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Increasing the Competitiveness of the Dairy Supply Chain in Ukraine: Role of the Gov- ernment

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In 2012 Ukraine experienced two flashes of dairy trade disputes with Russia. First time in February and then in early fall Russia suspended imports of cheese from several Ukrainian dairies. The formal reasons for trade restrictions from Russia's side were ensuring food safety and quality. As Ukraine exports about 40% of its dairy products, and about 70% of these exports goes to Russia, this dispute has been quite critical for the sector. This has not been the first dairy conflict in the history of both countries since the break up of the Soviet Union, nevertheless Ukraine keeps exporting its dairy exports mainly to Russia. This reflects not so the failure of the sector to learn the lesson and diversify its dairy exports' structure, but rather more fundamental and persistent problems that inhibit the sector from increasing its competitiveness and diversifying its exports accordingly.

These fundamental and persistent problems include: i) shortage of human capital, ii) limited access to credits, iii) limited access to modern agricultural technologies, iv) not reliable budget support programs, v) inefficient taxation system in agriculture, vi) rigid, outdated and overly complex food safety and quality system, More fundamental problem is, however, a strong misconception of the Government of Ukraine (GoU) and policy makers about the linkages in the dairy supply chain and about appropriate policy measures to foster the development of the whole supply chain. Minimum raw milk farm-gate prices have been one of the many evidences of this misconception. Negative economic consequences of this measure for the whole supply chain are well documented in the economic literature. Nevertheless, last spring minimum prices were introduced against the background of the dairy conflict with Russia. This spring already two draft laws¹ suggest introducing minimum raw milk prices. Other examples of inadequate government measures are abound and, unfortunately, are rather a rule than an exception.

Generally speaking this puts under the threat the sector's growth perspectives even when world dairy markets are expected to stay bullish and offer splendid opportunities, e.g. see the OECD Agricultural Outlook (OECD, 2012). At the same time the international prices for feed crops, fuel and fertilizers are likely to increase as well. The net impact of high dairy output and input prices on dairy sector competitiveness will depend on how efficiently inputs are converted into output along the dairy value chain, i.e. on efficiency and productivity growth. In this regard the following steps should be taken to tackle the fundamental problems of the dairy value chain and boost its efficiency and productivity:

i) Re-assessing the role of agricultural education and research system as well as the scope for reforming this system would have positive long-run effects as human capital plays a vital role in modern agriculture in determining productivity and competitiveness.

ii) By committing to non-interventionist trade and agricultural market policy the GoU would gain back a trustworthy from the sector and eliminate a sizable risk from the sector.

¹ Draft laws # 2297 as of 14.02.2013 and # 2297-1 as of 27.02.2013

iii) Complete refusal from minimum farm-gate raw milk prices would allow the dairy sector to reap the greatest benefits from the bullish world dairy market, would force inefficient farms to improve their production efficiency and reduce costs or exit.

iv) Taxing the profits of agricultural enterprises and treating agriculture/dairy farming the same as other sectors rather than supplying them with preferential Fixed Agricultural Tax would have positive long-run effects, as it is impossible to efficiently manage a modern agricultural enterprise without detailed and accurate accounting. Also, the privileged taxation of agriculture does not come at no cost since other sectors must be taxed correspondingly more to maintain a given level of budget revenues.

v) Improving access to credits via widely used instruments as: microfinance, co-operative banks, credit guarantee schemes, and supply chain financing. More important, however, commitment to non-interventionist trade and agricultural market policy (see ii above) will eliminate a sizable risk from investments in agriculture/dairy supply chain. Legally required professional bookkeeping systems coupled with investments in education and training for the bookkeepers would tackle the problems of the lack of creditworthiness, financial illiteracy of farmers, lack of sector-specific knowledge with the loan officers in the banks.

vi) Complete refusing from Import Substitution Policy would foster competition and better access to new agricultural technologies. International experience of pursuing Import Substitution Policy proved to be a failure. Coupled with different problems, in the end, the countries pursuing this policy grew more slowly than the others, not adopting it. Moreover, this policy is against WTO rules as it clearly discriminates among domestic and foreign products. As far as agricultural machinery and equipment are concerned, the discrimination between domestic and foreign agri-machinery and equipment in the state support programs should be eliminated.

vii) Harmonization with international food safety and quality standards, streamlining and simplifying regulatory procedures is critical for penetrating other dairy markets and diversifying Ukrainian dairy exports.

viii) Facilitating the development of agricultural cooperatives could decrease the costs of collection and transportation; improve the quality of raw milk, support household and small dairy farms.

