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COMPARING MEAT MARKET INSTITUTIONS ACROSS TRANSITION ECONOMIES: A NEW REGULATORY/BUSINESS ENVIRONMENT INDEX

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ABSTRACT

We propose an approach to assess the institutional environment of meat markets combining qualitative and quantitative aspects. We developed an index that covers laws and regulations, implementation tools and practices influencing animal registration, quality of veterinary inspections and disease control as well as the marketing of meat products. Using the newly developed index, we perform an analysis of institutional environment of meat markets across four post-Soviet countries with a heterogeneous reform process: Lithuania, where EU regulations prevail; Kazakhstan, which is part of Eurasian Economic Union; Ukraine, which orients towards integration into EU, and Uzbekistan, whose regulatory practices developed rather independently. Our findings show that similar regulatory practices on paper in Lithuania, Kazakhstan, and Ukraine result in different institutional environments due to the way of implementation. In Lithuania where regulatory practices are more transparent and rather consistently implemented, the legislation facilitates inclusive meat market institutions while similar legislation in the other two countries is only partially enforced nurturing an extractive institutional environment where different forms of corruption exist. In Uzbekistan, formal institutions are less internationally harmonized hampering meat trade and the development of internal meat businesses. Our results show that the newly developed index can be applied to other countries. The consistent cross-country comparison allows detecting similarities and bottlenecks for sustainable development of meat-related agribusiness.

1. INTRODUCTION

In the empirical and the theoretical literature there is a broad consensus that in countries where institutional settings relying on excessive regulations, institutional environment fail to protect business from corruption and fraud, improve public health and food safety, as well as safeguard the environment (Djankov *et al.*, 2002; Wheelan and Malkiel, 2010). These challenges are also applicable for meat businesses in form of poor institutional support; declining rural infrastructure, and restrictive policies (Worosz, Knight and Harris, 2008); high capital costs (e.g., equipment, transportation, and infrastructure) but also excessive regulations and controls. These difficulties have been recognized all over the world: in Europe (Kotisalo *et al.*, 2015), North-America (Worosz, Knight, and Harris, 2008), East Asia (Ndraha, Hsiao and Chih Wang, 2017), and Central Asia (Esenova and Dobson, 2000). Many of these challenges are directly and indirectly associated with governance and regulations of meat market administrations such as veterinary services, and food safety offices. We present a proposal on how to measure meat market institutions empirically focusing on actual laws, rules, and compliance procedures to define regulatory breaches, assess the link between meat market regulations and economic development of the sector that could be manipulated by a policymaker to foster the design of formal institutions for enabling meat market development.

A review of the academic literature suggests that most of the empirical studies explain the meat market development in terms of economic production factors such as input supply, technological changes and infrastructural environment (Tambi *et al.*, 1999; Esenova and Dobson, 2000; Kobayashi *et al.*, 2003; Petrick, Oshakbaev and Wandel, 2014). However, empirical research on

the institutional development of agricultural markets is scarce. A substantive volume of existing works has been built on the Coase (1937) theory and applied to agricultural markets: Hobbs (1996) classified transaction costs into information, negotiation, and monitoring or enforcement costs and defined that transaction costs, by their nature, are difficult to measure and therefore the appropriate measurements for them should be obtained (Hobbs, 1996). Following Williamson's perspectives (1979, 1993, 1996), where transaction costs are determined as the costs arisen from transacting and forming contracts in the market, great attention received the analytical effort on the governance of contractual relations to define causal relationship between socio-economic, institutional environment factors and type of contractual choices (Katchova and Miranda, 2004; Fertő, 2006; Okoye *et al.*, 2016). Pingali et al (2005) analyzed the farmers' participation patterns in agricultural markets by explaining that transaction costs have arisen and emerged from dealing with a food system characterized by different rules and regulations that deter the entry of small farmers into the market (Pingali, Khwaja and Meijer, 2005).

Given the widely shared view on the vital role of regulations Spiller (2013) outlines that Transaction Cost Regulations (TCR) require deep understandings of both basic institutional environments and transaction hazards. Based on the Transactional Cost Economics (TCE) framework of Coase (1964) and Williamson (1979) define regulations as the forms that take the governance of transactional interactions. Regulations can be viewed as a public agency mode of governance that is well-suited for some objectives and poorly suited for others (Williamson, 1999). In meat markets, it is important that the government establishes necessary regulations concerning public health independently, in order to protect the industry from itself (D. Long, 1993). However, it is difficult to find the correct balance between over and under-regulating. Therefore, the analysis of regulation requires the proper institutional comparison with a strong focus at the micro-analytical level. Following this perspective legal regulatory practices – an approximation of the formal institutional environment - as well as efficiency regulatory practices – an approximation of transaction cost - must be assessed in reference to all relevant alternatives. Indeed, there is no comprehensive and comparable measure available for agricultural markets that embrace the regulatory practices, the efficiency of regulations, and the level of their implementations of meat markets for a cross-country analysis.

Dozens of empirical papers purporting to present evidence in support of the claim that stronger economic institutions – effective rule of law, a good business climate, more secure property rights and market-friendly social norms – are critical factors to sustain economic growth, attract foreign direct investment, promote trade, and facilitate agricultural production (Binswanger, Deininger and Feder, 1993; Robinson, Acemoglu and Johnson, 2005; Lehne, Mo and Plekhanov, 2014). However, empirical studies implicating to show the relevance of institutions receive many critiques. For instance, a substantial number of analytical work focuses on individual property rights and insufficient focus is laid on other institutional quality indicators that address coordination failures (Bardhan, 2005; Lawry *et al.*, 2017). Much of the empirical studies relating to assessing the economic effects of institutions have not been measuring the quality of institutions, but policies or the institutions' assessments are based on flawed indicators of institutional quality (Glaeser *et al.*, 2004). Many of the available indicators of institutional quality are highly correlated and very frequently used such as those offered by the World Bank's initiative or commercial agencies such as International Country Risk Guide. Shirley (2005) stresses that the variable on institutional quality is a broad aggregate of laws, which measurement does not reflect practice. Following these perspectives Woodruff, 2006 indicates that the enforcement is more important than the substantial content of the regulations.

Our major contribution is that we developed a new index for institutional quality of meat markets that covers various dimensions of meat market regulations for a sample of countries in transition from a planned to a market economy to describe the differences in meat safety and veterinary services policies. More specifically, our analysis focuses on regulations on paper as well as their implementation based on evidence from four post-Soviet countries. Using the newly developed index, we perform a comparative analysis of institutional environment of meat markets across four countries with a heterogeneous reform process: Lithuania, where EU regulations prevail; Kazakhstan, which is part of Eurasian Economic Union; Ukraine, which orients towards integration into EU, and Uzbekistan, whose regulatory practices developed rather independently. Applying both qualitative (comparative analysis of documents) and quantitative (the law quantification) approaches, the research allows better coverage, higher precision, and quality of data on agricultural regulations. The newly developed index highlights the impact of the institutional environment on the delivery of meat market regulations in a development context and the benefits generated by improving the institutional environment. The comprehensive

outcome index allows the assessment of the veterinary services and meat safety regulations measuring their quality, efficiency, and implementation across different economies serving a good indicator of meat markets' institutional environment.

