Sustainable Food Security: Floating Balance of Markets

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January 2016

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Abstract

The paper deals with pressing issues in food security. The research focus is on defined specifics of a price factors' influence on a balance in a market. The paper specifies features of food security and there is a conclusion of its division into static and dynamic. The subsequent development of ideas on dynamic security has led to a defined "floating" balance, when the market due to its movement inertia crosses an equilibrium point, from a condition of relative deficit to an account surplus of supply and demand, and vice versa. With an analytical review of known scientific approaches, in the paper, there is an assumption that any national food market is more subject to price volatility than the global market. These and other features have allowed finding a number of sustainable regularities in an influence of changes to prices upon a status of security.

Keywords: food security, price factors, market equilibrium and balance, risks, uncertainty, self-organization.

JEL Classifications: Q01; Q11; Q17

1. Introduction

The food issue is one among other priorities in a survival of the society. Scientists have been making various emphasises to define significance of the problem, but they all agree on an essential need in supply-demand harmonization. Ways to achieve the equilibrium in the food market depend on a rightly understood and perceived status of security. This equally applies to a content of the category, where in an opposition of distinct concepts, they have been simultaneously developing ideas of autarky and liberalism in trade. Neither absolute openness of food markets, nor their closure may be an efficient solution to the security problem. Obviously, it lies in a completely different plane. It does not only become important to achieve a compromise in freedom of markets, but also in necessarily barriers available in imported food supply. A result is an achieved conditional balance (and, being previous, it is worth saying that the equilibrium is achieved in the floating market balance, it is instantaneous and dynamically transformed along with a change to the national potential).

To ensure sustainable food security, we cannot do without specifying characteristics of a business mechanism. A specific role in this regard has been assigned to motivators that cause cyclical fluctuations in the food market. It is understanding of principles of these factors' impact, that this research aims at. Expected findings should basically contribute into elaborating an efficient security model. Preliminary approaches are based on a hypothesis that a safe condition is then and only then set, when own capabilities are able to cover national needs, taking into account unused spare production capacities. The result is a permissible level of a possible substitution achieved with imported supply, while the national food market is kept secured. At the same time, the factor of price differences between exports and imports is perceived as a minor one. However, to our mind, it is worth somewhat making the research deeper as it is price characteristics that create incentives to shape foods flows. These and other aspects emphasize how relevant and significant it is to elaborate the question of equilibrium in markets. Along with ambiguity in a definition for food security itself, there is an objective need in a clear and rigorous methodology.

Questions like how to identify such a condition, analyse and manage it in its dynamics are a set of unconventional research objectives.

2. Literature review

The scientific community traditionally considers (Glazyev (Note 1), Mikhailushkin & Barannikov (2012), Kostusenko (2009) etc.) that a concept of "food security" was first introduced into scientific use in mid-1970-ies and is associated with the World Conference on Food. It was there where it was found that food security is uninterrupted availability of sufficient global reserves of foods to maintain a sustainable growth in food consumption and fluctuation offset in overall production and prices (Report of the World Conference, 1975). A free-and-easy interpretation of the conference conclusions has changed academic understanding of the term. In this way, Kostusenko gives somewhat different definition, when food security refers to a condition when all people always have a physical and economic access to safe and nutritious foods in quantities sufficient to meet their needs and preferences in food, required for an active and healthy life. This once again confirms the fact that the concept has not received its sufficient evidence to make its rigorous content. Not focusing on differences in an interpretation of the concept, it is worth mentioning that the term is in place in publications issued long time before the World Conference. This is not surprising. The first modern references date back to the 1940-ies. Events of the World War II said at the international level of a need to achieve "freedom from poverty" (Report on findings, 1943), which means reliable, proper and appropriate food procurement. Similar problems had been also solved before that, but within national policies.

It is obvious now that the issue of food security is extremely complex and multifaceted, has a long history of studies. Approaches to find solutions to its certain aspects can be found in a number of scientific papers. We may refer to Coates, Webb and Houser (2003) on a measurable estimate of food security; Lawrence, Lyons and Wellington (2013), Panda (2009) on a definition of an influence of globalization and trade liberalization; Thomson and Metz (1999), Pollard (2012) on safety control and impact consequences; McDonald (2013), Hulsc (1995) on industry specifics; Nazarenko (2011), Sárkány (1982), Bagramov and Sushchenko (1984) on an analysis of a condition; Bulavko and Nikitenko (2009), Kravchenko (2011) on theory and methodology of the problem; Dubovtseva and Kundius (1999) on control over food security, and other papers, which reveal important aspects of the problem.