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INTRODUCTION

In 2012 Ukraine experienced two flashes of dairy trade disputes with Russia. First time in February and then in early fall Russia suspended imports of cheese from several Ukrainian dairies. The formal reasons for trade restrictions from Russia's side were ensuring food safety and quality. In particular, Russia explained the ban of cheese imports by violations of dairy technical standards by selected Ukrainian producers. As Ukraine exports about 40% of its dairy products, and about 70% of these exports goes to Russia, this dispute has been quite critical for the sector. It also demonstrated how vulnerable the sector is and showed the need for a diversification of Ukraine's dairy exports.

The dairy trade dispute between Russia and Ukraine is not the first one in the history of both countries since the break up of the Soviet Union. In 2006 Russia banned Ukrainian dairy imports when the share of Russia in Ukrainian dairy exports exceeded 75%. That year the share dropped to 42%, but slowly recovered afterwards to the pre-conflict level and reached 71% in 2011. This reflects not so the failure of the sector to learn the lesson and diversify its dairy exports' structure, but rather more fundamental and persistent problems that inhibit the sector from increasing its competitiveness and diversifying its exports accordingly.

This dispute has also demonstrated a fundamental misconception of the Government of Ukraine (GoU) and policy makers about the linkages in the dairy supply chain and about appropriate policy measures to foster the development of the whole supply chain. Minimum raw milk farm-gate prices have been one of the many evidences of this misconception. Negative economic consequences of this measure for the whole supply chain are well documented in the economic literature. Nevertheless, almost each year when the prices start their 'bearish season' (due to the pronounced seasonality of the raw milk supply in Ukraine), policy makers come up with this suggestion under the pretext of politically beneficial excuse. Last spring minimum prices were introduced against the background of the dairy conflict with Russia. This spring already two draft laws² suggest introducing minimum raw milk prices. Other examples of inadequate government measures are abound and, unfortunately, are rather a rule than an exception.

This misconception is also clearly articulated in the Sector Program for Dairy Farming Development until 2015³. While the Program identifies crucial issues in the dairy farming, it fails to put it in a broader picture of the whole dairy supply chain, as if raw milk were exported directly from dairy farms. Generally speaking such a short-sighted vision of policy makers puts under the threat the sector's growth perspectives even when world dairy markets are expected to stay bullish and offer splendid opportunities, e.g. see the OECD Agricultural Outlook (OECD, 2012).

In this paper we try to provide a comprehensive look at the dairy supply chain articulating the key problems at each of its stages and what is the role of the GoU in addressing them to facilitate the growth of the entire dairy supply chain. In the following section we discuss the key facts about the Ukrainian dairy value chain. We then discuss the key problems in the dairy value chain. Section 3 focuses on the role of the GoU in addressing the key problems.

² Draft laws # 2297 as of 14.02.2013 and # 2297-1 as of 27.02.2013

³ Order of the Ministry for Agricultural Policy and Food #886/128 as of 10.12.2007

1. KEY FACTS ABOUT THE DAIRY SUPPLY CHAIN

Overall reduction of herd size and raw milk output...

Production of raw milk in Ukraine decreased from about 24.5 m t in 1990 to nearly 11 m t in 2011, i.e. by more than 50%. The share of dairy farming in the total agricultural output, though, decreased from 17.2% in 1990 to 11.9% in 2010, reflecting the restructuring processes within agriculture over transition period. Reduction of raw milk output could even be more pronounced, had not the sector experienced gradual yield improvements. Against a background of dairy herd fall (from more than 8 m cows in 1990 to 2.58 m cows in 2011), the annual milk yield per cow increased from 2.86 t to almost 4.17 t.

... and growing but still low cows' productivity

Despite evident growth, the productivity of cows in Ukraine is still very low per lactation compared with western standards. The average productivity of a cow in Germany, for example, is in the range 6-7 tons/year and 11-12 t/cow in Israel. As Figure 1a) in the Annex shows, some dairy farms in Ukraine are able to reach average German and even Israel's yields. Compared with its competitor Belarus, as Figure 1a) in the Annex demonstrates, Ukraine is a bit disadvantaged in cow productivity vis-à-vis Belarus. The distribution of milk yields in Belarus is less variable and centered over the higher yields. The maximum milk yields in Belarus, however, reaches at approximately 9t/cow per year, while some dairy farms in Ukraine exceed 12 t/cow in 2010.

Large share of households in total raw milk supplies...

