profit maximization criterion:

$$\pi_1(q_1, q_2) = (p_1(q_1) - c_1)q_1 \to \max_{q_1}.$$

A substantial distinctive feature of the Stackelberg oligopoly is the emergence of the first signs of the *market power*: the leader dictates his(her) output volume q_1 to 'followers' and thus strives to monopolize the market profits.

A continuous character of the evolution of market structures is essential for us here: the market structure of oligopoly is continuously transformed into the market structure of monopoly via transitional forms of Bertrand and Stackelberg oligopoly.

Monopoly

In the previous paragraphs we tried to emphasize the following idea: the competitive exchange is based upon *common values* of exchanged goods (e.g., market prices, moral values, etc.) but the oligopolistic exchange is based upon *interactive expectations* of agents who take part in the exchange process. This paragraph deals with the monopolistic exchange based upon the institute of *market power*. All these institutes (common values, interactive expectations, and market power) are not eternal and primordial. They change and transform into each other depending on circumstances of interactive exchange.

Authors of microeconomic textbooks usually stress that the market demand curve is down sloped in the typical situation of the monopolistic exchange. It follows from here that monopolistic prices are higher and volumes of transactions are lower than in the situation of competitive exchange. However, this conclusion uses an assumption that a monopolist knows precisely the market demand curve for his(her) production.

This is the typical microeconomic textbooks' interpretation of the monopolistic exchange. The actual cases of monopoly are much more complicated. Typically, a monopolist does not know precisely a market demand curve for his(her) goods. This knowledge, however, is crucial for the possibility to extract monopolistic profits. Remark that in the situation of competitive exchange, the knowledge of subjective preferences of counteragents is not necessary for the existence of market equilibrium (equilibrium prices).

In actual situations of the monopolistic exchange, a monopolist uses some estimates of the market demand curve, i.e. he(she) it models this curve. Let us consider in detail this modeling process. Suppose a true demand curve for a monopolist is $p^c(Q)$ and this monopolist uses the following model of it: $p^m(Q)$, where Q is the supply volume of goods. If the functions $p^c(\cdot)$, $p^m(\cdot)$ differ substantially, then actual monopolistic profits are not optimal. A monopolist is obliged to adapt the model of the market demand curve using current information about the market.

Suppose that the monopolist chooses the supply volume Q from the profit maximization criterion:

$$p^m(Q)Q - cQ \to \max_Q,$$

where c is the marginal cost.

Then

$$\frac{dp^m}{dQ} = \frac{c - p^m}{Q}.$$

If the model of market demand curve p^m is corrected in the exchange process and depends on time, then the dynamics of p^m and Q^m are connected by the relationship:

$$\frac{dp^m}{dt} = \frac{c - p^m}{Q^m}\frac{dQ^m}{dt}.$$

Let us explain how the market demand model is corrected by the monopolist. First, the market price p^m is set. Then the monopolist observes the reaction of the market. Suppose the actual demand volume for the price P^m equals Q^c but the monopolist expects the volume Q^m. Then

$$p^m(Q^m) = p^c(Q^c),$$

where $p^c(Q^c)$ is the actual market demand curve.

Consider the inverse function $f = (p^c)^{-1}$. Then from the above equation we obtain: $Q^c = f(p^m)$. Suppose that the monopolist corrects the supply volume Q^m on the basis of the actual demand volume Q^c: if the market demand volume exceeds the supply volume then the monopolist increases the supply, i.e.

$$\dot{Q}^m = \gamma(Q^c - Q^m).$$

where $0 < \gamma < 1$.

Therefore, we obtain the following system of equations which describes the evolution of the market price p^m and the volume of supply Q^m:

$$\begin{aligned}\dot{Q}^m &= \gamma(f(p^m) - Q^m)\\ \dot{p}^m &= \frac{c - p^m}{Q^m}\gamma(f(p^m) - Q^m).\end{aligned}$$

Stationary points of this system satisfy the condition $f(p^*) = Q^*$. Consider stability of such an equilibrium. In a neighborhood of a stationary point we obtain:

$$\frac{d\dot{Q}^m}{dt} = \gamma(f'(p^*)\dot{p}^m - \dot{Q}^m) = \gamma(f^{'}(p^*)\frac{c - p^*}{f(p^*)} - 1)\dot{Q}^m.$$

Hence, we conclude that the equilibrium point (Q^*, p^*) is stable if

$$f'(p^*)\frac{p^* - c}{f(p^*)} + 1 < \gamma^{-1},$$

i.e. $0 < f^{'}(p^*)(p^* - c)/f(p^*) < 1/\gamma - 1$.

