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Will the institution of coexistence be re-defined by TTIP?

Mariusz Maciejczak

Department of Economics and Organization of Enterprises
Faculty of Economic Sciences
Warsaw University of Life Sciences – SGGW
Poland
Email: mariusz_maciejczak@sggw.pl

Contributed paper prepared for presentation at the
Seventh International Conference on Coexistence between Genetically Modified (GM) and non-GM based Agricultural Supply Chains(GMCC-15)
Amsterdam, The Netherlands, November 17-20, 2015

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Abstract:

The coexistence between genetically modified (GM) and non-GM based agricultural supply chains is an economic institution that defines rules of the games, the objectives of which are set more broadly than economic rationality and efficiency. Institution of coexistence covers the formal rules as well as informal constraints devoted principally to identity preservation and segregation, and the ways how they are imposed and enforced in the GM and non-GM based supply chains from agri-food sector. They applies to the dynamic process of formulation, selection and adaptation of behaviors and rules, which form the institutional orders in local, regional and international dimensions, under the circumstances of constant changes in the socio-economic systems. The paper is an attempt to describe the coexistence as an economic institution in the light of New Institutional Economics. Using the results of foresight technique it also examine how the Transatlantic Trade and Investment Partnership under negotiation between the European Union and the United States could re-define both legal regulations and market-based standards of coexistence. In the Delphi method panels participated stakeholders from both GM and non-GM based agri-food supply chains, who forecasted that the institution of coexistence will be re-defined by the rules that TTIP would set up.

Keywords: economic institution, co-existence, GMO, TTIP

JEL codes: B52, L51, O43

1. Introduction

Under the dynamic changes in the economy, which are mostly driven by the innovations, technologies and information, and are resulting in the growing diversification of markets, the phenomena of coexistence is becoming increasingly crucial, especially for the agriculture and food sector. This comes from the emerging need to find acceptable, rationale and efficient ways to ensure the presence at one market of products from competitive supply chains without excluding each other.

The coexistence is known in both natural and artificial complex adaptive systems [Holland, 1992; Miler and Page, 2007]. Its concepts have been recognized and researched broadly theoretically and empirically in several scientific disciplines. In case of the natural systems the basic question has been asked by the environmental scientists. The "Paradox of the Plankton" is trying to explain the situation how a number of species could live next to another, thus co-exist, in a relatively isotrophic or unstructured environment, all competing for the same sorts of materials and in the long term ensuring relative populations growth rate, without oust each other [Hutchinson, 1961; Cheeson, 2000].Whereas classical natural competition theory predicts competitive exclusion of species with similar requirements, the species diversity may be explained by several different theories describing the mechanism of coexistence in different natural environments. One argue that although species apply multitude of processes acting at different scales, there are similarities in competitive abilities, equalizing individuals in the given environment, which often may facilitate the coexistence [Mac Arthur, 1972; Hille Ris Lamberset al., 2012]. The coexistence is explained also by the stabilizing mechanisms (e.g. environmental niches) which can overcome fitness differences and balance competitive exclusion introducing different trade-offs and through facilitate the coexistence [Wilson, 2011; He et al., 2012; Colgan and Asner, 2014].

The considerations of environmental studies on coexistence gave a background for both theoretical analysis of mathematicians [Lanchier and Scarlatos, 2014; Chen et al., 2013; Dimitrovski and Rajovic, 2007] and more empirical researches done by computer and information scientists, which both were addressed to the artificial systems. The computer scientists analyzed the issue of coexistence of two different heterogeneous technologies in a working environment, especially of wireless networks, showing that proper configuration and management assuming the trade-offs, could make it possible [Geirhofer et al., 2008; Gąsior and Orski, 2014].