Annex

Table 1 in the Annex shows a large the share of households in the total volume of raw milk in Ukraine. The share was 24% in 1990, it gradually reached its peak 82.2% in 2007, and decreased to 79.7% in 2011. In contrast to Ukraine, for example, 87% of the total volume of raw milk in Belarus was supplied by farms (Nivievskiy and von Cramon-Taubadel, 2011). The prevalence of households in total raw milk supply in Ukraine adds costs to the dairy value chains in these countries because it implies a difficulty to capture economies of scale both in dairy farming and in the industries up- and -downstream from dairy farming. Many small households are not able to guarantee a large and stable supply of high quality milk to dairies in the same way as a small number of large farms can.

... as a result, pronounced seasonality in raw milk supplies

As Figure 2 in the Annex shows, the raw milk supply by households in Ukraine has a pronounced seasonal pattern. This concerns not just seasonality of supply, but seasonality of raw milk fat and protein content. Milkfat content of the off-season raw milk (when supply is short) is usually higher than during the high supply season. Seasonality of raw milk supply has a big impact on dairy processors' strategies and costs. In the summer there is a sufficient supply, and the quality of this milk can be reasonably controlled. However the supply falls dramatically in the winter, so the processors are willing to pay more, even for milk of lower quality, to ensure enough raw material supply. Clearly, dairy processors would prefer more stable pattern of raw milk supplies.

... as a result, fragmented and expensive raw milk supply to processors

Strong external demand for dairy products and falling domestic raw milk supply (see above) has been constantly increasing a competition for raw milk supplies among dairy processors. In fact all the experts in the sector admit a current deficit of raw milk supplies for loading the existing processing capacities. Processing capacity utilization has been at 60-65 (UCAB, 2012). This increased competition fueled the domestic raw milk farm-gate prices (adjusted for quality) above European and world levels. As Figure 4 in the Annex shows, only Russia's farm-gate prices exceed the Ukrainian ones. Clearly this puts Ukrainian dairy value chain at disadvantage vis-à-vis its competitors.

Prevalence of households in total raw milk supplies magnifies the problem. First, dairies additionally have to account for costs of collecting raw milk from households. As households are scattered spatially, sometimes the radius of procurements for some big processors reaches 150-200km. Clearly this procurement is costly and usually makes up 25-40% of the raw milk price (UCAB, 2012).

In general, the interaction between raw milk suppliers and dairies has been developing along three schemes (UCAB, 2012). First scheme is cooperation via milk cooperatives. The members of cooperatives might be either households or farms. For example, Danone has been operating its Milk communities project that aims at creating 20 milk cooperatives, each including between 20 to 80 households that are located in procurement regions of Danone plant in Kherson. The project has been implemented by the Heifer International and financed by Danone Ecosystem Fund (BFC, 2012). Over the last couple of years Danone via Heifer International has invested over 1 m euro in development of 23 milk cooperatives. Investments were channelled into improvement of milk procurement and production, advised on herd replacement and feeding practices (UCAB, 2012).

Second, dairies have been securing raw milk supplies via cooperation with large livestock farms where agriholdings play a key role. Some agriholdings have been specialising in dairy cattle (e.g. Astarta, Agro Alfa, Industrial Milk Company) while the others have diversified production portfolio with dairy cattle playing a significant role (e.g. HarvEast, Myronivskiyi Hliboproduct, Ukrros, etc). Danone could be also used as an example here. The company has established long term cooperation with Astarta that foresaw joint investments in dairy farming (UCAB, 2012).

Third scheme is raw milk supplies in vertically integrated structures. Company Terra-Food could be used as an example here. This giant structure combines 10 meat-and-milk processing companies, 15 agricultural enterprises combined in agriholding "Zelena Dolyna" (Green Vaile). Concern "Roschen" has also been using this scheme of raw milk supplies (UCAB, 2012).

Shrinking raw milk supplies from households or between-groups restructuring...

As it has been already mentioned above, dairy farming has turned now into the situation of shrinking raw milk supplies from households and increasing the supplies from dairy farms. There are different drivers for shrinking supplies from households. Shrinking and aging of rural population is probably the most important driver among the others. One might also add in here shrinking areas for grazing. Fewer and fewer uncultivated fields is left for pastures as Ukrainian agriculture expands and includes the abounded land

in cultivation. Better management practices leave less opportunity to households to benefit from using the feedstocks or by-products from agricultural enterprises. Also the notorious problems with households as expensive milk collection and ensuring good quality (see discussion above), contribute to this pattern (UCAB, 2012).