This condition can be written as follows:

$$p^* \frac{f^{'}(p^*)}{f(p^*)}(1 - \frac{c}{p^*}) < \frac{1}{\gamma} - 1.$$

First, we observe that at the equilibrium point: $p^* > c$, i.e. the equilibrium price level chosen by the monopolist must be greater than the marginal cost c, i.e. the monopolistic markup is set. Second, for the dynamical stability of correction process it is necessary that the elasticity of the inverse market demand curve must be high enough in a neighborhood of this equilibrium point. Otherwise, the process of dynamical correction of the model of the market demand curve becomes unstable.

Venture

This market structure is not considered in microeconomic textbooks for the following simple reason: conventional models of competitive, oligopolistic and monopolistic markets are static and are not used for the analysis of microeconomic dynamics. However, the *venture* market is the necessary element of the whole spectrum of the interactive exchange structures. This element gives an important momentum to the process of market transformations. The main characteristics of the venture are as follows:

- the venture proposes new kinds of goods with innovative consumer characteristics. For economic goods, the typical example is software firms in computer industry: most of these firms began their business *from zero*: from a discovery of a new product to competition with old monopolies. For symbolic goods, the venture is typically a small social group who proposes new social values. The crucial examples of symbolic ventures are well known: early Christianity (Christ and apostles), early marxism.

- the venture is born in an alienated segment of the monopolistic market as a 'protest' form of interactive exchange. In fact, the monopolistic market is characterized by higher prices and lower volumes of transactions as compared to competitive markets. Initially, the venture uses this unsatisfied consumer demand. Psychologically, it is much easier to propose a new product and to offer it to a consumer in the situation of high monopoly prices and a restricted access (deficit) to ordinary monopolistic goods. This consideration is valid both for economic goods and symbolic goods.

Suppose Θ is a potential demand volume for a competitive market; Q^m is the demand volume for the monopolist; Q^c is the demand volume for the venture. We assume that the venture uses unsatisfied consumer demand, i.e. $Q^c = \Theta - Q^m$. The subjective price for a venture depends on the volumes Q^c, Q^m, i.e. $p_c = p_c(Q^c, Q^m)$.

For the venture market, the following important condition must be satisfied :

$$\frac{\partial p_c}{\partial Q^c} > \frac{\partial p_c}{\partial Q^m},$$

because a consumer of venture goods wants to discard old (monopolistic) goods from his(her) actual consumer set and to change them to innovative goods. In many cases $\frac{\partial p_c}{\partial Q^c} > 0$, because a consumer wishes to have only innovative venture goods in the consumer set. Since for the old monopolistic goods $\frac{\partial p_c}{\partial Q^m} < 0$, the key condition for the venture market is satisfied.

The demand equation for the venture market has the following form:

$$\dot{Q}^c = k^c(p_c(Q^c, Q^m) - p),$$

where p is the market price; $k^c > 0$.

The supply equation is

$$\dot{Q}^s = k^s(p_s(Q^s) - p),$$

where p_s is the subjective supply price for the venture; $k^s < 0$.

The dynamic equation for the market price:

$$\dot{p} = \alpha(Q^c - Q^s),$$

where $\alpha > 0$.

Consider a certain initial point Q^c_*, Q^s_*, p_* in the phase space, which is characterized by low volumes of demand and supply for a venture good and by a low market price of this good.

Let us study stability of this market. According to Lyapunov's method, for this purpose we must consider the linearized equations of demand and supply. For the demand equation, we obtain:

$$\dot{q}^c = k^c(q^c(\frac{\partial p_c}{\partial Q^c} - \frac{\partial p_c}{\partial Q^m}) - \Delta p).$$

By virtue of the main condition for the venture market, the demand volume for an innovative good increases, as well as the market price p and the supply volume. Since the market demand curve for the venture goods is positively sloped in most cases, the stability condition in this system is easily violated and the non-equilibrium trajectory of market evolution leads to a rapid increase of the market demand for the venture goods. The venture market of personal computers in 1970-1980s has developed according to this trajectory of evolution.