2. METHODOLOGY

2.1. DATA

The data is obtained from multiple sources of evidence such as documents, surveys, and interviews. The data has been elicited from both the primary and secondary sources. The primary sources of the data derive information about the existence of regulatory good practices from semi-standardized interviews and the written regulations such as veterinary medicine laws, animal identification and registration rules, food safety and meat handling regulations as well as meat marketing and transportation rules. The enforcement and compliance to regulation as well as corruption incidences were verified both by the secondary data sources such as public media documents, standardized questionnaires, and primary sources trough experts' interviews. Reaching out to respondents, both from the private and public sectors, helps to compare the perspectives of all actors involved. We have analyzed 87 legal written documents, 24 paper questionnaires from four countries with three respondents from the private sector and three respondents from the public sector in each country.

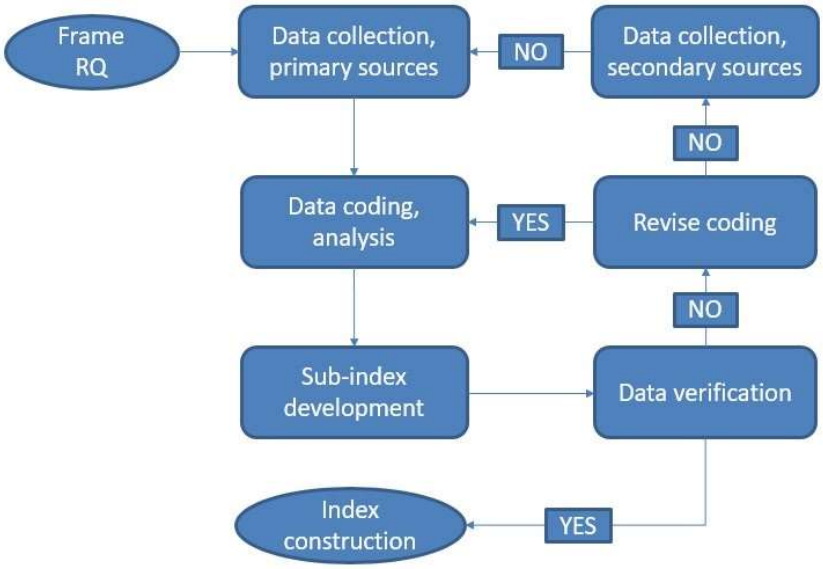
2.2. METHOD

The study applies to two mix-methods of data analysis that combines qualitative and quantitative approaches. The qualitative data were drawn upon multiple sources of evidence to seek convergence of responses about the kind of regulations used in particular operations and the level of their enforcement as well as reduce the impact of potential biases that can exist in a single method (Bowen, 2009). In order to identify and select cases that meet some predetermined criterion or fall outside a specified criterion of regulations in meat markets in selected countries, the sample size of documents, questionnaires and interviews was determined to be purposeful since the goal of the data collection is to select comparative information to construct the index (Palinkas *et al.*, 2015).

Qualitative data analysis commenced with scientific and media document analysis to provide data on the context within which background information and historical insights were given to

the institutional development in meat markets in post-Soviet countries. The literature review determines the formation of the topics and questions that were used to elicit information from legal documents regarding animal registration, veterinary control, and meat marketing regulations and requirements. After legal document analysis and data collection from the written regulations, the semi-standardized surveys and interviews with the country-level experts in the meat and livestock production sectors were conducted. These interviews aimed at verifying findings or corroborate evidence from the legal documents. Lastly, selective documents referenced in the surveys and by interviewee were analyzed to provide supplementary research data. The iterative data collection process and analysis is conducted until the data from all sources and all parties will converge into correspondence and satiate the information for sub-index construction (Figure 1).

Figure 1. Data collection flow chart, adapted from (Bitsch, 2005).



The main approach to analyze the qualitative data from different countries involves skimming, reading, and combining elements of content as well as thematic analysis that was performed by coding and category construction using qualitative analysis software Atlas.ti. The data coding and analytic procedures are based on the method of constant comparison of legal documents and regulations applicable to meat markets that serve to uncover and explain patterns and variations in legal systems of the countries in the sample. The data coding implies three analytic techniques: open coding, axial coding, and selective coding (Bitsch, 2005).

2.3. COUNTRY SELECTION

The selection criteria of the country choice include representation of the states with different levels of meat market development and a quite heterogeneous reform process. To select a sample of countries for assessment of regulatory framework for agribusiness, we did an analysis of the livestock and meat market sectors by looking at three characteristics: productivity of livestock that indicate by the variation in carcass weight of meat animals within the countries over time; the time series trend of the livestock production level approximated by the total amount of fresh meat produced in a country; and institutional variation that indicates the trajectory of the policy reform undertaken after the Soviet Union dissolution. Based on these criteria, Lithuania, Kazakhstan, Ukraine, and Uzbekistan have been chosen as the countries with the common Soviet historical background but very divergent political and market institutions. With very similar trajectories of development of meat markets during the Soviet period from 1951 to 1992, the selected countries in the period from 1992 to 2016 demonstrate various meat market development levels, Lithuania and Ukraine experience a net decline in meat production after the dissolution, while Uzbekistan increases the meat production and Kazakhstan partially recovered the industry. In terms of productivity of meat animals, Lithuania and Ukraine increased the average carcass weight of farm animals while Kazakhstan and Uzbekistan experience decline in meat production efficiency (Figure 2, Figure 3). Without doubt, there might be many different triggers of variation in the meat market performance such as different infrastructural and technological heritage left by the USSR. Here the focus is on the choice of different trajectories of institutional development: in Lithuania, where EU regulations prevail; in Kazakhstan, which is part of EAEU; Ukraine, which orients towards further integration into the EU, and Uzbekistan, whose regulatory practices developed rather independently. The high variation in the dynamically changing market and institutional environment during the transition period in post-Soviet countries makes it possible to compare the legal frameworks across the countries, highlight the impact of institutional environment on the delivery of the agricultural market development and generate improvements in meat market governance.

Figure 2. Cattle Number Index with Base Year 1992=100.