In the social sciences, especially in the law, the politics and the economics the coexistence issues are researched too. The basic problems addressed in the law disciplines with regard to the coexistence is the functioning of two different regimes of executing the law: codification and judge-made law [Scarman, 1967], or different legal systems [Unschuld, 1980], or different rights, such as human rights and intellectual property rights [Helfer, 2003]. In the political sciences there is simple question elaborated from different perspectives and dimensions about how two different political systems, points of view, or groups, could peacefully co-exists within the society [Darkwa, 2009; George, 2000]. The overview of the understandings and attempts to explain the coexistence in law and politics shows, that from the systemic point of view, several kinds of trade-offs should be made collectively, at least in the short run, to achieve conflicting objectives.

Finally, there is a question how the theory and empirical studies in economics address the paradox of coexistence from the perspective of the complex adaptive systems? There are empirical evidences of economic analysis of coexistence in the monetary economics, banking and finance, economics of property rights, welfare economics, trade, as well as production, political and environmental economics. Although the empirical significance of the coexistence approaches is not reflected and supported much in the theoretical literature yet.

This paper first objective is to present so far understanding of the issues of coexistence from different economic perspectives. The second objective is to make an attempt to describe the coexistence as an economic institution in the light of New Institutional Economics on the example of GM and non-GM based agricultural supply chains. Using the results of foresight researches the third objective is to examine how the Transatlantic Trade and Investment Partnership (TTIP) under negotiation between the European Union and the United States could re-define the institution of coexistence with regard to GM and non-GM based supply chains from agri-food system.

The paper is organized as follows. Section two presents the review of the economic literature with the focus on the attempts to explain the issues of coexistence. Section three presents the coexistence as an economic institution. The possible influence of the TTIP on the institution of coexistence between GM and non-GM based agricultural supply chains is presented in section four. Section five formulates conclusions and directions for further research.

2. Coexistence in the economy– puzzle or not?

In a Pareto efficient allocation of economic resources, perfect competition serves as a natural benchmark against which are contrasted other imperfect market structures with the empirically proven market failures. However there are also situations where the implication of theory is inconsistent with observed economic data, which is considered as an economic puzzle [Nalebuf, 1987; Balcerowicz and Rzońca, 2015]. As such economic puzzle, the phenomena of coexistence is considered by the mainstream economists. The coexistence as an economic puzzle is discussed and analyzed by the monetary and financial economists whom research the case when different modes of assets performing the same functions exists simultaneously at the market. In the applied theoretical monetary models they try to show the conditions under which government bonds and commodity money [Andolfatto, 2005; Aiyagari et al., 1996] or money and credit [Boerner and Ritschl, 2010] or money and higher-return assets [Hu and Rocheteau, 2013] could coexist. As shown by Gersbah and Uhlig on the example of standard banks and credit markets the application of different market strategies could lead to coexistence, however socially inefficient [Gersbah and Uhlig, 2006]. Also Kim and Lee using monetary models have shown that intermediary costs of application of different market strategies and associated uncertainty are key determinants of portfolio choice between money and interest – bearing assets [Kim and Lee, 2011]. From these analysis point of view the coexistence of two different assets is possible under the given legal restrictions as well as responses of market players and costs of such actions in search of equilibrium.

A part from theoretical analysis, the majority of investigations of coexistence in the economics are referred to the questions answered by the empirical studies, under the assumptions of classical or neoclassical economic principles. The welfare economists address the phenomena of coexistence very rarely, researching the strict empirical facts of simultaneous existence of different kinds of socio-economic phenomena, such as food insecurity and obesity [Zhang, 2015] or under and overweighed people [Shimokawa and Pinstrup-Andersen, 2006] in the given economies and time. The econometric analysis have shown that this kind of coexistence is driven by the varying economic conditions, such as taxes, prices of flat rent, or labour availability.

In the trade economics the coexistence is analysed from the point of view of efficiency of the governmental trade policies [Shachmurove, 1997], or companies trade agreements [Tarantini, 2015]. The trade economists understand coexistence as a dynamic process of setting rules and arrangements of the exchange, which lead to equilibrium in short and long run.