An overview of scientific papers shows all the ambiguity in perceived food security. It is obvious that the concept is difficult to be attributed to that group of terms, an interpretation of which is conventionally long-standing. Reasons for such a situation are of a dual nature. On the one hand, an economic category of security reflects loose identification with predicates of its manifestation. Herewith, the particular attention is paid to semantic ambiguity in a syntagmatic relationship of the concepts, when security in relation to an object is, inter alia, a "property", "attribute", "combination of factors", "state", "activity", etc. On the other hand, with relatively known parameters, using which they make an appraisal, security criteria are unclear. Different approaches make distinct emphasises to ground certain security levels. Methodical fragmentation was a reason for this. Due to conceptual uncertainty, it comes from distinct prerequisites to make such a provision. That is why for the purposes of the research we should clarify characteristics of an objective to provide food security, assuming that food (FAO et al, 2013) *is in a sufficient quantity* (volume required for a healthy diet) *and of high quality* (not dangerous by organoleptic, sanitary and biological parameters), *physically and otherwise accessible* (not limited to economic factors), *reproduction-stable* (including an opportunity to make short and long-term reserves.)

All these indicators may undoubtedly be quantitatively measurable. With various degrees of specificity and comprehensiveness, on the list, there is an assessment of quality and availability of foods. Adoption of differentiated levels of acceptability with their aggregate influence limits a volume of disposable foods. Remaining parameters of the quantity and reproduction stability are mutually complementary (in control over supply, demand and production capacities) and directly involved in resource base making. Hereby, we have outlined a circle of parameters of the primary and secondary order. They should be a basis for the

model of food security. It is worth mentioning that, considering an isolated system of national markets, we only define a volume of food production with national factors, where special importance belongs to the population factor as basis forming. Putting an autarchical nature aside, we may say that the system is complemented with an external influence, misbalancing a market position at the expense of permanently changing flows of foods. And if in case of parameters of the quality and availability of foods, safety criteria are clear enough, then as for indicators of overall production, the situation is not so obvious. In both cases, a direction and a strength of food flows are defined by price conditions, which are partly offset by priorities to ensure security itself. All this points out to a need in harmonization of a "movement" of foods establishing clear boundaries for acceptable exports and imports, the national output and a potential to make a change to the output (reserves). Kennedy (2003) confirms this saying of an available "...need in the world ... in simple and strict ways to measure food security ...".

Unfortunately, despite all the variety of scientific approaches, they do not include an objective assessment. In one way or other, an analysis depends on certain reasonable deductions of an acceptable security status without a proper scientific rationale for a choice. An illustrative example refers to Gusakov et al. (2008) and Ilyina (2003) on an optimal view of national output scale and foreign transactions at a ratio of 80-85 per cent to 15-20 per cent. A similar view is in Mikhailushkia and Barannikov (2012), who consider that national food security is at least 80 per cent. Kaygorodtsev (2006) has a different view. He notes that "as a criterion of food independence in the world practice the level of imports of 30 per cent is applied". Hence, the national market must provide at least 70 per cent of a demand for foods and farm resources. Pashina (2013) offers smoother ranking of food security: from an unacceptable level (with a value of national availability less than 20 per cent) to a high level (with 80 or more per cent). In contrast to this, Fajado (2003) points out to quality indicators to be included in an assessment. Mason (2003) presents a similar idea claiming that "a qualitative approach is highly up-to-the-minute". At the same time, there have not been found any reliant scientific arguments for a certain level to be considered a reference value for security.

Of course, the approaches are very close between each other in perception of necessary food security, but most often, we assume perceptions of a particular situation. It is important here to distinguish *static and dynamic security.* In the first case, security refers to set specific value of national output, disregarding circumstances of doing business. Mainly, these conditions may include trends in sales of non-food products (services). In the second case, dynamic security is indeed made under an influence of these circumstances and at the same time shows an untapped potential of national output. It is obvious that spare capacities are a source to cover a possible food shortage in case of critical aggravation in a situation. In fact, such vision of the problems makes a basis for the main hypothesis of the research, later developed in a way to estimate a permitted value for a replacement of national food production with imports (Kuzmin, 2015).

A solution to a scientific problem of food security modelling is mostly in line with making a dynamic balance where threshold values for exports and imports are set based on capabilities of a national potential. The balance plays an important role in balancing the food market and making it sustainable. Therefrom, we may conclude on overseeing the security status as parameters of the market will be mutually harmonized. Many scientists have discussed the question of achieving a sustainable balance in the market. In agriculture and other economic sectors, founders of the balance approach Egereva (1963), Dadayan and Kossova (1962), Eidelman (1966) and others have made their contributions. Modern ideas are developed based on the view that the balance is not so much a tool to solve applied problems of efficient allocation of resources as a key to understand a genesis of risk boundaries and economic threats.