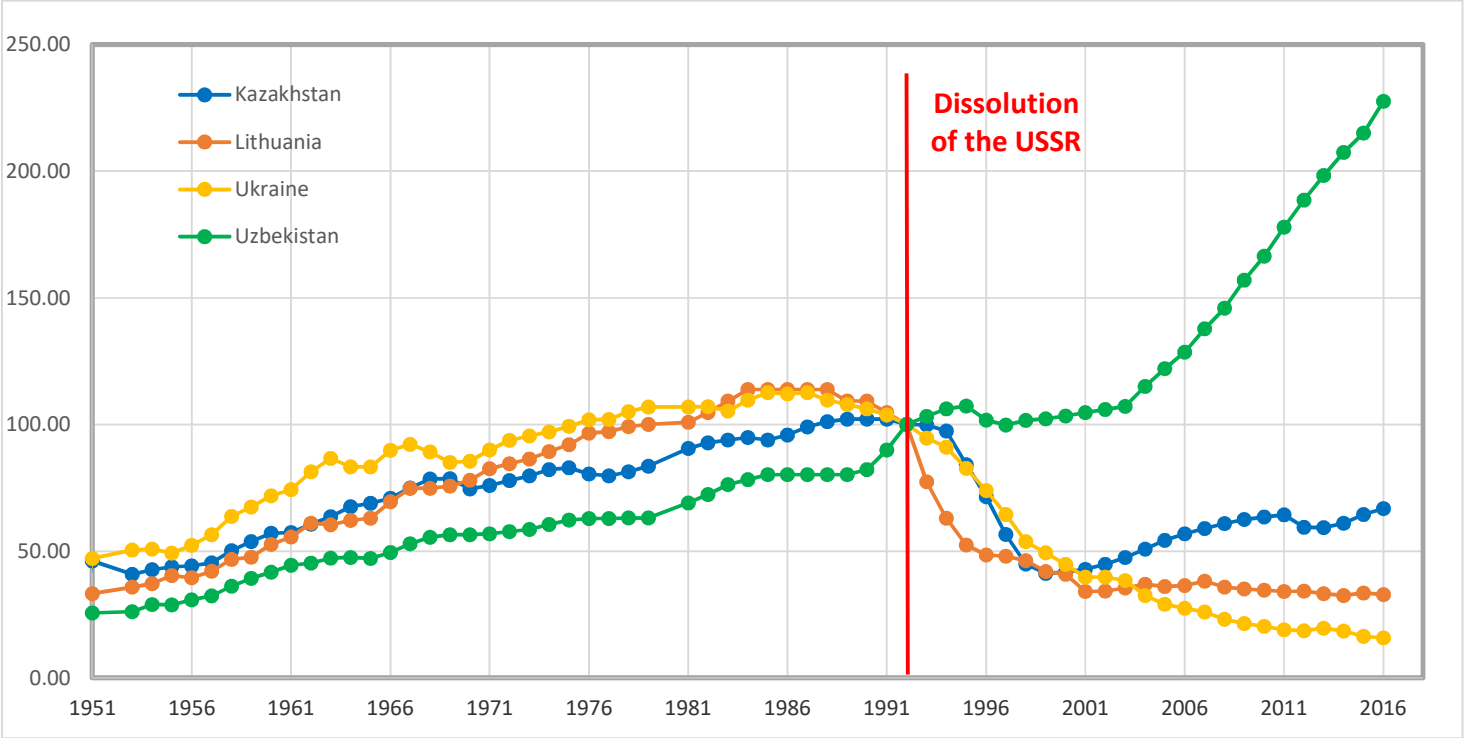
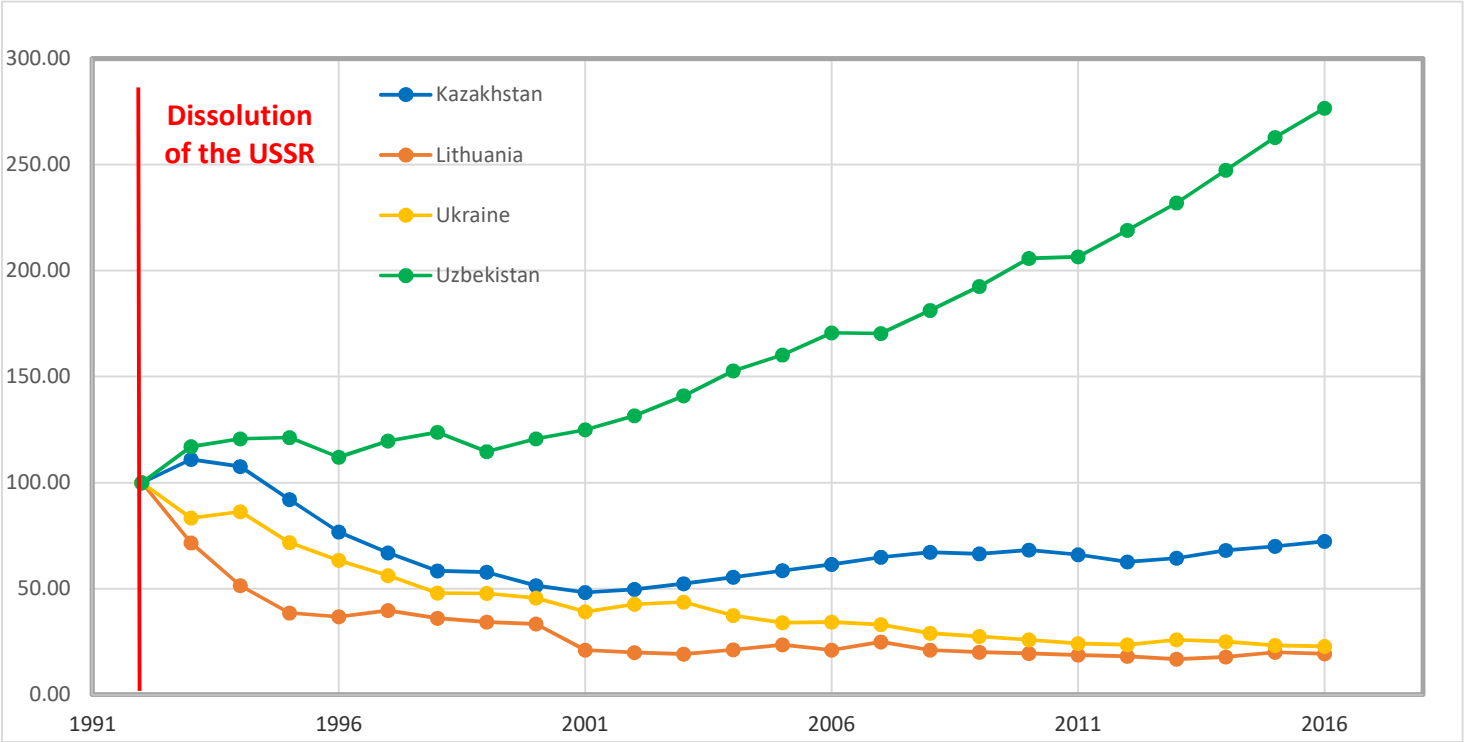


Figure 3. Cattle Meat Production Index with Base Year 1992=100.



2.4. INDICATORS

The overall index is based on three core categories or indicators on the institutional environment for meat markets: animal registration, veterinary inspections and quality controls, and meat marketing. We analyze the veterinary services regulations relevant to certain parts of animal raising value chains: from animal birth and animal raising to “finished” animal ready for slaughter; the analysis of meat safety regulations includes meat supply chains from the slaughterhouse to a butcher shop.

2.4.1. ANIMAL REGISTRATION

In most of the countries, farm animals cannot move freely, distributed, sold or slaughtered unless they are identified and registered in a designated authority. The introduction of animal identification and registrations are motivated by animal health (including zoonosis) and food safety issues (Shackell, 2008; OIE, 2017). It aims to ensure livestock diseases notification, disease outbreaks control (Alban *et al.*, 2011; EFSA, 2011), thievery prevention, the production and animal selection management, ownership rights establishment, protection and enhancement for value of branded meat (Elbakidze, 2007; Bowling *et al.*, 2008; Shackell, 2008; Kim *et al.*, 2017). Animal identification and traceability systems assist in maintaining international markets and facilitating supply chain management (Bowling *et al.*, 2008). A functioning animal identification system can be used as a tool to distribute producer support like coupled direct payments and slaughter premium (Wismans, 1999). We develop an indicator consisting of the three modes of animal registration: animal identification, animal database and information reporting, as well as animal registration.

2.4.2. VETERINARY INSPECTIONS AND QUALITY CONTROLS

The potential damage caused by disease outbreaks can lead to massive livestock mortality, human health endangerment, and closure of borders for trade. To avoid potential hazards the timely animal health inspection, vaccination, and phytosanitary control are essential tools for disease prevention. Well established, consistent and free from fraud veterinary inspections and controls decrease the farmers’ not only direct losses but also indirect ones (Worosz, Knight and Harris, 2008). However, many developing and transition countries experience difficulties in establishing property rights and enforcing laws, while relying on excessive regulation. These

regulations fail to help farmers rather favor the number of mandatory inspections and permits creating opportunities for rent-seeking agencies. The excessive regulation force entrepreneurs into the underground economy, where regulations are absent at all (Djankov *et al.*, 2002). For instance, in post-Soviet countries, the "lion's share" of meat production is produced by unregulated households. The animal control and inspection methods, as well as punishments for breaking laws, vary significantly across countries but a minimum set of standardized method to increase animal disease prevention and control can be applied across the world. We develop an indicator consisting of the three modes of veterinary inspections and quality controls: animal inspections, animal confiscation and compensation, and slaughter inspections.