The issue of coexistence is also undertaken by the innovation, development and technology researchers. Under the market design theory and with the empirical evidences from differentsectors. They analyses the economic rationality when multiple distribution systems for financial services – automatic and human tellers, operate in the market [Berger et al., 1995] or two different transmission standards could be chosen simultaneously by the consumers [Aftab, 2002, Kelechi and Nordin, 2014]. In explaining the economic puzzle of coexistence from the innovation economics point of view, there is elevated the role of contracts and agreements and the trade-offs between applied technologies or standards for different economic agents under the asymmetry of information. The second area of the economic analysis of coexistence in the technology and innovation spectrums is the issue of the property rights [Voight, 2004; Beckmann et al., 2011]. Here the coexistence of different regulatory regimes and property rights are under investigation, which focus on the transactional costs impact on the effectiveness.

The market arrangements and their impact on the economic agents from the trade off and spill - over effects points of view are key arguments for environmental economists whose growing number of analysis aimed to explain the empirical roots, causes and effects of coexistence of different forms of using the renewable sources, i.e. agriculture and coal seam gas [Huth et al., 2014] or agriculture and industry [Lopez, 2010].

A similar approach is proposed by the agricultural economists whom, in the largest extend, do analyse the coexistence phenomena, however not considering this as an economic puzzle. Except of researches done by James, Klein and Sykuta [2005] on the coexistence of different organizational forms of companies, which is explained by the transactional cost, the largest body of analysis done by the agricultural economists is focused on the economics of agri-food based supply chains and their coexistence under the segregation and traceability requirements assumed as ex-ante regulations and ex-post liabilities [Beckmann et al. 2006; Moschini, 2015].

They show the importance of market design and market arrangements on different levels of the supply chains organized and integrated vertically and horizontally under irreversibility and uncertainty. From the agricultural economics publications is coming also the only definition of coexistence elaborated from the economics point of view. Beckmann, Seregaroli and Wesseler defined the coexistence as a state described by a set of policies exogenous to the farmers that result in the planting of organic and/or non-organic-non GM crops as well as GM crops in the same point in time and in a pre-defined

region with at least one farm under a GM farmer property right system and at least one farm under a non-GM farmer property right system. This definition includes thus for its authors exogenous policies such as ex-ante regulations and ex-post liability rules [Beckmann et al., 2006]. This definition however does not take into account the endogenous processes and behaviours that take place at the farm.

Analysing the economic approaches to the coexistence presented above one could sum up that this phenomena is commonly investigated from the perspective of a given and pre-defined systems operating at defined market and time. It is not, however, considered from more broad economic perspective, assuming the applicability of regularities to different markets and periods. The change of analytical perspective from theoretical models towards explaining the reasons for observable phenomena and looking for regularities, such impact of ex-ante regulations and ex-post liability, indicates, that coexistence in the economy cannot be treated as a puzzle no longer. It seems that the reason for considering the coexistence as the economic puzzle was not irrational observations, but lack of adequate theoretical foundations, which could take into account the historical changes over time, the dynamism and complexity of activities not only of individual agents, but also of the whole systems.

The above overview of various economic analysis show that the coexistence has some common features, by means of which can be quantified and thus analysed. These are:

a) Simultaneous existence of different competing systems of open nature at the market,

b) Each system is endogenously governed by informal behaviours and formal rules,

c) The interaction of systems enabling coexistence is governed by the exogenous informal behaviours and formal rules,

d) The presence at the market of both systems is ensured by the trade-off effects between exogenous and endogenous behaviours and rules,

e) The effectiveness of the coexisting systems depends on the equilibrium of market arrangements through dynamic adjustment of formation, selection and adaptation mechanisms.

Hence rejecting the assumptions of orthodox theories, which focus on the methodological individualism and applying the methodological holism from the perspective of economic complex adaptive system theory [Miller and Page, 2007] the above characteristics enable to make an attempt to the discussion of the coexistence as an mechanism understood as an economic institution.