Taking into account that dynamics of national food output and its potential are taken as a given, depending on current development trends, price factors are only pulse sources for their growth or decline. It is they that actually determine a direction of movement for commodity flows in an inter-regional aspect of the issue. Ivantsov (2009) agrees with such view on food security and this only goes to prove scientific soundness of judgments. However, it does not allow talking about exclusiveness of such a decision.

Ivantsov perceives such status with an increase in national overall production, which is obvious because of the absent complete information of the market and a nature of its imbalance.

Some regularities in business mechanism in balancing the food market are disclosed in studies on trade liberalization. In this regard, Rosset (2006) argues that "liberalization in agriculture generates uncertainty in trade inherent to them", which is only partially true. Uncertainty is universal and applies to all the elements within the economic system, making some clumps of higher density in those areas, where complexity in administrative decision-making will be typical, whether in the multiplicity of subjects of an influence or their non-coordinated interaction. Anyway, Rosset (2006) insists on his position with an argument that "food sovereignty is described with a secure access to foods through local and national markets". The access is indeed executed through local markets, but this access is finite and does not indicate how agricultural commodities came to these markets. Markets are interconnected, and it is unreasonable to abandon trade liberalization because it leads to uncertainty.

Analysing his position, Lawrence, Lyons and Wellington (2013) conclude that "for Rosset, trade liberalization reduces inventory reserves (which significantly contribute into security) due to food sale in the world market". This idea found its further development in another research. Holt-Gimenez, Altieri and Rosset (2006) have somewhat similar views. Their focus is an objective to maintain sustainability in agriculture, which is at the same time not allowed "to be excluded from trade". However, the question is an action of the comparative advantages law, which, in their opinion, should be a determining mechanism in a choice of a place for production and a market, in which the product will be sold. Thus, as a way to balance food markets, liberalization is not denied, but limited to a reasonable location of reference points in agriculture. Indeed, any trade is only desirable until the time it does not violate conditions of security. Holt-Gimenez, Altieri and Rosset's example vividly shows that economic benefits from trade itself should not affect a security status. Otherwise, benefits got from trade may be replaced with re-purchase losses with an only purpose – to restore a lost status of security (Note 2).

3. Methodology

The primary element in an analysis of food markets is clarifying a nature of the business mechanism of their functioning. In this way, Gusakov et al (2008) refer to this mechanism as a system of measures, which provides a balanced market activity. The balance here is understood as a condition, with which the supply and the demand for agricultural resources completely cover each other. However, achieving such a condition is an extremely complex application. *Markets are permanently at a point close to the equilibrium, but far from it; any movement towards the absolute balance faces a confident response from uncertainty, leading the system off from the relative deficit of the supply to its subsequent surplus, and vice versa.* All this traditionally encourages maximization of effects from production or consumption. On the one hand, in a direct increase of output when there are increasing prices in place and a food shortage. On the other hand, in building-up or restructuring consumption in time of a decrease in prices and food surplus. I think that difficulties in achieving the balance appear in an unboundedness of a respond by the parties. With a shared impulse to action (which actually contributes into the equilibrium in the markets), each participant takes an independent decision. Moreover, such decision is uncoordinated with respect to others. It is obvious that a result is *an available continuous cycle, which in its movement often crosses a point of equilibrium.*

It is worth mentioning that following the conservation equation, it is only possible to balance any market if and only if its adjacent markets have been already balanced. This is a typical example of self-organization. On the contrary, in conditions when adjacent markets have not been balanced, an achievement of tranquillity in economic development is executed in establishment of rigid boundaries. It mostly refers to a natural volume of food flows. At the same time, food prices are getting a factor that induces flows to their movement guiding then for purposes of profit maximization. All this is only a manifestation of reasonably allocated resources for economic reasons. Supply barriers within the food security model add to the system an element of protection, based on an assumption that security is a

condition, in which the national demand (need) is achieved at the expense of national forces, taking into account cross-supplies, whether in food, or non-food commodity groups. It is worth reminding that, to our mind, national output is supplemented with reserves of the potential output that have not been involved so far. Thus, security, rigidly understood as a concept, loses its relevance, giving way to its mild wording.

Working further on the above-mentioned idea that food security is, amongst other things, a result of other subjects' dependence and parity suppresses attempts to achieve risks or present violations to the status quo, we can come to the following conclusion. *National food security rejects its self-isolation and its exclusive focus on national production.* However, in control over the national market of foods and agricultural resources, there is a need to apply a "system of interconnected natural balances between animal and crop products, as well as their derivative products" (Vorozheikina, 2012). All this is necessary to make the security model. We share the same view, pointing out to an exclusively balance nature of the equilibrium, in the sense that security cannot be determined otherwise as by establishing a standard (for example, in a replacement of national production with imports). At the same time, the standard is dynamic, that is, subject to changes in due time. Some arguments for this conclusion are available in Panda (2009) saying of the food security model conditions, where he highlights importance of solving a "corpus of equations for the market equilibrium for output, employment and foreign exchange markets". It is obvious that it is impossible to achieve the static balance (and it works), but the different thing comes true, i.e. with cyclic fluctuations of markets transition from a state of their relative deficit to their surplus, and vice versa. From time to time, the equilibrium point appears and markets always go through it in inertia of their movement.