2.4.3. MEAT MARKETING

Successful domestic and global food trade depends on safe food supplies that meet consumer expectations and can be achieved via well-designed standards, norms and their implementations (Henson and Caswell, 1999; Ndraha, Hsiao and Chih Wang, 2017). The meat standardization improves trade and marketing of meat and facilitates the long-distance transactions by overcoming the problem of adverse selection. The buyers and sellers could observe and differentiate the quality of meat that reduce the costs of writing and enforcing contracts; the meat producers could receive the price premium for the high quality of goods (Dimitri, 2003). But ambivalent standards lean the meat markets to risk and hazards, challenge a single economy to expand to new markets and create informal markets (Henson and Caswell, 1999; Dunn, 2003; Herzfeld, Drescher and Grebitus, 2011). The meat standardizations and trade requirements vary significantly across the world but a minimum set of standards to increase trade can be applied in many countries. We develop a meat-marketing indicator consisting of the two sub-indicators: licensing and trade permits, quality assurance and labeling.

2.5. CONSTRUCTION OF THE INDICES

Following the qualitative analysis, the selective coding technique provides core dimensions to select comparative criteria for legal documents and regulations, which form the measure for the institutional environment of meat markets in selected countries and turn these comparative dimensions into quantitative terms for scoring (Table 1). The measurement characteristics for scoring the legally binding documents and regulation enforcement should correspond to the

following criteria: the characteristics have to affect animal and meat production control; the characteristics need to be quantifiable, so that they can be scored on a ratio or binary scale from 0 to 1; objective measures should be preferable over subjective measures; and they need to be different across countries to define differences in national regulations (VOIGT, 2013; Nieuwesteeg, 2015). The quantitative method of the research considers not only the scoring of regulations but also considers deregulation. Stricter animal identification and veterinary control rules receive higher scores since the legal requirements need to set appropriate rules in these areas to ensure health and food safety (EBA, 2017). For instance, applying the ratio measurement units, a country will receive the score "1" if animal identification is required, the partial animal identification is scored with "0.5", and if the animal identification is not required, the score is "0". In case a holder must request a veterinary passport from several authorities, we assign a value of "0" and interpret it as overregulation, the "one window procedure" will be scored with "1". The result of summing up scores overall dimensions for a given country forms a benchmark where the highest cumulative score is considered as the frontier. Benchmarks very near the frontier indicate that a country has regulatory good practices. While the lower scores far from the frontier show areas where examples of better regulatory practices exist elsewhere.

Table 1. An Example of Scoring.

Selective code (dimension)	Country	Comparative dimension	Legal basis	Score
Code: **Animal Identification** Memo: *Does the legal framework require identifying animals and tracing their history, location and movement for the purpose of animal disease control, food safety, or trade or any other legal requirements?*	Kazakhstan	**- Partly, the requirement covers specific types of animals are identified and traced**	A32 C1 Law of the Republic of Kazakhstan of 10 July 2002 No. 339-II on Veterinary Medicine A1 C2, C18 Rules for the Identification of Farm Animals	**0.5**
	Lithuania	**- Yes, identification and movement control in accordance with international standards**	A3 C15,16 Order Regarding Registration of Holding Points and the Approval of the Labeling and Accounting Procedure For Farm Animals	**1**
	Ukraine	**- Partly, the requirement covers specific types of animals are identified and traced**	A 15 C6; A37 C6 Law on Veterinary Medicine A 5 Law on Amending the Identification and Registration of Animals C2, 11, 12 Rules for the Identification of Bovine Animals	**0.5**
	Uzbekistan	**- Partly, the requirement covers specific types of animals are identified and traced**	Animal registration Rules 2017 (CabMin) s.1 (Uzb)	**0.5**
	International regulations	**- Yes, identification and movement control in accordance with international standards**	Chapter 4.1 Terrestrial Animal Health Code	**1**

** The legal basis is based on the legal documents in force before 1.12.2017*

After each dimension is scored and the frontier is defined the cumulative scoring is aggregated into the sub-index that evaluates the institutional quality of meat markets in a given economy. The indexing methodology, a distance-to-frontier (DTF), used by Enabling the Business of Agriculture (EBA) and pioneered by Doing business, World Bank, is established. The idea of the DTF method is to score benchmarks with respect to a frontier, the regulatory best practice. The legal regulatory best practice, the legal frontier, is the highest possible index score, even if no country could obtain that value. The lowest benchmark is the fixed minimum observed score that a country obtains. The DTF measurement methodology implies a scale from 0 to 100, where 100 represents the best performance or a frontier and 0 the worst performance (EBA, 2017).

The overall DTF index is based on three sub-indexes of the institutional environment: regulatory practices, the efficiency of regulatory practices, and the governance practices. The regulatory practices sub-index measures the quality of regulatory practices by representing the existence of regulations and rules, their compliance with animal health, welfare, and environmental requirements with accordance to international norms. Calculating the distance-to-frontier score involves the normalization of the indicators to a common unit where each indicator is rescaled by the linear transformation (Divanbeigi and Saliola, 2017):

$$DTF_{i,j}^{qual} = \frac{RP_{i,j} - RP_{min_i}}{RP_{max_i} - RP_{min_i}} \qquad (1)$$

- *i-quality score for economy j;*
- *RP, RPmin are observed, the minimum and maximum number of regulatory good practices;*
- *RPmax is the legal frontier, the highest possible score*

The efficiency sub-index represents another dimension, which approximates transaction cost expressed in time or monetary units. It reflects the efficiency of the legal framework that firms or individuals have to bear to comply with regulations – e.g. the number of procedures, time, and cost to complete animal registration. The cost and time estimates are obtained from the official fee schedules and then verified by respondents who administer the relevant regulations or undertake the relevant transactions on a constant basis through semi-standardized interviews of questionnaires. The time estimates for a particular regulatory process is divided into clearly defined steps and procedures. For instance, an animal registration process is broken down into clearly defined steps such as time spent on animal identification, time spent on the addition of

the information to a database, and time spent on veterinary passport issuance. Unlike the regulatory practice where the frontier is the highest possible score, for the efficiency regulatory best practice, the frontier is a country with the lowest transaction costs (EBA, 2017). The efficiency indicators are combined and averaged to build a single efficiency indicator and then each indicator is rescaled by the linear transformation (Divanbeigi and Saliola, 2017):

$$DTF_{i,j}^{eff} = 1 - \frac{TC_{i,j} - TC_{min_i}}{TC_{max_i} - TC_{min_i}} \qquad (2)$$

- *i- efficiency score for economy j;*
- *TC, TCmin, and TCmax are the observed, minimum and maximum transaction cost amounts in the sample.*