... with pervasive within-groups consolidation

Against the background of this between-groups' restructuring process, one can also observe a within-group restructuring. The household segment of dairy farming sector has been in a process of enlargement and transformation into family and peasant farms. For example, according to the State Statistic Committee of Ukraine (Ukrstat) the share of households with 4 and more cows has increased from 0.3% in 2005 to 1.2% in 2010, while the share of households with only 1 cow has decreased from 79.7% to 76.6% over the same period. Similarly in the dairy farms segment, the number of dairy farms has been decreasing against the background of growing size. Figure 2 in the Annex demonstrates a direct effect of this process. The seasonality of households' monthly raw milk supply has been leveling off over the last decade, its standard deviation decreased from 285.8 t in 2005-2006 to 211.3 t in 2010-2011. Much better improvements in seasonality, however, have been observed on dairy farms. It has decreased almost by 50% over the same period, i.e. its standard deviation decreased from 54.5 t in 2005-2006 to 29.1 t and in 2010-2011.

Dairy farms in Ukraine are relatively large (see Figure 1b in the Annex). Unlike in Belarus (Nivievskiy and von Cramon-Taubadel, 2011), where most frequently observed herd size of dairy farms is in the range between 700 and 800 cows, in Ukraine this figure is in the range 50 to 100 cows. Furthermore, dairy farms in Ukraine have been further consolidating. One of the drivers of this process is efficiency/productivity. Figure 1c) in the Annex demonstrates that larger farms tend to have higher milk yields. This relationship, though, is non-linear. Milk yields (logged) increase until the herd size of dairy farms increases to about 700 cows. Above this threshold the relationship between milk yield and herd size becomes statistically insignificant. Figure 1h) in the Annex demonstrates the same relationship between herd size and gross margins. Gross margins increase until the herd size of dairy farms increases up to about 700 cows and the association becomes insignificant afterwards. This empirical observation supports the thesis that the scale does matter in dairy farming and more efficient and profitable production is achieved on larger dairy farms. But it is hardly possible to advice on 'optimal' herd size. Managers should find their own profitable 'optimal' size, driven by numerous factors. As the empirical evidence shows, 500 cows' farm can be as efficient as the 1500 cows' farm.

Low quality of raw milk supplies

The quality of raw milk has been one of the major problems in Ukraine. Table 2 in the Annex contrasts the milk quality standards for food production in Ukraine, the EU and the USA. Second grade milk is not used for food production at all in the EU and USA. As UCAB (2012) reports, the share of such milk in total raw milk deliveries to dairies in Ukraine has dropped to 4.1% in 2010. Raw milk of the 1st grade has been dominating the deliveries, though its share has dropped from 73.4% in 2005 to 59.3% in 2010. The

share of the highest grade milk has increased from 16.9 in 2005 to 31.3% in 2010. Raw milk of the Extra grade, which is comparable to the EU standards, made up only 4.4% in the total raw milk deliveries to dairies in Ukraine in 2010, but its share has been gradually increasing (UCAB, 2012). The problem of quality is especially acute with households as it is difficult to ensure a homogeneous quality of milk from so many households.

Low milkfat and protein content in Ukrainian raw milk is another issue. The content of fat is important in butter production, while protein content is important in cheese production. As Table 3 demonstrates, the fat content of raw milk in Ukraine is 0.6 p.p. lower than in Germany and 0.8 p.p. lower than in the Netherlands. The protein content in Ukraine's milk is 0.4 p.p. (13%) lower than in the EU and New Zealand. This adds costs to the entire dairy value chain as it increases processing costs per unit of output by roughly the same proportion.

Extensive fodder production

As the Figure 1d) in the Annex shows, feed accounts for the largest share of milk production costs of dairy farms. In most of the cases its share in total costs is in the range of 40-60%, with the average about 50%. This is somewhat higher than 46% in the EU (IFCN, 2011) in 2010. Moreover interesting, is that not only feed account for the highest share of total costs, it also appears to account for a highly variable share of the costs from farm to farm. This suggests that some farms are able to reduce their feed costs considerably compared with others, which implies potential efficiency gains. As the Figure 1e) in the Annex shows the (logged) milk yields increase as the dairy farms increase the share of feed in total milk production until approximately 50% (0.5). Above this threshold the relationship between milk yield and share of feed turns into negative, indicating either these farms spend too little on other inputs, or that they feed very inefficiently. This relationship is not unique for Ukraine; exactly the same pattern is observed in Belarus (see Nivievskiy and von Cramon-Taubadel, 2011)

Dairy farms mostly produce their own feed, which is often of low quality (Milk and Farm, 2012). Fodder production for dairy cows on Ukrainian farms generally takes place on a very extensive basis. Crop yields in Ukraine lag behind that in the EU and the land requirements for dairy farming are relatively high in Ukraine. Optimizing feed production for dairy cows could reduce the corresponding land requirements by roughly 30-50%. So the opportunity costs of extensive feed production are high.