As it was mentioned above, inertia in food markets depends on a producers' desire to maximize their profit with a search for and redirection of commodity flows to a place, where price conditions are relatively better. In the absence of protective barriers, it is this that causes cyclical fluctuations when the market equilibrium point only appears for a while and becomes instantaneous. There is an important remark by Panda (2009) on an impact of national industry prices, which "play a balancing role to achieve a balance between the supply and the demand in each sector". A certain scientific interest in this regard also belongs to an issue of inclusion of a national food market in global interactions. It seems that a nature of the price factor impact in global and national food markets will differ.

The research on price dynamics has shown that higher prices would not only naturally and quite reasonably lead to a reduction in total food consumption (for elastic commodity groups) and a simultaneous growth in production, but be also able to transform some net buyers into net sellers and vice versa. However, similar changes usually tend to have little effects. To this, Minot and Goletti (1998) reasonably refer with their definitions for "effects of the second order". Among the factors, they also analyse effects from poverty due to changes to prices. According to Zezza, Davis, Azzarri, Covarrubias, Tasciotti and Anriquez (2008), a growth in prices is only to a small extent reflected in scales of poverty among the population. Such a statement may seem paradoxical, but a change to prices towards their increase does not mean firstly a growth in food prices in a national market, and, secondly, poverty largely increases due to a closed nature of markets and unavailable foods. With trade liberalization for foods and agricultural resources, prices have generally increased, but herewith scales of poverty have been reduced. Other foreseeable effects from sharp fluctuations in prices deal with an issue of "poverty traps" and political upheavals. A duration of a period with high price levels leads to a reduction in private capital to ensure foods. On the other hand, effects from price changes influence economic development. The new price levels shift a focus that clearly affects investment dynamics in an industry, production output, employment and other indicators. However, the similar thing does not mean that price fluctuations are only of a negative nature. Any changes are associated with a desire to allocate resources reasonably assuming that a behaviour is subject to strict logic of economic extremism. Price volatility obviously encourages movement, while their stability more often leads to decaying and weakening food flows between markets.

Adherence to terms of certainty creates incentives to achieve rigid autarchy. With balanced and self-sufficient national markets, this concept has no internal contradictions. However, in a case where national markets have been balanced only in parts, and an access to global markets has been limited, it would lead to greater fluctuations in national food prices. One reason for an increase in prices and their non-permanence are supply shocks, resulting from imbalanced development. Another scenario assumes that a change to values in world markets would not be essential. Then, a foreseeable result from protection in a national market would be suppressing a growth in prices, but for a time only until there are available reserves. Government control in the food market should seemingly reduce an impact of price uncertainty. Keeping rates and restrictions in a turnover of goods and services naturally prevent a transmission of price fluctuations from unstable foreign markets. Global markets are usually more balanced; therefore, they experience a less effect from factors of risk and uncertainty. Due to economy of scale, they manage to balance supplies owing to redistribution in available flows of foods. In some cases, it is a government intervention that is a source of inner disturbance causing a drastic or essential change to prices. We should add here that at the expense of the same economies of scale, dynamics in the cost of foods and agricultural raw materials in world's markets is described with distribution viscosity.

As a result, a reasonable conclusion from our discussion is an assumption that *that ceteris paribus a national food market is largely subject to price volatility* (Note 3) *than the global market.* These and other features are disclosed in detail in the research of the price factor below. It may be said that its role in food security is ambiguous. At the same time, it is a source of a permanent movement of markets and a benchmark for them to be balanced. However, due to its vague manifestation, it gives inertia to the whole process, thereby diverting the system from its point of equilibrium. This distinguishing feature has allowed us to give a wording for conditions of "floating equilibrium" in the sense that the balance on the food market is subject to cyclical changes.

4. Price factors of "floating balance"

The abovementioned regularities only represent one side of a direct influence of the business mechanism. Measures aimed at a control over food supply presume that current price levels are sustainable. Nevertheless, the mere fact that these measures are introduced leads to a new ranking of price targets. Understanding of the fact that regulation generates incentives to the price response, sometimes unpredictable and uncertain in its way, only makes the further research more relevant. Some trends in this field will be specified below.