3. Institution of coexistence

The adoption of the system point of view to the analysis of socio-economic phenomena requires, with the accordance to the general theory of systems, not just to make an observation in a dynamic spectrum, but also to take into account the factors of creation, adaptation and selection, that due to the cause and effect reactions and feedback loops, allow for self-regulation under the asymmetry of information and heterogeneity of space and time [Kamitake, 2009; Laszlo and Krippner, 2007; Stefanovic, 2007]. Such perspective gives the New Institutional Economics (NIE) [Williamson, 1994, 1998; Bromley, 2009]. The concept of NIE of pays special attention to the role of institutions in the search of the equilibrium between cooperations and conflicts of market agents [Hodgson, 2000; Hagedorn, 2003, Hurrelmann, 2002]. Such situation when agents dynamically pass from one to the another phase of interactions namely cooperation and conflict understood here as competition, requires the framework to solve joint problems and ensure effectiveness. Additionally, there are needed mechanisms which would protect the market players from both the market failures and the government failures [Nelson, 2008; Hagedorn, 2008]. This role could play the institution of the coexistence, which mechanisms enables the dynamics of cooperation and competition at the market.

Analyzing the selected from the economic literature definitions of the institutions and referring them to the institution of coexistence one could confirm the functional attributes of it. Firstly, the institution of coexistence enables the relationships between the agents at the market, whom competing, at the same time respect the right of the rivals to exist. The institution of coexistence defines the rules under which the relationship is executed and through their implementation enables the actions to be undertaken. Several NIE classics paid an attention on rules that structure the situations under which the actions take place [North, 1990; Williamson 1998; Olstrom, 2005; Hagedorn, 2003]. Vincent Ostrom defining the institutions distinguished the possible actions into those that are prohibited, permitted and required and that establish the constrains that allow for predictability in the relations under the uncertainty situations [Ostrom, 1985]. In case of the institution of the coexistence those actions should be complemented by the expected one, which arise once the trade-off situations occurs, thus those imposed by the uncertainty and asymmetry of information in the played game.

Secondly, the institution of coexistence enables for clustering of market actors into groups (game teams) that share the common interest and as a consequence undertake similar actions. Such institutional characteristic provide among others Hamilton [Hamilton, 1932], Schmidt [Schmid,

2004] and Nelson [Nelson, 2008]. In case of the coexistence situations these clusters might be integrated vertically or horizontally.

Finally, as emphasized a.a. by the Aoki [Aoki, 2001] and Hodgson [Hodgson, 2006], the institution should form a self-sustaining system. The institution of coexistence enables for self-sufficiency as it governs the strategic interactions of the agents (clustered in the groups of shared interest) in a self-enforcing manner and in turn is reproduced by their actual choices in a continually changing environment.

There are several frameworks applied to social analysis and particularly to institutional analysis [Morgan et al., 2010; Brousseau and Glanchart, 2008] The institution of coexistence could be analyzed by several of them. The most widely cited and applied framework of intuitional analysis is proposed by Williamson [Williamson, 2000], and this scheme will be used for the purposes of this paper. Williamson proposed four levels of the analysis. The first level covers the social embeddedness and deals with informal institutions, such as norms, values, customs, and religion. Often new institutional economists do not treat informal institutions as variables in their analysis, since changes in norms and customs are supposed to take much longer than those in political institutions or organisational structures. However, the informal institutions might have an impacts on the whole system, since they influence all other levels [Beckmann and Padmanabahn, 2009]. The second level consists of the institutional environment covering the basic legal rules, such as property rights, contracting rights, as well as political institutions, such as public regulations. The third level is described as the governance level and deals with organisations and the appropriate choice of contractual relations. At this level markets, firms, public agencies, and contracts are located. Finally the fourth level within constraints set by the upper levels, covers the continuous process of resource allocation. Within this level the issues of economising in the sense of maximising are assumed, with the accordance to the neoclassical approach, when the marginal conditions are met, that is, where marginal benefits equal marginal costs.