Far from optimal feeding practices

Feed rations are far from optimal in Ukraine (Milk and Farm, 2012). Dry matter is used as an indicator of the amount of nutrients in a particular feed. The reference efficiency of transforming the dry matter in raw milk is 1.4-1.5 of milk per 1 kg of dry matter. A good farmer receives more milk from a kilogram of dry matter than a poor one. The average conversion rate for Ukraine is in the range of 0.76-0.8 kg of milk per 1 kg of dry matter (Milk and Farm, 2012). Improving feed rations and feeding practices could increase milk yields and decrease the production costs of dairy farming.

Fluctuating dairy products output

As the Table 4 in the Annex shows, whole-milk and fermented milk products dominate the structure of the dairy products output in Ukraine. They are consumed mainly domestically, whereas cheese and butter are exported. From 2000 to 2007 dairy processing sector was one of the most vibrant sectors in the economy and was able to double its output in that period. Since then, however, as Ukrstat reports, the pattern reversed and the average annual rate of sector contraction has been about 5.3%. In 2010 the share of dairy sector output in total food sector output made up 12%. As the Table 4 in the Annex shows, the contraction has been observed almost in all segments of the dairy products sector. Against this background one can observe a gradual restructuring of the sector that essentially follows world patterns covered below. In particular there has been a contraction of the quantity of dairies as well as their consolidation. The total number of dairy dropped to 210 in 2011 with only 1-2 dairies left in some of the regions. On the other hand, big operators expand so as 20 biggest operators occupy more than 75% of the dairy market. Processing capacity utilization has been at 60-65 % (UCAB, 2012).

Risky dairy exports structure

About 20% of the raw milk in Ukraine that is delivered for processing is exported in processed form (see Annex

Table 1 in the Annex), giving dairy sector a visible role in Ukrainian foreign trade, accounting for approximately 1% and 4.6% of all total and food exports in 2011, respectively. Cheese and to a lesser extent butter have been dominating the country's dairy export structure. About 40% of the cheese production in Ukraine was exported in 2011. Imports of dairy products to Ukraine have been growing, for example one can observe a 10% increase in 2011 compared to 2010. The volume of dairy imports is remarkable (about USD 150 m in 2011), but still far less than dairy exports.

While the growth of dairy exports shown in Figure 3 in the Annex is very encouraging, the structure of Ukrainian dairy exports reveals a serious weakness, namely a strong focus on Russia as a trading partner. As Figure 3 shows, the share of Russia in Ukrainian dairy exceeded 75% in 2005 and then dropped to 42% in 2006, when Russia banned Ukrainian dairy imports. After that the exports to Russia have been recovering and reached 71% in total Ukrainian exports in 2011. This underlines the dependence on Russia and the fact that the 'milk war' has not, at least so far, led to sustainable diversification of Ukraine's dairy export portfolio.

For a number of reasons the dependence of Ukrainian dairy exports on Russia appears quite natural. First, Russia is a large market with a deficit in dairy products. Demand in Russia is projected to increase further. The most recent OECD-FAO Agricultural Outlook foresees that world dairy prices will remain high and that Russia will remain a key and growing importer of cheese and butter (OECD, 2012). Second, Russia and Ukraine are traditional trading partners with similar and in some respects identical quality and food safety standards.

The EU market is the largest single market in the world and it directly neighbors Ukraine. Hence, it could represent an alternative for the Ukrainian dairy sector to expand and diversify its dairy exports. However,

policy makers and consumers in the EU are extremely concerned about food quality and safety and will under no circumstances make concessions to non-EU countries with regard to quality and food safety standards (Hess et al, 2009). Moreover the EU dairy sector is able to supply more milk than is currently consumed in the EU. To be able to export dairy products to the EU, Ukraine would have to attain so called 'third country' status. At the moment Ukraine does not have this status in dairy products for food consumption (Commission Regulation (EU) # 605/2010) thus it cannot export dairy products for food consumption to the EU. The procedure for getting this status is well defined and described by the EU Commission⁴.

In this situation, Ukraine would be well-advised to diversify and expand its dairy export structure by targeting developing and emerging economies that are less demanding in terms of food security and quality standards. The demand for dairy products is expected to remain especially strong in the North Africa, Middle East and East Asia (OECD, 2012).