In contrast to the former two categories, governance practices such as enforcement practices and corruption incidences are mostly neglected in the literature. However, the endowment of countries with well-functioning governance systems could be essential for meat market development. Therefore, we construct a sub-index of the governance practices and include it in the aggregate index. The new sub-index measures implementation and enforcement level of veterinary and food safety regulations, the incidences of corruption in the sector, and the compliance to standards. The higher score is given if the existing regulations are implemented properly and enforced in time. For example, if in a country the animal identification is mandatory and should be implemented during the first seven days after the newborn animal has appeared, the score “1” is granted if the animal is identified and assigned with an individual identification number otherwise the score is “0”. If the procedure of identifications is exceeded the timeframe limits stated in the legal rules the country receives score “0”, in the case when the process of identification takes less or equal time than the prescribed limits the given score is “1”. The corruption incidences such as possibilities of bribery extorting or distortion on animal information reports are scored according to five-dimensional Likert scales from “highly likely” to “very unlikely”. The scoring for the Likert scale is ratio based where the score “1” given if the corruption is “highly unlikely”, “0.75” if it “unlikely”, “0.5” for “neither likely nor unlikely”, “0.25” for “likely”, and “0” if the corruption “highly likely”. After the scoring, the DTF is calculated that reflects the enforcement of the legal framework and incidence of corruption with respect to other countries:

$$DTF_{i,j}^{gov} = \frac{GP_{i,j} - GP_{min_i}}{GP_{max_i} - GP_{min_i}} \qquad (3)$$

- *i-quality score for economy j;*
- *GP, GPmin are observed, the minimum and maximum number of governance good practices;*
- *GPmax is the legal frontier, the highest possible score in governance practices*

After all the sub-indexes are calculated the average value of all the sum of all sub-indexes is defined as the overall DTF index of meat markets.

$$DTF_j^{total} = \frac{1}{n}\sum_{m=1}^{n} DTF_j^m \qquad (4)$$

- *m - sub-index for economy j*

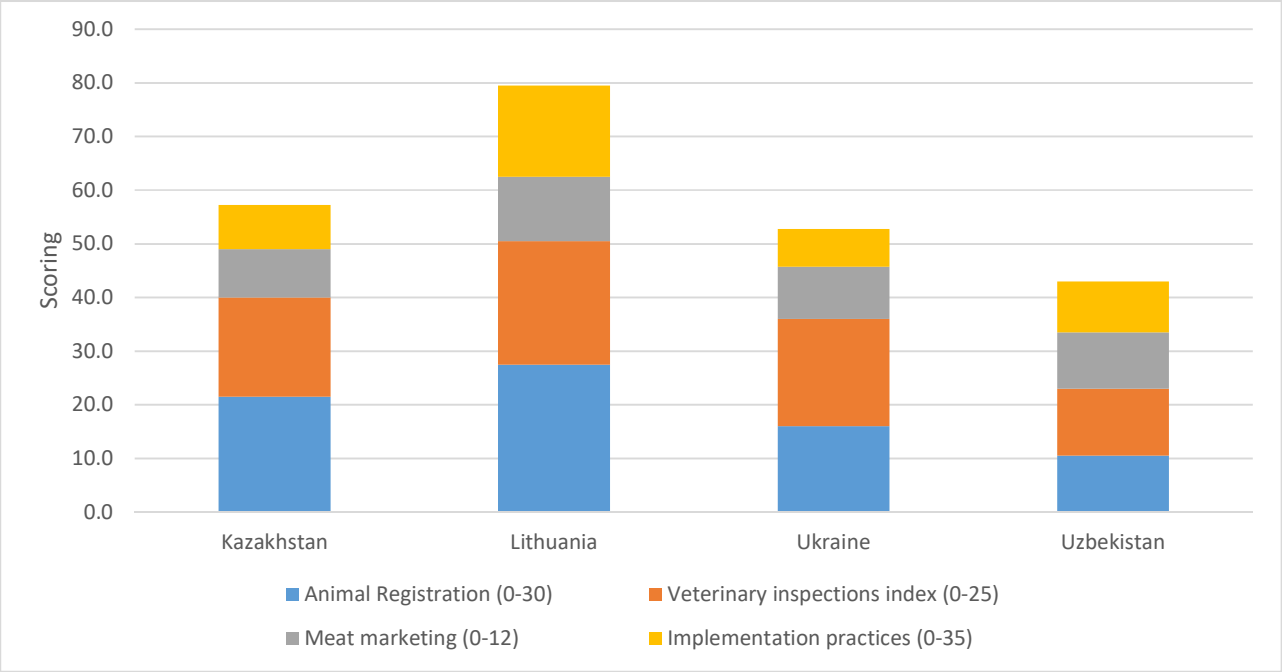
3. RESULTS OR COMPARISON OF INSTITUTIONS OR APPLICATION TO POST-SOVIET COUNTRIES

Figure 4 and Table 2 summarize the major results by mapping the overall index of institutional quality of meat markets and the three sub-indices for four selected countries. The sub-indexes the quality of regulatory practice, $DTF_{i,j}^{qual}$, and the efficiency of regulatory practices, $DTF_{i,j}^{eff}$, both result from the legal documents while the implementation practices, $DTF_{i,j}^{gov}$, refers to the survey and media documents. Not surprisingly, that the top performer is Lithuania, which is in the high-income group of countries, as defined in the World Bank's World Development Indicators. Outside the high-income group, the lower-middle-income countries Ukraine and Uzbekistan perform the lower ranking. Kazakhstan, the resource-based economy, represents the upper-middle-income country with the scoring close to the average.

Table 2. The frontier in regulatory practice

		Kazakhstan		Lithuania		Ukraine		Uzbekistan		Frontier	Worst performance
	Topic/indicator	Data	DTF Score	Data	DTF Score	Data	DTF Score	Data	DTF Score		
DTF_j^{total}	Meat Market		42.35		78.38		25.50		12.94		
$DTF_{i,j}^{qual}$	Animal Registration (0-30)	21.5	56.4	27.5	87.2	16.0	28.2	10.5	0.0	30.00	10.50
	Veterinary inspections index (0-25)	18.5	48.0	23.0	84.0	20.0	60.0	12.5	0.0	25.00	12.50
	Meat marketing (0-12)	9.0	0.0	12.0	100.0	9.8	25.0	10.5	50.0	12.00	9.00
$DTF_{i,j}^{gov}$	Implementation practices (0-35)	8.3	7.4	17.0	58.8	7.0	0.0	9.5	14.7	24.00	7.00
$DTF_{i,j}^{eff}$	Time to register an animal and obtain a permits for marketing (days)	33.0	100.0	41.0	61.9	51.0	14.3	54.0	0.0	33.0	54.0

Figure 4. The visual comparison of countries' performance by four indicators



Before turning to the more specific evidence on sub-indices and changes in rankings over time, we compare our index with other global indexes on institutional quality, available from the World Bank website, World Bank Governance Indicators (WGI) 2017 and the Ease of Doing Business (EDB) 2017 indicator. The scoring and ranking methodologies underlying the two indexes differ in various aspects. The WGI scoring is based on subjective assessments of surveys of firms and households, as well as the subjective assessments of a variety of commercial business information providers (Kaufmann, Kraay and Mastruzzi, 2010). The EDB approach is based on survey respondents, which capture perceptions and experiences of businesses as well as includes data from domestic laws, regulations, and administrative requirements (WorldBank, 2016). The newly developed index contrasts the former indexes with the fact that it covers both de jure and de facto institutions with the internal and external level of implementation as well as the objective and subjective measures. The focus of the WGI and EDB scoring approaches is on the overall institutional quality, while we cover specific indicators of the quality, efficiency, and implementation of regulations applicable to meat markets.