The following analysis of the coexistence institution will be made on the example of the GM and nonGM based supply chains from agri-food systems. As argued by the Menard and Valceschini developing, signalling and monitoring quality in the agri-food industry has become a central issue that requires hybrid arrangements and alternative institutional solutions designed for guaranteeing food safety [Menard and Valceschini, 2005]. One of such institutions is the institution of coexistence between GM and nonGM based supply chains.

Introduction of new technology to agricultural production and processing based on the genetical modifications resulted in the development of different systems of production and distribution based on GM and on nonGM products, due to the consumers need of segregation and traceability in order to ensure the identity preservation (IP) [Maciejczak, 2006]. A part of the applied market strategies of the actors of the food systems integrated vertically into supply chains, which aim to ensure consumers expectations, there were developed different approaches to GM products itself based on understanding of the precautionary principle [Ingeborg, 2010, Wesseler, 2012]. The risk assessment assumed by the precautionary principle with regard to GM crops has resulted in two different policy outcomes namely in the European Union and in the United States of America. It depends on how the regulatory agencies involved have acknowledged scientific evidence as well as the associated uncertainties. This has caused disagreements about the significance of scientific evidence on benefits, costs and risks and the appropriateness and necessity of risk frameworks and regulation. These disagreements lead to the development of several country - based legal regimes, informal customs, as well as contractual schemes regulating the application of GM crops and treatment of GM based products with relation to nonGM, esp. organic [Pattersonn and Jossling, 2002; Lusk and Rozan, 2005; Branquinho et al., 2010; Hubbard and Hassanein, 2013; Maciejczak, 2008].

Thus, on the international level one could identify the coexistence between country-based approaches to GM and nonGM based products that influence the trade restrictions, which is a special case for the UE and the US [Nielsen, 2007; Anderson and Jackson, 2005]. Accordingly the coexistence become an issue for regional (the case of the EU) and national regulations (the case of the US) [Lynch and Vogel, 2011; Koch, 2008; Bodiguel and Cardwell, 2010]. In the EU coexistence refers to the choice of consumers and farmers between conventional, organic and GM crop production, in compliance with the legal obligations for labelling defined in Community legislation. It is written that the possibility of adventitious presence of GM crops in non-GM crops cannot be excluded. Therefore, suitable measures are being implemented during cultivation, harvest, transport, storage and processing to ensure coexistence. Coexistence pursues the aim to achieve a sufficient segregation between GM and non-GM production. In the EU the subsidiarity-based approach on coexistence is applied, with the liability costs passed on to GM producers [European Commission, 2009]. Simultaneously, in the US there is growing demand for identity preservation agricultural products, both organic and conventional without GMO admixture. Due to the growing market demand there are incentives to stimulate the supply chains to implement the coexistence measures. However due to

the US law the liability costs are passed on to nonGM producers, which make the basic difference to the EU approach [USDA, 2012].

Assuming the Williamson framework for institutional analysis and the development of the coexistence mechanism for GM and nonGM based supply chains in the agri-food systems at different geographically, formally and market organized levels, there could be elaborated the matrix for the institution of coexistence. The matrix is presented in the table 1. At the social embeddedness level of coexistence institution could be identified, at each assumed level of geographical organization, the customs that lead the market actors to identify and verify the quality products or products with IP, which course differ in space. At the institutional level there are identified all bilateral and multilateral agreements related a.a. to intellectual property right protection, trade of agricultural products, etc. Once the regional or country levels are concerned the coexistence regulations of segregation, traceability, testing, certifying and adventitious presence should be taken into account. The market governance level is driven especially by the contracts and the assumed strategies of production and processing for applying segregation and traceability measures in order to ensure the identity preservation, which includes also testing and certifying. Both legal and market institutions include also the labeling schemes. At the resource allocation and employment level of institutional analysis of coexistence there could be identified IP premiums, compensations schemes, costs of adaptation and compliance as well as transactional costs.