4.1. Transparency in global prices

First, as it has been already mentioned above, global food prices are transparent. Their weird broadcast to national markets faces a number of obstacles and barriers. Effects from such an exchange are not strictly clear. On the one hand, it depends on a national market, or rather on its self-sufficiency. It would be reasonable to assume that a low share of domestic production would be a prerequisite for an accelerated "exchange of prices", while its dominance among imported food supplies, on the contrary, might slow down such a motion to some extent. On the other hand, consequences and effects from a change to prices in the domestic market because of their growth or their decrease in the global market are difficult to be unambiguously defined as negative or positive. Food availability and welfare of households influence the consumer basket. Therefore, even with increasing food prices, such social phenomena as poverty or hunger may not face significant variations, equally as in case when there is a decline in prices. By the way, a restricted access to global markets or a complete closure of borders with making autarchy economy is far more dangerous undertaking than trade liberalization.

4.2. Protectionism and open markets

Second, a strategy for the agro-industrial policy, aimed at supporting national output (within its competitive advantages) and an active participation in a food foreign trade turnover, are more effective than a strategy for a full national food supply without a cross-border economic exchange. An explanation

for this assumption depends on established external dependencies in cross-supplies of both food and non-food products and services. A significant role in this context parity of security plays, acting as a constraining factor in an opposition of interests between countries.

A closed nature of economy does not mean its inefficiency. A correlation criterion is balanced markets, implemented in such a way that adjacent national markets do not face a threat of overproduction or a lack of goods. In these circumstances, you can forget saying that the economy is inefficient. However, a comparative contrast with an open-type economy speaks well for trade liberalization. Herewith, it is time to make a number of remarks to understand better a nature of a business mechanism. Prior to that, we have substantiated an idea that making a closed economic system will lead to a growth in national prices. Uncertainty relating to an order of future operation of the market order would indeed cause (perhaps temporarily) a food shortage in some subjects and a relative surplus in others. Establishing new business relationships takes time, so markets would move from a state of a conditional balance (if it was close) to a state of disequilibrium. Similar uncertainty is destructive for those markets that are only forming or in a stage of their steady development. However, after a completed adjustment period, in a similar way, as in systems with established institutional rules and standards, certainty would declare itself in an idea of a new mechanism for cooperation in business. A result would be tranquillity in prices and their sustainability, but it would be true if and only if markets had achieved a point close to the equilibrium.

As a result, any artificial changes to the business mechanisms, such as establishing barriers for an access to international markets or a frequent change to rules of customs and fiscal policies would be pregnant with growing uncertainty. *A reasonable consequence from this would be a decrease in economic activity and price volatility.* In this regard, Nogues (2011) research is significant. It presents Argentina experience in a quantitative restriction of the exported wheat to normalize national prices. Contrary to an expected increase in national supply, an opposite situation appeared that led to an upturn in the wheat price. All this proves once again that any intervention must not generate uncertainty, which could be perceived as a clear sign of a crisis in economic contacts in a current mechanism of institutional regulation.

Self-sufficiency in food production reduces a dependence on global prices, even when markets are free and open. Reasons for this are various, but we can point out to the most obvious. With inherent capabilities to meet a demand at the expense of its own output, a movement of foods is limited within national boundaries. Imported supplies lose their economic viability, unable to transfer global prices to a national market. However, it is worth taking into account that prices are able to be changed without being exposed to physical deliveries. Herewith, *diffusion penetration* plays a special role, which, when global prices have been known, forces changes to national prices in a simple desire to maximize manufacturer's benefits. Another question is a response adjustment to quantity demanded and supplied. For elastic and replaceable products, the consumption pattern will be changed, while for the goods inelastic in their price, there would be no such changes to the demand. The case is amazing when the national market is self-sufficient, but prices are over global ones. We believe that with open markets, the national output would be reduced in favour of substitution with imported goods at the lower price. A point of price comparison is to stop the process of balancing food supplies. Different versions of combinations between national prices against global ones and a self-reliance extent in food production say of two fundamental approaches. It is important to distinguish a way, in which production sufficiency was originally achieved. If in the first approach, we say of security, achieved through trade restrictions, the second approach focuses on competitiveness in the agricultural sector.

4.3. Social and economic externalities of price changes

Thirdly, an impact of food prices affects competitiveness in production of goods and services in the non-food sector. This mainly refers to labour-intensive sectors. Expenditures for labour depend on available foods and with a price increase, such availability reduces causing either a decline in a quality of physical work under the same labour costs, or forces to raise costs for wages to cover the increased cost of foods. As for the non-food field, similar regularities exist and show themselves in the clearest way. At the same time, it is possible that in the agricultural sector the price increase in one group of foodstuffs would not

only increase expenditures to produce other foodstuffs, but also themselves. A closed chain of increasing costs appears, which with its repeated running, reduces competitiveness in economy. Therefore, we might confidently state that "a care of low prices" in foods is a prerequisite for a successful economic development. Solving problems of a social nature, availability of foods becomes a guarantee of system security, including food one. Among adverse social effects from an increase in food prices, we may point out to an increase in poverty and a number of the hungry, reduced welfare and consumption potential in households, increased tensions in the labour market with a simultaneously less number of employment opportunities.