Table 3. Global institutional quality indexes

	Ease of Doing Business Rank *		Government effectiveness		Regulatory Quality		Rule of law		Control of corruption		New index on meat markets		
	DTF Score	Global Ranking	Score	Percentile Rank	Score	Percentile Rank	Percentile Rank	Ranking	Score	Percentile Rank	DTF^{total} Score	DTF^{eff} Score	DTF^{gov} Score
Kazakhstan	78.84	21	0.01	53.85	0.17	61.06	-0.41	38.46	-0.82	19.71	42.35	100	7.4
Lithuania	75.09	35	0.98	80.29	1.16	83.17	0.99	80.77	0.55	70.19	78.38	61.9	58.8
Ukraine	63.90	80	-0.46	35.10	-0.32	40.38	-0.71	25.00	-0.78	22.12	25.50	14.3	0
Uzbekistan	63.03	87	-0.56	32.69	-1.26	8.65	-1.11	11.06	-1.16	12.02	12.94	0	14.7

Best performance - 2nd best performance - 3rd best performance - lowest performance

* The ease of doing business score benchmarks economies with respect to regulatory best practice, showing the absolute distance to the best regulatory performance on each Doing Business indicator.

** Score - estimate of the governance measure on a scale from approximately "-2.5" to "2.5". Higher values correspond to better governance.

*** Percentile rank – indicates the rank of the country among all countries in the world. "0" corresponds to lowest rank and "100" corresponds to the highest rank.

Table 3 indicates that the overall institutional quality of meat markets correlates with WGI rankings and the efficiency sub-index is correlated with the EDB ranking in the sample of the four countries in question. However, the implementation practices sub-index is necessary to identify differences in correlation between the EDB as well as WGI indexes that gives grounds for further fruitful negotiations.

3.1. QUALITY OF REGULATORY PRACTICE

3.1.1. ANIMAL REGISTRATION

Under the animal registration sub-index, we have measured whether a country has a legally binding requirement to register animals, ease access information to the animal registration, awareness of the duration by which the registration completed, administrative procedures while issuing a veterinary passport, as well as the existence and access to an official farm animal-disaggregated database. The main difference in scoring in animal registration regulatory practices across counties is mainly due to different development stages of veterinary legislation bases in the countries. While in Ukraine and Uzbekistan, the mechanism for identification of farm animals is in the process of coordination and at the initial stage of implementation. Kazakhstan and Lithuania have better established written rules for animal registration.

Lower scores received the countries that can avoid animal identification in specific cases. In Kazakhstan, Ukraine, and Uzbekistan there is some exception for the imported animals for

slaughter purposes that can avoid identification during a certain period until the slaughter is executed. The online services for animal registration are well developed in Lithuania where the animal registration and animal import permits can be requested online through the electronic government portals. In Kazakhstan, the online services such as import/export permits and veterinary certificates are provided in the list of online services on the government websites but the state veterinary organizations who implement the services are not integrated into the national network services system thus making the online services unavailable for livestock producers.

The Lithuanian regulations clearly state the names, rights, and obligation of organizations implementing the animal identification procedures, animal database maintenance, the supply of the identification devices, and the issuance of the veterinary passports. The Kazakh, Ukrainian and Uzbek regulations, on the other hand, are very subtle in stating the names, responsibilities, and duties of the organizations conducting the animal identification. The lack of information on organizations that implement the veterinary services facilitate uncertainties for farmers while requesting the animal registration, veterinary passport issuance, and data reporting on animal information. In the rules on animal identification in Uzbekistan state that an animal's identification number and identification device should correspond to "international standards" without referencing the exact name or coding of a standard (*Animal registration Rules 2017* (CabMin) s.2(7) (Uzb)). Lithuania references both the standards for identification devices and the country codes for identification coding ISO11784/11785 and ISO3166 respectively. Kazakhstan requires only identification devices to be in accordance with the ISO11784/11785 while Ukraine requires the coding correspondence to ISO3166.

Inconsistency in animal identification regulations exists among some countries. In Uzbekistan raising not identified animal and slaughtering animal without or damaged identification devises is prohibited (*Animal registration Rules 2017* (CabMin) s.4(32,41) s.2(15) (Uzb)), but the slaughter of not identified imported animals is allowed (*Animal registration Rules 2017* (CabMin) s.2(14) (Uzb)). Similar mismatch was found in the Ukrainian regulations, where the law on the animal identification prohibits the slaughter of animal without identification (*Law on Animal Identification 2009* (MinAg) s.5 (Ukr)) and the law on the veterinary medicine prohibits the import of animal without identification (*Law on Veterinary 1992* (MinAg) s.85(5) (Ukr)), while the rules

for bovine identification states that the non-identified animal can be imported for slaughter purposes (*Bovine identification Rules 2018* (MinAg) s.11,12 (Ukr)).

3.1.2. VETERINARY INSPECTIONS AND QUALITY CONTROLS

Ukraine and Uzbekistan do not state the name of the authority, which is responsible for veterinary control and inspections in the country, while Lithuania and Kazakhstan do so. In Uzbekistan, there is no legally binding document that states the frequency and the sequence of veterinary controls and inspections. The veterinary inspection in Kazakhstan, Lithuania, and Ukraine are conducted according to the strategic planning and epizootic situation in the region. Notwithstanding, there is a controversy in the Kazakhstani regulation about how the inspections should be conducted. In the law on the veterinary medicine is stated that all inspection should be conducted with accordance to the entrepreneur codex of Republic of Kazakhstan (*Law on Veterinary 2002*(MinAg) s.14(1-2) (Kaz)). In the referenced codex is indicated that the control and supervision body is obliged to notify in written form the subject of control and supervision about the commencement of the inspection at least thirty calendar days prior to the commencement of the inspection with the special order of inspections or verification except the cases during episodic outbreaks when there is a potential danger for human health (*The Enterprise Code 2015* (AkOrda) s.147 (Kaz)). However, in the regulations on inspection and supervision is stated that the controlling body should not notify the subject of control in advance (*Regulations on inspection and supervision* 2014 (minAg) s.# (Kaz)). In Lithuania top-down supervision and control to a more advisory role aligned with the Hazard Analysis and Critical Control Points, good agricultural practices, and good manufacturing practices codes and standards. The inspection of small household livestock producers in Ukraine focuses only on interventions during disease outbreaks with the lack of risk analysis.

The disease control management represented by the epizootic online-based database in a country is presented in Lithuania and Uzbekistan, while Kazakhstan has one with a substantial time lag. In Ukraine, there is no national database to monitor and access information on animal diseases. It is the big issue of vaccination in Kazakhstan where vaccination should be handled according to the epizootic situation and states plans of eradication the disease outbreaks according to which the government supplies numerous financial support to the local veterinary authorities. As a result, in a number of regions in Kazakhstan, the documented facts of double

vaccination of animals have been established in order to fulfill the plans for veterinary measures and to use the allocated funds (Shybarshyn, 2017). In the EU, the prevention of diseases is based on a non-vaccination policy. However, vaccination is also possible due to the epizootic situation and disease outbreaks, which is undertaken in a controlled way, as provided for in legislation (van Wagenberg *et al.*, 2012). Another regulatory challenge in Kazakhstan, Ukraine, and Uzbekistan is that there are no requirements for the maintenance of animals with respect to animal welfare and food safety. There is a lack of regulations that include mandatory minimum requirements for biosafety for economic activities of various forms of ownership except different tax regimes for each form of ownership. Such norms would have to increase the effectiveness of disease control.