4. Impact of TTIP institution of coexistence between GM and nonGM based supply chains in the agri-food systems

As it was argued by Williamson [Williamson, 1995] and later by several authors [see: Alston, 1996, 2008; Aoki, 2001, Menard, 2001; Menard and Shirley, 2005; Beckmann and Padmanabhan, 2009] the levels of institutional analysis influence each other. Investigations on the effects of institutions take certain institutions or institutional changes as exogenous and ask how this choice or change affects higher or lower levels. Thus, a change in the institutional environment, for example, may affect the governance structures, the resource allocation and even the values and norms of a society. For the purpose of this analysis there will be analyzed how the institutional environment changes on the international level, namely TTIP, will influence the changes at the regional and country levels taking into account Williamson's dimensions of social analysis.

The Transatlantic Trade and Investment Partnership is a negotiated bilateral agreement between the European Union and the United States, and aims to reduce barriers to trade, such as tariffs and regulatory inconsistencies, between the two largest economies in the world. Trade barriers between the U.S. and EU are already remarkably low, with weighted tariffs for U.S. agricultural exports to the EU averaging 4.8 percent, and 2.1 percent for EU exports to the U.S. [Bureau et al., 2014]. The biggest challenge is however the very different approaches to regulation. Regulatory coherence, like expanded trade, is in itself a neutral term but appears to be gaining specific meaning in the context of this agreement. Leaked versions of the regulatory coherence reveal a strong emphasis on the use of U.S. style cost-benefit analyses to regulations, an approach that is much too limited for rules on such issues as the environment, public health and food systems. The trade agreement could affect a broad range of sectors, and would have a significant impact on the evolution of agricultural markets and food systems in the U.S. and the EU.

Unlike the global World Trade Organization (WTO), there is no specific chapter in TTIP on agriculture. Instead, the rules affecting agriculture, food safety and food systems are woven throughout the texts. Also unlike the WTO, which publishes negotiating proposals on its website, little is known about the content of the TTIP proposals, since the governments involved have stated that they will not publish draft text. Regarding the possibility of the introduction of GMOs into the European markets, the European Commission affirms that European Union laws will remain consistent. This issue was excluded from the negotiations [Bureau et al., 2014; Josling and Tangermann, 2014, House, 2014].

For the purposes of this research to answer the questions *i)* whether, *ii)* and if so, how: positively or negatively; and *iii)* thus with what force (measured in the Likert scale), TTIP will influence the institution of coexistence in the EU and the US, there was applied the foresight heuristic Delphi method [Rowe and Wright, 2001, 2011]. The rationale for the choice of this method was the hypothetical impact of trade agreement, as the GMO issue was excluded from the negotiations and unknown results of final agreement, i.e. with regard to IPR as well as trade of agricultural and food products. The impact of biotechnology on the agriculture has been already researched using Delphi method by Menrad et al. [1999] and Maciejczak [2010]. Also in other policy areas of agri-food sector this method was widely used [i.e. Frewer et al., 2011; Wentholta et al., 2012]. In the following research a three-round, predominantly qualitative and quantitative, Delphi survey was held. There were identified per 3 experts from eight areas of the GM and non GM based supply chains of the food systems: breeders, farmers, processors, wholesalers, retailers, consumers, policy makers, academics

(together 24 experts). All experts were chosen deliberately because of their knowledge, were of Polish origin although engaged in the international affairs. A quantitative and qualitative survey was conducted, all responses were coded and anonymity of participants maintained regarding both specific responses and other group participants. The Delphi rounds took place after the tenth round of TTIP negotiations, that were held in Brussels from 13 to 17 July 2015. There was a basic assumption that the TTIP will increase the cultivation of GM crops in Europe and quality products, such organic in the US, with simultaneous increase of the volume and value of trade between agreement parties. The synthetic results of the Delphi investigations are presented in the Graph 1.