4.4. Consumption specifics

Fourth, a structure of food consumption usually depends on cultural traditions, a result is that price dynamics in replaceable foods depends on their assignment to a group of national (traditional) and specific (non-traditional). A typical example of a changes to consumption structure in this case is a choice between ground corn foods (cassava, millet and sorghum) and cereal foods, or a choice between products of one kind, such as corn, rice or wheat. The replacement does not substantially change the nutrition value, however, due to specifics in national markets it allows on the one hand to reduce the consumption cost, and, on the other hand, neutralize volatility risks or price fluctuations in a comparison between a national and the global food markets. In case there is an increase in market priced for certain groups of goods and at the same time their consumption and production within a national market is not a priority, national prices may not be exposed to external pressure, and for a long time ignore global trends to change their value. A cause for coordination disunity in markets is seemingly in their integrity, which does not allow transferring prices.

Uncoordinated markets allow a fresh look at a progress of the food crisis. A lack of foods causes a response rise in prices. As far as commodity groups in consumption of traditional and non-traditional products differ, we can assume that the relative magnitude of price changes would not be the same within them. Indeed, the consumer behaviour should be aimed at an increase in the demand for replaceable non-traditional foods, while the manufacturers, in turn, should increase supplies of traditional at the expense of output reorientation. As a result, the national market would experience a paradox: a sharp reduction in the supply and an increase in the demand for non-traditional replaceable products and an increase in the supply with a slight decrease in the demand for traditional. The both cases mean an increase in prices for foods. However, its growth for non-traditional products should be less than for traditional ones.

A division among replaceable foods let us understand better the business mechanism of the control over markets. But we should keep in mind that both national (traditional), and specific (unconventional) foods are only considered as such for the purposes of classification in national consumption. A different picture emerges in the global food market, where there are primary consumer goods. And the way, in which basic foodstuffs relate to national traditional and unconventional products influences an actual change to the supply and the demand. A question of stability in consumption and sustainability in prices for foods also affects an aspect of diversity. Diversification of foods is a natural way to reduce exposure to sudden changes to available necessary food and a change to costs of households for the food basket in general.

4.5. Sustainability in price fluctuations

Fifth, a cyclical nature in economic development shows inevitability of price volatility and volumes of output. Any kind of variations and changes to these market variables are natural and completely standard. At its core, their unique combination at any time determines reference points of the equilibrium. A balance as an intermediate milestone in food security cannot be achieved in tranquillity of price development and volume of output. As a result, before a discussion on measures to restrain and reduce volatility in national prices, it should be recognized that to a certain degree price fluctuations are an essential characteristic of the market. On the one hand, in the short term, prices undergo changes due to available inconsistencies in a smooth production and consumption flow, caused by objective reasons of a seasonal nature and harvesting or cultivation specifics. On the other hand, in the longer term, any change

to prices is a signal of overproduction or food shortage. An increase or a decrease in a marginal net benefit over time provide efficient incentives to adjust an operational program.

Thus, costs arising due to volatility in food prices are reasonably manageable. In general, measures to inhibit price shocks might be divided into two groups. The first includes measures to reduce price volatility, like improvements to market information (Food and agriculture organization of the United Nations, 2011.) The measure is more aimed at making a situation more certain, i.e. stabilizing and making consistent through a development of probabilistic forecasts and information exchange. It is obvious that the information on current conditions and prospects in the global market of food and agricultural raw materials define expectations of future prices, which have been becoming more tangible and manageable. Thus, uncertainty turns into a condition of a scheduled change that does not cause any sharp response. All this produce conditions for efficient functioning of markets. The second group assumes implementation of measures for adaptation to any changes to prices and, in fact, it recognises fluctuations as an irreversible reality in economic development. A good example for adjustment is a use of national buffer reserves and control over trade. But it's worth mentioning that application of these measures is at the same time intended to reduce price volatility.

5. Discussion and Conclusion

National and regional specifics in terms of business environment, infrastructure, capabilities and features in production setup, available social conditions, political sustainability and many other parameters are involved in a process of harmonization related to the development in the agro-industrial complex. The pricing policy in this way is ranked among the first. Its control and suppression by a government (to reduce fluctuations in domestic prices) have been for a long time among important tasks for both the developing and developed countries. Given that causes of price changes could include disparities in volumes of the supply and the demand in the national market and trends in the global food market, a comprehensive policy in volatility aspect cannot be only focused on protection against global price shocks. The problem of a balance in terms of a national food shortage and a buffer storage depletion cannot be solved otherwise than participating in global trade. Cyclic successive crises in a development and a growth of global markets make a task of price control actual. Its solution is partly in supporting diversity (diversification) in terms of manufacturing and consumption. A connecting element between them is an economic exchange: its intensity let us cope with price shocks in terms of the food crisis. In general, there is a prevailing idea that national trade is the most efficient way to stabilize prices in terms of uncertainty shocks.