It is important, however, to keep in mind the changing paradigm of the world dairy markets. Domestic and international trade policy reforms (e.g. WTO, changing CAP in the EU) have shifted international dairy markets from a supply driven paradigm (with oversupply and depressed prices) to a more demand driven paradigm (OECD, 2011). Growing global population and increasing incomes (especially in developing and emerging economics), increase food demand but also shift it towards higher valued food and to livestock products (including dairy products). In addition, dairy markets are driven by westernizations of diets and the increasing range of dairy products. In particular, dairy producers nowadays have to account for a growing awareness of consumers regarding their health and wellness. As a result dairy producers face stricter food safety and quality standards.

2. KEY PROBLEMS IN THE DAIRY SUPPLY CHAIN FOR THE GOVERNMENT

Shortage of human capital

Many sources report about a glaring shortage of human capital in the sector in particular, and in agriculture in general (see e.g. Koester et al, 2010; OECD, 2012b). These sources mention about the shortage of adequately trained young Ukrainians at all levels of qualifications. In most cases the current farm managers adhere to agronomic practices that are far from optimal or rarely make the best possible use of the scarce capital that is at their disposal. This results, in particular, in extensive fodder production. Dairy farmers, for example, highlight problems in recruiting veterinarians, especially in rural areas (OECD, 2012b). Even when technical specialists are available; their technical skills might not be aligned to international best practices. This leads, for example, to inadequate feeding and, as a result, to inadequate cows' welfare and lifespan, low productivity and low quality of output.

Poor management also contributes to a lack of capital, because creditors will be very hesitant to lend

⁴ See http://europa.eu/legislation_summaries/food_safety/veterinary_checks_and_food_hygiene/sa0020_en.htm

money to a farm that has consistently underperformed and is manifestly poorly managed (see below). Trying to respond to these challenges, some large farms/holdings have their own on-the-job training and agricultural schools where they train their own technical staff. See, for example, projects like the Agrischool by the UCAB⁵.

The shortage of human capital not only detracts from competitiveness at the farm level. Producers and agri-food businesses lack knowledge of markets and marketing, including quality requirements in target markets and how to work towards fulfilling these requirements on the farm and in the food chain. And public institutions, such as the ministries responsible for identifying policy needs and formulating and implementing appropriate responses, suffer from a lack of the necessary analytical capacity and in particular the ability to distinguish between private and social costs and benefits.

Von Cramon-Taubadel and Nivievskyi (2011) find Ukrainian agricultural economists isolated from the international agricultural economics community, with almost negligible rates of publications and participation in the top international journals and conferences, respectively. This suggests that the agricultural research and education system as a whole in Ukraine has not managed to keep up with international standards.

Limited access to financing

Numerous sources report about the poor access to finance for agribusiness in general and for dairy sector in particular (e.g. IFC, 2011; OECD, 2012b; BFC, 2012; LRB, 2013). This deters necessary investments into new technologies, equipment and expertise. For example, IFC (2011) investment climate survey reports that 75% of firms in the agribusiness sector report poor access to finance as a key barrier to further expansion and investment. Internal self-financing in the form of retained earnings (60%) and personal savings (13%) remains the most prominent source of funding among agribusiness enterprises. External financing through bank credit (28%) and trade/supplier finance (5%) rarely appears to be a viable option for agribusinesses. Moreover lenders in Ukraine are biased against small- and medium-sized agribusinesses. Even IFIs dedicated to SME finance prefer the large-scale finance of agri-holdings and large food processors in their portfolios (BFC, 2012). The most often cited reasons for problems associated with agricultural finance are: 1) lack of creditworthy borrowers, 2) lack of professional bookkeeping and financial literacy of farmers, 3) lack of collateral, 4) sizable risk of the GoU interventions with mainly negative consequences for farmers, 5) lack of sector-specific knowledge with the loan officers in the banks to adequately assess the risks of doing agribusiness and agribusiness loans applications (see BE, 2011 and BFC, 2012). All these problems result in high cost of borrowing that is especially detrimental for small and medium-sized farms' development.

Limited access to modern agricultural technologies

Coupled with limited access to financial market, excessive regulatory and policy environment in Ukraine further limits the access of Ukrainian agricultural sector to modern agricultural technologies. Recently

⁵ <http://www.agribusiness.kiev.ua/en/service/1327578347/>

released Doing Business (2013) report rather eloquently assessed the general regulatory environment in Ukraine and ranked it 137 among 185 economies. Ukraine's neighbors in this ranking are Lesotho, Philippines, West Bank and Gaza, Ecuador provide "more than enough" understanding about the regulatory barriers to business development in Ukraine.