Ukrainian legal framework does not provide a mechanism for the compensation and confiscation or forced slaughter of sick animals presenting a danger to the health of animals and humans while in Kazakhstan, Lithuania, and Uzbekistan the confiscation and compensation rules for farm animal exist. However, some clauses in the Kazakhstani regulations about confiscation are very inconsistent. For example, ideally, the animal is confiscated if a disease listed in the national list of dangerous diseases defined at an animal. After careful veterinary and laboratory investigation that confirms the sickness, the committee headed by chief national inspector makes the decision about confiscation (*Rules on animal confiscation* 2014 (minAg) s.2(4) (Kaz)). After that, the animal is fully compensated at the average market price from the state budget (*Rules on animal reimbursement* 2014 (minAg) s.3(9) (Kaz)). However, at the same time, a local veterinarian is allowed to make a decision that the sick animal can be assigned for disinfection or a sanitary slaughter meaning that the meat after slaughter can be processed (*Rules on animal confiscation* 2014 (minAg) s.3(18) (Kaz)). This can lead to opportunistic behavior and collusion of both the veterinarian and processor which happens in reality when some farm animal forced for slaughter without any animal health inspection and a meat processor receive cheap meat (Chemeneva, 2016). In that case, the compensation consists of the shares of 30% by state and 70% by a processor from the average market price for the farm animal (*Rules on animal reimbursement* 2014 (minAg) s.3(9) (Kaz)). Moreover, to receive compensation is a very bureaucratic and burdensome procedure where the reimbursement applicant should submit seven documents obtained from five different organizations (Chemeneva, 2016). The process of compensation

takes much longer than it is stated in the law: instead of ten days stated in the law in Kazakhstan, it can take around 180 days, in Lithuania instead of five days it might take up to 45 days.

3.1.3. MEAT MARKETING

In order to improve trade and especially the meat export, the internationally recognized food safety, sanitary, and production standards are essential criteria for marketing. However, in Kazakhstan, Ukraine, and Uzbekistan, the legal framework does not envisage all spectrums of hazard analysis, risk assessment measures, and demonstrate a lack of regulations for farm animal slaughter. According to the current legislation in Kazakhstan and Ukraine, each consignment of farm animals must undergo a clinical examination before slaughter implementation. Some industrial animal farms solve this issue by obtaining a license for private veterinary practice for the chief veterinarian of their farm, therefore, avoiding the independent party inspections. In Kazakhstan, the rules for veterinary control state that the inspectors should examine the functioning system intended for meat quality control purposes only if such quality control units exist but the necessity of such quality control system is not required ((*Rules for veterinary control* 2015 (minAg) s.2(8), s.4(10) (Kaz))). At the same time, the names of the systems Hazard Analysis and Critical Control Points (HACCP), as well as standard requirements for the systems such as International Organization for Standardization (ISO) and Good Manufacturing Practice (GMP)) are literally written in English in the national documents, which is not the state language in Kazakhstan and beyond of comprehension for many citizens (*Rules for veterinary control* 2015 (minAg) s.2(8) (Kaz)). In addition, the rules do not indicate any explanation of the meaning or operational functions of the systems.

The sanitary norms for animal slaughter as well as meat traceability regulations are essential to capture trade and exports growth if the rules are harmonized with international standards. To ensure traceability in Lithuania, Kazakhstan, and Ukraine, farmers must provide meat chain information to processors for animals and meat delivered under normal conditions. In Lithuania, this may be provided through electronic data exchange or in the form of a standardized declaration (Regulation (EC) No 853/2004) while in Kazakhstan and Ukraine such operations are only available in the paper forms via certificates. In Uzbekistan, the traceability regulations are required, but it is not stated in the regulations at which level of value chains the traceability marks should be established. In Kazakhstan, there are some noticeable limitations in the rules

for slaughter. According to the rules, the slaughter of animals for the trade purposes should be executed in the processing enterprises or in the slaughter stations (*Rules for the slaughter* 2015 (minAg) s.2(5) (Kaz)) but in the case of absence such stations the slaughter can be executed in the slaughter site, an adapted premises (place), established for the period of the absence of the processing enterprise or slaughter station (*Rules for the slaughter* 2015 (minAg) s.2(6) (Kaz)). But sanitary and technical requirements for the "slaughter site" are not indicated. This clause may hamper the development of slaughter infrastructure and worsen the vertical integration of the meat sector in Kazakhstan where the slaughterhouse chain is not essential. In addition, due to this controversial clause, the middleman and veterinarians may behave opportunistically executing and approving an illegal slaughter for trade purposes.

Most of the production standards in Kazakhstan, Uzbekistan, and Ukraine are local (GOSTS) which are recognized mostly in CIS countries. There are no legally binding meat classification standards based on the distinctive features of slaughter products (e.g. Kosher, Halal meat) in Kazakhstan. The meat traceability requirements in Uzbekistan are contradictory. There is a requirement that the food products including meat and meat product should be traceable (*Regulations on the Safety of Meat and Meat Products 2018* (CabMin) s.3(22) (Uzb)). However, there is no legally binding document that requires keeping ante and post mortem inspection records and adding these records to a database. Moreover, according to the conducted survey, the respondents neglect the existence of such a database where the origin of meat could be traced. Thus, for better exports and trade the meat standards should be more internationally harmonized, the produced meat should be traceable and slaughter products should be distinctive.

3.2. EFFICIENCY OF REGULATORY PRACTICE

The awareness of how long the animal registration process can take allows planning animal circulation, transportation, and distribution. The expected registration time is an estimation by a regulatory authority of how long the registration or identification process takes. Lithuania and Kazakhstan regulations indicate the requirements for the detailed registration procedures with the examination of an animal's health by a veterinarian, while Ukrainian identification system relies on a farmers' inspection for the animals' identification who are allowed to identify animal themselves (*Bovine identification Rules 2018* (MinAg) s.3(9) (Ukr)). All countries in the sample

provide a time limit for the registration process in a legally binding document or a non-legally binding guideline. The legal timeframes for animal identification range from seven days in Kazakhstan to 14 days in Uzbekistan. To obtain the veterinary passport the regulations set the time limit of three days in Kazakhstan and Uzbekistan, five days in Ukraine and seven days in Uzbekistan.

Kazakhstan is also leading in setting the minimum requirements for meat marketing permits with five mandatory documents to be submitted and two working days to receive an official trade permit. In Lithuania, the same procedure takes five days while the number of mandatory documents is the same as in Kazakhstan. In Ukraine, nine documents are required to be submitted with a one-day limit to grant the permit. Uzbekistan does not set the legal requirement for document submission while the operation to obtain the marketing permit officially takes seven days.

3.3. IMPLEMENTATION PRACTICES

3.3.1. ANIMAL REGISTRATION

In some countries, we witness the good regulatory practices but the implementation level might deviate from what is written on paper. For instance, in Kazakhstan, while registering a newborn animal in the national database on average takes up to 30 calendar days instead seven written in the law while in Lithuania the same procedure takes only one day with a seven-day legal time limit. To obtain a veterinary passport in Ukraine takes on average 14 days instead five-day legal limit while in Lithuania it takes one day out of legally assigned seven days, in Kazakhstan three out of three days, and in Uzbekistan five out of three days. Even though the farm animal registration and identification is mandatory among all countries in the sample, in practice neither animal identification nor animal movements control might exist. According to the survey and media document analysis, it is very likely that farm animals in Kazakhstan are unidentified, e.g. the identification number is not assigned to an animal, in Ukraine and Uzbekistan it is likely that farm animal unidentified while in Lithuania it is very unlikely that the animals do not possess identification. Even though the information reports on farm animals is mandatory in Kazakhstan, Lithuania, and Ukraine it is highly likely that in Kazakhstan and likely in Ukraine that incorrect information (e.g. nonexistent animals) is added to the database and that some animals are not

registered in the database while in Lithuania both cases are unlikely. Irregular payments in order to get identification done or to speed up the process are likely in Kazakhstan, Ukraine, and Uzbekistan while unlikely in Lithuania. It is possible in Kazakhstan, Ukraine, and Uzbekistan that farm animals do not possess a veterinary passport at all while in Lithuania this is highly unlikely.