Measures to adjust to price volatility are usually aimed at combining risk management and social protection tools. Risk management assumes that price performance generates potential threats of reduced production. This might be only applied in full to non-food industries in economy. At the same time, a contradiction appears, when a growth in food prices and agricultural resources leads to an opposite situation, an increase in a volume of their production output. It should be said that a similar phenomenon is heterogeneous and therefore effects from price volatility are not fully understood. But these regularities are enough to conclude that greater predictability would reduce risks, and at the same time, lead to a decreased trade margin.

When trade is viewed in its subjective representation, they point out to a specific role of an interaction between the consumers and the food producers. In the most cases, a difference in prices between producers and consumers of food products remains the same and manifests its sustainability even when national and international markets are under price pressure. In specifics of food movement from the producer to the consumer, any upward change to prices takes place with a time lag. At the same time, a primary growth in producer’s prices is quite insignificantly (at the beginning) reflected in an increase in consumer prices. This delay in responding is mainly due to timing for collection, shipment and processing of food raw materials to become ready-made meals. At the same time, a duration of this cycle may be up to several months. Such not the full price “transfer” also depends on a number of intermediate

transactions. Amazing regularities in this regard relate to regional differences. Even in regions, for which short and brief in time supply chains are typical and there is a high proportion of their own production, changes to producers' prices for basic foodstuffs have a very little effect on final consumer's prices.

To summarize the findings, a number of conclusions should be made that contribute into the rightly understood business mechanism of price controls in food markets. Available features of its functioning enable to define a direction of changes using basic indicators. Price and volume criteria for food production and consumption are both considered governing parameters and parameters of control. Their comparison is subject to objectives and tasks in the search for the equilibrium point. Taking into consideration the fact that markets are in a continuous cyclic movement, the equilibrium becomes instantaneous and statically unachievable. Inertia of the production basis causes a condition when any uncertainty is more disclosed in changes to prices than in changes to infinite demand and supply. Updated abovementioned regularities set us closer to an academic search for an efficient model for food security, or rather, the model of balanced functioning of food markets.

Acknowledgement

Russian Humanitarian Research Foundation (RHRF) supported the research, project number 14-12-66012a, "Food Security Model in Context of Converged Potentials of Regional Agroindustrial Complexes".

Notes

Note 1. Report of the expert group led by Izborsk club academician S. Yu. Glazyev "On Food Security in Russia" at: http://www.dynacon.ru/content/articles/1725.

Note 2. It is important to make a remark that in this and other discussions we assumed that all the buyers and sellers had a clear net position of demand and supply respectively (Minot & Goletti, 1998).

Note 3. Volatility (or oscillations) of prices is estimated in various ways depending on applications of the research and requirements to measurement accuracy. A common approach is a calculation of the variation coefficient obtained as a ratio of the mean-square deviation to the average price for a period. An alternative for the calculation is the mean-square deviation in a change to a logarithm of food prices (Gilbert & Morgan, 2010).

References

Bagramov, L.A., & Sushchenko, V.V. (1984). *Modern capitalism and food issue*. Moscow: Institute of the United States of America and Canada (the USSR Academy of Sciences); Science.

Bulavko, V.G., Institute of Economics of Belarus NAS, & Nikitenko, P.G. (Sc. Eds). (2009). *Economic security: theory, methodology, practice*. Minsk: Law and Economics.

Coates, J., Webb, P., & Houser, R. (2003). *Measuring food insecurity: going beyond indicators of income and anthropometry*. FANTA, Washington.

Dadayan, V.S., & Kossov, V.V. (1962). *Balance of economic region as tool to plan calculations*. Moscow: The USSR Academy of Sciences Publishing House.

Dubovtseva, T.G., & Kundius, V.A. (1999). *Food security management in regions by interregional economic association "Siberian Agreement".*Altai State University Press.

Egereva, L.I. (1963). *Balance of good production and distribution in agriculture*. Moscow: Publishing House of Economic Literature.

Eidelman, M.R. (1966). *Inter-branch balance of social product: theory and practice in its making*. Moscow: Statistics.

Fajado, L. (2003). *National level user's perspectives: Colombia*. In FAO (2003): 339-342.

FAO et al. (2013). *Position of affairs due to food insecurity in the world in 2013. Multiple manifestations of food security*. Report. Rome, FAO: 20-22.