...to modern seeds varieties

Talking specifically about dairy supply value chain, its competitiveness is closely related to productivity and efficiency of fodder production. Moreover, as we have mentioned it already before, dairy farms mostly produce their own feed and its production takes place on extensive basis. In this relation the genetic potential of seeds, adapted to the local agro-climatic environment, is of high importance to improve the productivity of fodder production and to make it more cost-efficient. Given the deficiencies in Ukraine's agricultural research system (see above), there is an increasing need for imports. However, Ukraine employs a tedious and costly testing and registration system for imported seed varieties, increasing the transaction costs for producers. Not only that testing and registration is quite costly⁶, it significantly delays delivery and application of modern seeds varieties in Ukraine. Usually the leading R&D companies in the seed business try to commercialize in Ukraine the varieties that have been in use for a couple of years already, e.g. 2-3 years. According to Ukrainian legislation, it should take 3 more years to test and register new variety in Ukraine. In reality, however, due to different delays and obstacles, it might take 4 to 5 years. Summing it up, the new seed varieties come into Ukraine with at least 5 years delay.

...to modern agricultural machinery

Lack of physical capital is one of the key constrains for more intensification of agriculture in Ukraine. According to the FAO estimates, Ukrainian farmers have only 48- 66% of various kinds of agri-machinery they need to ensure timely farm operations; nearly 80% of existing agri-machinery has depreciated and needs immediate replacement. As far as dairy farming is concerned, Ukrainian farmers urgently need modern agri-machinery and equipment to increase the feed yields and decrease the feed costs. Comparing the statistics on imports of foreign machines and equipment and on sales of domestically produced ones, indicates that Ukrainian farmers usually prefer the imported agri-machinery and equipment. In fact the imports of new and used agri-machinery and equipment demonstrate an exponential growth (AFPR, 2012a). For various reasons, domestic production of agri-machinery has clearly not been able to keep up with imports. Despite this, the Government of Ukraine has been supporting exclusively the purchase of domestically produced agri-machinery and equipment. It does this via: i) financial leasing mechanism through the state-owned company Ukragroleasing, ii) 30% compensation of the costs of domestic agri-machinery to farmers, and iii) credit concession program for purchase of domestically produced agri-machinery and equipment. In another words, the Government stimulates the purchase of less efficient domestic technologies in pursuit of substitution imports with domestic production. Talking specifically about dairy supply chain, in this way the Government increases the costs of agricultural machines and

⁶ According to market players' information, the cost might well go beyond \$10 000.

equipment to farmers and slows down intensification of feed production and decreases the competitiveness of the entire dairy supply chain in Ukraine.

In general it seems that the new Government has taken a direction to a so-called Import Substitution policy⁷. International experience, however, demonstrates that this policy (pursued by Latin America countries before 1980s) proved to be a failure as it was industry-focused and neglected agriculture and service sector. Higher import duties increased agri-machinery costs for farmers. The policy also led to inefficient state-owned enterprises without a need to upgrade its efficiency in the protected environment. New industries did not become competitive. Above all such a policy led to fiscal deficits and inflationary pressures. In the end, the countries pursuing this policy grew more slowly than the others, not adopting it. Moreover, this policy is against WTO rules as it clearly discriminates among domestic and foreign products (AFPR, 2012a).

Inefficient state support and taxation

... livestock budget support programs are not reliable

Livestock budget support programs include rather broad range of measures, e.g. animal subsidy (slaughter subsidies per young head (cattle) with minimum weight threshold; subsidies for ecologically pure milk for producing childhood nutrition, wool; special animal subsidy (for increments in cattle meat, milk or combined productivity; payments for pedigree cattle bred or purchased; payments for young cattle purchased from households or kept by households; per head subsidies for meat cattle; cattle identification and registration). The program of establishing livestock production facilities has been on policy agenda since recently. Livestock producers who have finished the construction and put into operation in 2009-2010 livestock production facilities of no less than 500 heads of cattle or 1200 sows or 1 million heads of poultry are eligible to receive a partial refund from the government not exceeding 50% of the incurred expenses. Dairy facilities and energy-saving technologies receive priority allocations.

The most heavily used and advocated channel of state support in dairy value chain has been *top-ups to raw milk producers from VAT accumulated by processors*. Omitting the details of the support scheme, in general raw milk producers receive top-ups for every litre of raw milk delivered to dairy processors. These top-ups are being paid from VAT accumulated by dairy processors.