The subsequent evolution of the venture market branches in several trajectories. First, the situation of sure positioning of venture goods on the market: all efforts of the monopoly to harm this positioning process (barriers to enter the market, 'predator prices') turn out to be useless and the venture surely grasps a certain niche on the market. The monopoly structure of the market then rapidly evolves into the oligopolistic structure. Second, the investment strategy of the monopoly is also possible: the monopoly buys patents for the venture goods or lures the best 'generators' of innovative ideas and de-facto integrates the venture into the monopoly structure.

Conclusion

To conclude this exposition of the evolutionist model of interactive choice, let us briefly remind the main logical steps of our study.

We begin from the perfect competitive exchange between a consumer and a supplier of a certain good (economic or symbolic). This elementary exchange structure allows us to discern and analyze the main ingredients of the exchange process:

- coordinated adaptation of individual prices of an exchanged good;

- emergence of an objective price of an exchanged good (a market price in economics) as a result of the exchange process.

The perfect competitive exchange is cooperation-based. Coordination of individual motivations, prices and preferences leads typically to an exchange equilibrium point which is characterized by an equilibrium price level and equilibrium demand and supply volumes of an exchanged good. However, we formulate precise conditions for existence of this equilibrium and consider certain cases of an exchange disequilibrium.

Three particular cases of a market failure (transaction costs, moral hazard, and adverse selection) are characterized by negative deviations from the perfect competitive exchange. In the last case (adverse selection) an incomplete market of an exchanged good appears. A model of incomplete markets can be obtained quite naturally from the model of perfect competitive exchange: a good's quality can gradually worsen for some suppliers and so called 'lemons' emerge, i.e. goods positioned as ordinary goods for this market but actually of with lower quality characteristics. We demonstrated above that this market gradually disappears because it is impossible to find a market price which satisfies all market participants.

Another substantial feature of incomplete markets is an important role of *subjective expectations* of consumers who are obliged to adapt their demand volumes with account of their subjective estimates of the share of 'lemons' in this market. This important role of subjective expectations of agents (social actors) becomes quite remarkable for *oligopoly markets*. In this paper the main models of oligopoly markets based upon interactive expectations of agents were studied: the model of Cournot oligopoly which describes the mechanism of cooperation-based interactive exchange, the model of Bertrand oligopoly which describes the mechanism of conflict-based interactive exchange, and the model of Stackelberg oligopoly which provides a necessary logical link for transfer to the market of monopoly.

The logic of these transformations of exchange structures is as follows: from common values (in particular, market prices) shared by agents of exchange, to interactive expectations of agents for oligopoly markets, and further, to the mechanism of market power intrinsic for the market of monopoly. Let us mention the institutional aspect of these market transformations: the institute of common values (norms) which rules the perfect competitive markets is transformed into the institute of confirmed interactive expectations (semi-norms) for the oligopoly market, and then - into the institute of market power for the monopoly market.

The mechanism of market power leads to higher monopoly prices and lower volumes of supply of an exchanged good in the monopoly market. This 'triumph' of the monopoly power often ends the analysis of market exchange structures. However, in reality we see the following unexpected continuation of this story. In the shadow of monopoly giants who totally destructed all spreads of free competition, quite surprisingly, new forms of 'alienated' interactive exchange begin to grow. These are 'ventures' who propose innovative goods with higher consumer characteristics as compared with monopoly. An unsatisfied consumer demand rapidly switches to goods supplied by ventures, and all attempts of a monopolist to struggle with unwished competitors often fail and a venture finds his(her) niche in the market. The end of the stage qof monopoly domination in this market looms and the vector of market evolution suddenly changes its direction: from the monopoly market, to oligopolistic markets, and further, to the perfect competitive market.

In this paper the notion of the *venture market* was introduced and described. A venture market has no equilibrium trajectories of evolution and exibits purely disequilibrium dynamics. This feature is explained by the paradoxical character of the market demand curve for venture goods: in violation of the law of decreasing marginal utility, the market demand curve for venture goods is positively sloped. In virtue of this feature, ventures are able to overcome the mechanism of market power intrinsic for the monopolistic market. A necessary logical chain of evolution which gives real dynamics to the process of transformation of market structures can be found in the phenomenon of the venture market.

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