Food and agriculture organization of the United Nations. (2011). *State of Food Insecurity in the World: How does international price volatility affect domestic economies and food security?* Rome: 32.

Gilbert, C.L., & Morgan, C.W. (2010). Review: Food price volatility. *Philosophical Transactions of the Royal Society B*, 365: 3023-3034.

Gusakov, V.G. et al. (2008). *Food security: terms and concepts: wikis. ref.* Minsk: Belarusian Science.

Holt-Gimenez, E., Altieri, M., & Rosset, P. (2006). *Ten reasons why the Rockefeller and the Bill and Melinda Gates foundations' alliance for another green revolution will not solve the problems of poverty and hunger in Siib-Sabaraii Africa*. Oakland, CA: Food First Institute for Food and Development Policy.

Hulsc, J.H. (1995). Science, agriculture and food security. Ottawa. Ontario, Canada: NRC Research Press.

Ilyina, Z.M. (2003). Food security: criteria and evaluation parameters. *Proceedings of Belarus National Academy of Sciences. Agrarian Sciences Series*, 1, 3-9.

Ivantsov, I.I. (2009). *Business fundamentals to ensure food security in the Republic of Belarus*. Minsk: Belarus. Science.

Kaygorodtsev, A.A. (2006). *Economic and food security in Kazakhstan (issues of theory, methodology, and practice).* Ust-Kamenogorsk: Media Alliance.

Kennedy, E. (2003). *Qualitative measures of food insecurity and hunger*. In FAO (2003): 165-84.

Kostusenko, I.I. (2009). Food security and food sovereignty of regions: nature and approaches to their evaluation. *Urals Agrarian Herald*, 1 (55): 8.

Kravchenko, A.A. (2011). Methodological approaches to assess food security. *Asia-Pacific Region: Economy, Politics, Law,* 1: 70-83.

Kuzmin, E.A. (2015). Food security modelling. *Biosciences Biotechnology Research Asia*, 12 (Spl. Edn. 2): 773-781.

Lawrence, G., Lyons, K., & Wellington, T. (Eds.). (2013). Introduction: Food security, nutrition and sustainability in a globalized world. In *Food security, nutrition and sustainability*. Earthscan.

Mason, J. (2003). *Measuring hunger and malnutrition*. In FAO (2003): 197-228.

McDonald, B.L. (2013). *Food Security*. John Wiley & Sons.

Mikhailushkin, P.V. & Barannikoff, A.A. (2012). Analysis of possible equilibrium situations arising in food market from food security perspective. *Intellectual Potential in the 21th century: cognition stages,* 12: 162-166.

Minot, N., & Goletti, F. (1998). Rice export liberalization and welfare in Vietnam. *American Journal of Agricultural Economics,* 80 (4): 738-749.

Nogues, J. (2011). *Agricultural export barriers and domestic prices: Argentina during the last decade. Report prepared for FAO.*

Nazarenko, V. I. (2011). *Food security (in the world and in Russia.)* Moscow: Monuments of Historical Thought.

Panda, M. (2009). *Trade liberalization, poverty, and food security in India*. Intl Food Policy Res Inst.

Pashina, L.L. (2013). *Food market in system to ensure food security in the Far East*. Abstract of D-r Sci. (Econ.) thesis. Voronezh.

Pollard, C. (2012). Selecting interventions for food security in remote indigenous communities. In Food security. In Q. Farmar-Bowers, V. Higgins, & J. Millar (Eds*.), Australia: challenges and prospects for the future.* Springer Science & Business Media. http://dx.doi.org/10.1007/978-1-4614-4484-8_7

Report of the World Conference on Food, held in Rome, 5-16 November 1974. (1975). UN, New York.

Report on findings got by the International Intergovernmental Conference to establish the food and agriculture international intergovernmental organization. (1943). May, 18-June, 3, Hot Springs, Virginia, USA.

Rosset, P. (2006). *Food is different: why we must get the WTO out of agriculture*. Nova Scoria: Fernwood Publishing: XVI.

Sarkaniy, P. (1982). *World food problem*: [shortened translation from Hungarian]. Economics.

Thomson, A.M. & Metz, M. (1999). *Implications of economic policy for food security: A training manual.* Food & Agriculture Org.

Vorozheykina, T.M. (2012). Concept to forecast food security in Russia. *Bulletin of Tambov University. Series: Humanities*, 9 (113): 48-52.

Zezza, A., Davis, B., Azzarri, C., Covarrubias, K., Tasciotti, L., & Anriquez, G. (2008). The impact of rising food prices on the poor. *ESA Working Paper*, 08-07. Rome: FAO. Available at: ftp://ftp.fao.org/docrep/fao/011/aj284e/ maj284e00.pdf.