Analyzing the social embeddedness of the institution of the coexistence all the stekholders agreed that the TTIP will change only the situation in the UE. The impact overally was assessed negatively, with only one exception – breeders forecasted positive impact. The negative changes were in average assessed as medium. There were arguments that TTIP will not change the situation of the US producers, traders and consumers as the presence of the GMO is much matured and the issues of the coexistence just emerge. On the contrary looks the situation in the EU, where the coexistence issues are much matured, but the distrust to the GM technology is incomparably higher than in the US.

From the institutional perspective for both legal regimes the influence of TTIP on coexistence was assessed as negative, with the medium impact for the US and high impact for the EU. There were raised issues of the asymmetry of information and the inefficiency of the regulations. All stakeholders claimed that both parties have not implemented efficient regulations yet, and base more on the governance institutions in maintaining the problems of coexistence. Therefore the governance perspective impact was assessed as positive, with medium impact for both partners. It was agreed that the market liabilities will define needs for segregation and IP and the transactional costs associated to adventitious presence will develop better contractual relations.

Analysing the forecasted impact of the resource allocation and employment, one could notice the greatest diversity. Farmers and retailers forecast small negative impact for both US and the EU. Other stakeholders see it differently. In case of the EU the possible impact is mostly recognized as negative, while for the US as positive. The differences have been translated by economics of scale in production and trade, IP premiums, increase or decrease of adaptation and compliance as well as transactional costs and external negative effects.

5. Conclusions

The phenomena of coexistence is considered by the economists in two ways. The representatives of the mainstream economy have recognized coexistence as a puzzle, and thus rarely took it in the research agenda. From the perspective of agricultural economists the situation looks quite the opposite, as the issue of coexistence is an important social problem associated to the application and diffusion of different technologies, especially biotechnology. The agricultural economics literature on coexistence is applying mostly the classical or neoclassical theoretical frameworks to answer the research questions. The heterodox approaches such New Institutional Economics are used much less frequently.

The paper is an attempt to contribute to the existing literature by explaining the coexistence phenomena in the light of New Institutional Economics. This theoretical framework was assessed as the best and most promising to conceptualize the coexistence as an institution and describe it, sensus largo, as an general economic issue, and then analyse it, sensus stricte, with regard to GM and nonGM based supply chains from agri-food systems.

The conducted analysis show that the coexistence is not an economic puzzle. The coexistence is an economic institution that mechanisms operate at different levels of the social system. It is a process of formulation, selection and adaptation of endogenous behaviours and exogenous rules in the dynamic market arrangements that trade-offs enable to achieve effectiveness and through simultaneous existence of competing elements of the system ensuring its quilibrium.

As it was shown on the example of TTIP, the institution of coexistence has a system approach. The changes in the institutional market arrangements on one level of the social system will influence the others. TTIP itself will change the institution of coexistence with regard to both parties of the agreement, re-defining it by changing the centre of the gravity from legal arrangements to governance settings.

In their excellent paper about new institutions governing the agri-food sector Menard and Valceschini [2005] called for the alternative institutional solutions. They have shown solutions assessed in a transactional costs perspective, which forms a mainstream for the institutional analysis. However they not forth seen how other optional institution – namely coexistence. Coexistence matters and would change the rules of the games. In this respect, the institution of coexistence makes a difference!