3.3.2. VETERINARY INSPECTIONS AND QUALITY CONTROLS

In Lithuania, the regulatory bases facilitate more inclusive institutions that support the idea of animal health and welfare, while in Kazakhstan, Ukraine, and Uzbekistan the regulation performs more extractive institutions that in some cases create opportunities to extort bribes and might lead to the opportunistic behavior of the mandated authorities in the veterinary sector. Irregular payments in order to get the animal health inspection done or to speed up the process are likely in Kazakhstan and Uzbekistan, neither likely nor unlikely in Ukraine and highly unlikely in Lithuania. In practice, the timeframe delineated for the compensation of confiscated animals is highly deviating from the legal time limits in Kazakhstan with 180 instead of legally assigned ten days and 45 instead of five legally assigned days in Lithuania. It is likely in Kazakhstan that an animal was confiscated or slaughtered without any investigation or proof of the animal's sickness while highly unlikely in Lithuania and Ukraine and unlikely in Uzbekistan.

3.3.3. MEAT MARKETING

The meat market institutions in meat marketing sector are quite heterogeneous in the sample countries where the informal institutions are overlapping with formal regulations. For example, the distinctive features of slaughter products (e.g. Kosher, Halal meat) is not legally defined in Kazakhstan but still prevail in terms of the meat production. Slaughtering of farm animals in an informal way in not specialized places is highly likely in Kazakhstan and likely in Ukraine and Uzbekistan while highly unlikely in Lithuania. It is likely in Kazakhstan, Ukraine, and Uzbekistan that an animal is slaughtered without pre-slaughter inspection and highly unlikely in Lithuania. Selling meat by entities that are not registered, licensed, or certified is highly likely and likely in Kazakhstan and Ukraine respectively and highly unlikely in Lithuania and unlikely in Uzbekistan. Both in Kazakhstan and Ukraine, it is likely that the authority mandated to issue permits for the sale of meat requires additional documents not specified in the legislation or in the main list of required documents while highly unlikely in Lithuania and Uzbekistan. It is highly unlikely in

Lithuania and Uzbekistan when meat is sold that has not been examined while likely in Kazakhstan. Marketing meat without any documentation is highly likely in Kazakhstan, likely in Uzbekistan and unlikely in Lithuania.

It is worth noticing that assessments by public sector respondents and private sector respondents deviate more than in countries with low perceived corruption. For instance, in Kazakhstan, Ukraine, and Uzbekistan where the informal payments to speed up inspection procedures are more likely, the private sector indicates the high possibility of unregistered and unidentified animals as well as incorrect information reporting to the farm animal database while the public sectors indicate a low possibility of such incidents. In Lithuania, where the informal payments for “quick” veterinary inspection are unlikely, the responses for the public and private sector about the low possibility of unregistered animals correspond to each other.

4. SUMMARY

It is widely believed that a country’s endowment with stronger institutional quality matter to agricultural growth and economic development in general (Binswanger, Deininger and Feder, 1993; Robinson, Acemoglu and Johnson, 2005). However, better indicators for institutional quality are required to address the links between institutions and economic development of agricultural markets systematically. There was no comprehensive and comparable measurement strategy that encompasses all relevant components of meat markets. We overcome several conceptual index-based measurement flaws by proposing an approach to assess the institutional environment of meat markets combining qualitative and quantitative aspects and constructing a newly developed index of institutional quality of meat markets. The index is focusing on legal regulations, standards, and compliance procedures that could be manipulated by a policymaker to foster the design of formal institutions for enabling meat market development. In addition to the aggregate index, we construct sub-indices for specific components: animal registration, veterinary inspections, and meat marketing. To combine data from primary and secondary sources into the overall institutional quality of meat market index we use a distance to frontier approach, pioneered by the World Bank Doing Business initiative, where observed data both from primary and secondary sources in each area of meat markets scored on a binary or ration approach and normalized to the overall index. With this method, we provide a consistent overview of the quality of regulatory practices, their efficiency, and

implementation level of meat market regulations across countries with heterogeneous policy reforms such as Kazakhstan, Lithuania, Ukraine, and Uzbekistan.

We found that the capacity to implement the animal identification and meat traceability along the meat production chains vary across the countries, which differ in their prospects for integrating into global markets beyond the post-Soviet region. In practice, the identification mechanism for farm animals in Ukraine and Uzbekistan is in the process of coordination and at the initial stage of implementation. Animal health supervision, control, and inspections in Kazakhstan, Ukraine, and Uzbekistan are mainly based on the epizootic situation in a country while Lithuania adopted the regulations with an emphasis on public inspection—from top-down supervision and control aligned with the Hazard Analysis and Critical Control Points norms. In Kazakhstan, Ukraine, and Uzbekistan the veterinary services are less transparent with different degree of likelihood for rent-seeking opportunities of the implementing agencies. In Kazakhstan, there are cases of livestock holders' property right violation while confiscating the sick animals due to unclear regulations and evidencing of livestock theft. The analysis shows that in countries where GOST-based systems prevail, the compliance to standards is less implementable that has a potential impact on the large informal sector.

Following all perspective, we can assume that in countries where the formal regulations are less implemented and enforced the agent does not conform to the rule due to high transaction cost imposed by bureaucracy and uncertainties due to corruption. Thus, the expected utility from breaking the rule is higher than the expected utility of rule-conforming behavior. We propose the following recommendations to reduce such uncertainties and transaction cost. The number of controlling agencies in veterinary and quality management should be reduced in order to avoid overlaps in areas of responsibility. The access to relevant information and the need for specialized language skills should be improved in Kazakhstan because some requirements in legal documents are written in English. To avoid such drawbacks, the rules should clearly state the meaning of the terms and do not use a foreign language without the interpretation. An independent body should guarantee that the meat produce adheres to the required meat quality and safety standards that are important not only for the domestic consumption and food safety but also for accessing foreign markets. For instance, the distinctive features of slaughter products (e.g. Kosher, Halal meat) should be legally defined. The internet has a huge potential

to enhance transparency everywhere, reduce incentives for corruption, save travel and increase access to information. Property rights should be strengthened in order to abolish illegal animal confiscation or animal slaughter. The rules on animal compensation should clearly state the criteria under that a farm animal can be confiscated or forced for sanitary slaughter. The rules should limit the authority of local veterinarians to make the self-decision on animal sanitary slaughter. The rules should assign more investigation and laboratory tests before making such extreme decisions. In addition, in the upcoming future, Kazakhstan and Uzbekistan should develop and adopt the legal framework that provides a mechanism for an insurance program for farm animals to decrease the abuses of the reimbursement regulations and increase the responsibility for the health of the animals.

Overall similar regulatory practices on paper in Lithuania, Kazakhstan, and Ukraine result in different institutional environments due to the way of implementation. In Lithuania where regulatory practices are efficient, the legislation facilitates inclusive meat market institutions while similar legislation in the other two countries is only partially enforced nurturing an extractive institutional environment where different forms of corruption exist. In Uzbekistan, formal institutions are less internationally harmonized hampering meat trade and the development of internal meat businesses. To sum up, by overcoming previous data limitations, the newly developed index allows for consistent cross-country comparison and detects similarities and bottlenecks for sustainable development of meat-related agribusiness and can be applied to other countries.

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