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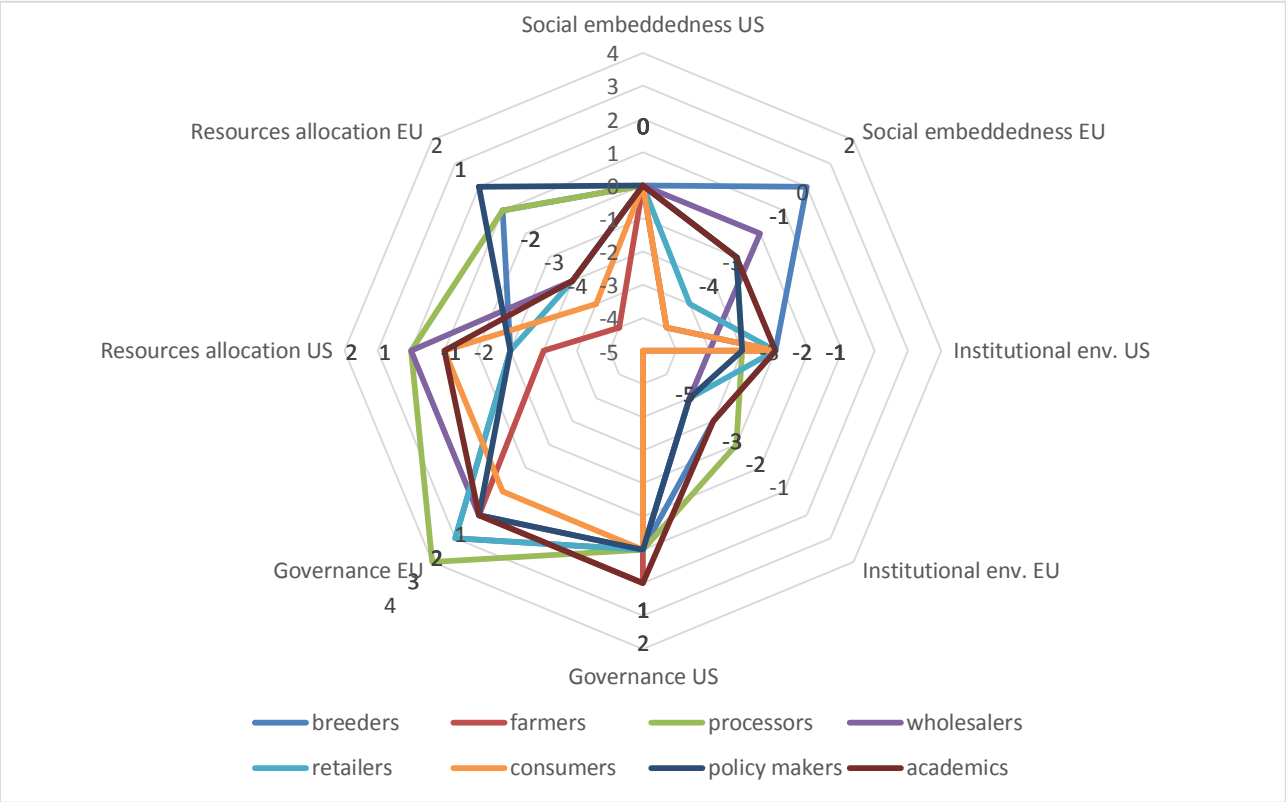
Appendix

Table 1. Mechanisms of institution of coexistence between GM and nonGM based supply chains in the food systems.

Level of social analysis	Level of the organization		
	International	Regional	Country
Social embeddedness	Customs to identify and verify quality products,	Customs to identify and verify quality products, Acceptance level for GM technology	Customs to identify and verify quality products, Acceptance level for GM technology
Institutional environment	WTO regulations of IPR of GMO and trade of products thereof Bilateral and multilateral agreements	Legal conditions for grow, process and trade of GM products, Labelling	Legal conditions for grow, process and trade of GM products, Labelling
Governance	IP based contracts, Testing, Labelling.	IP based contracts, Production strategies with the segregation measures Processing strategies with the segregation measures Testing, Labelling	IP based contracts, Production strategies with the segregation measures Processing strategies with the segregation measures Testing, Labelling
Resource allocation and employment	IP premiums, Competitive price advantages, Compensations Costs of compliance, Costs of adaptation, Transactional costs	Segregation measures IP premiums Competitive price advantages, Compensations, Costs of compliance, Costs of adaptation, Transactional costs	Segregation measures IP premiums Competitive price advantages, Compensations, Costs of compliance, Costs of adaptation, Transactional costs

Source: own investigations based on O. Williamson framework [Williamson, 2000]

Graph 1. The impact of TTIP on the institution of coexistence between GM and nonGM based supply chains in the food systems.



Source: own investigation based on the Delphi method