The government allocated significant sums to finance these programs. In 2007-2008 budget allocations to livestock programs exceeded the record level of 2 bn UAH (or about 5% of the livestock output in 2007) but significantly declined afterwards. Irrespective of the sums allocated, the main problem with these support measures is that they have not been reliable and farms cannot account for them in their production and financial plans. The set of measures and the sums vary not only from year to another, but also within the same fiscal year. This results in constant underfinancing and lack of trust in the GoU

⁷ Vice Prime-Minister Mr. Arbutov asserts this to be the priority for the Government, see the Business magazine #7 (1046), 18/02/13 (<http://www.business.ua/archive/46189/>)

support measures (AFPR, 2013). Pervasive corruption and selectivity in allocation of these sums make them virtually useless for the sector development in general.

The top-up regime has not got any trust either, for the Government has been in constant attempt to modify it. In 2011 the mechanism was changed for per head payments from the budget but it was revived in 2012 due to a massive underfinancing and critique from the sector operators.

... inefficient taxation system in agriculture

Agricultural taxation system consists from the Fixed Agricultural Tax (FAT) and from the special value added regime in agriculture (AgVAT). These two taxes leave agriculture largely untaxed (see AFPR, 2012b). The FAT is a flat rate tax that replaces a number of taxes and duties, including profit and land taxes. Its rate varies from 0.09 to 1% of the normative value of farmland, depending on farmland's type and location. In 2010, the FAT resulted in an average tax payment of only roughly 6 UAH/ha (0.75 USD/ha) of arable land that leaves farm profits in Ukraine essentially untaxed. This encourages the formation of vertically integrated enterprises that combine agricultural and highly profitable non-agricultural activities to effectively reduce taxation liabilities (as long as agriculture accounts for at least 75% of gross revenue). The simplicity of the FAT without the need to maintain detailed bookkeeping systems is attractive. This reduces, however, ultimately their productivity and creditworthiness, because it is not possible to efficiently manage a modern agricultural enterprise or get a loan without detailed and accurate accounting.

According to the AgVAT regime, farmers are entitled to retain the VAT received from their sales to recover VAT on inputs and for other production purposes at the discretion of farmers. In 2010, the benefits from the AgVAT accrued to UAH 11.1 bn (USD 1.39 bn). The AgVAT, however, is one of the main reasons for VAT refunds arrears to exporters that pass this on the farmers in the form of reduced farm gate prices (by 10% on average).

... counterproductive intervention with minimum farm-gate prices

Last August the GoU introduced minimum farm-gate prices for raw milk at the level of UAH 2.2 per kilogram (without VAT). This initiative came out as a response of the government to the 'bearish season' of the raw milk prices. Because of the seasonality of raw milk supply, seasonality of prices has been nothing extraordinary for the market players. Last spring, however, this pattern has been accompanied by a "cheese war" with Russia that has made the whole issue politically appealing, especially in light of the upcoming Parliamentary elections in August. As a result the GoU introduced minimum prices allegedly to ensure dairy farmers against falling prices. This spring already two draft laws⁸ suggest introducing minimum raw milk prices.

Annexed Figure 1f), however, demonstrates a basic problem with the minimum prices. Minimum farm-gate price UAH 2.2/kg covers the variable costs of almost all the dairy farms and the total costs of more

⁸ Draft laws # 2297 as of 14.02.2013 and # 2297-1 as of 27.02.2013

than half of the dairy farms in 2010. So the minimum prices allow very efficient farms to generate 'above normal' profits, while inefficient dairy farms generated some profits but remained in the sector rather than being forced to improve their production or exit. This prevented the sector from restructuring thus adding the costs to the entire value chain, reducing its international competitiveness and passing the burden of this regulation onto processors and further onto final consumers. Moreover, the minimum price regime were shown to be the least efficient policy instrument for increasing the incomes of producers and it became incompatible with WTO standards (Kuhn and Nivievskyi, 2005).

Rigid, outdated and overly complex food safety and quality system

Food safety and quality system (FS) have important implications for health safety of humans, plants and animals. However, they can also act as trade barriers that impede trade flows, discriminate against foreign producers and reduce competition. IFC (2009) documents that the current largely Soviet-type food safety and quality system in Ukraine does not ensure effective FS control for population but rather undermines Ukraine's export potential and international competitiveness in agriculture and food sectors via significant FS compliance costs.

Main features of Ukraine's FS system are the following (see IFC, 2009; IFC, 2010):

- FS legislation is fragmented and contradictory;
- FS standards and other requirements are outdated, overly-prescriptive, mandatory and product-focused; this, for example, may dictate a specific recipe, type of equipment, or material to use;
- FS control government agencies (several) control the same parameters and lack of appropriate communication or coordination. This results in scattered and overlapping competencies, redundant inspections, and overall inefficient FS control.
- FS control is based mainly on the 'end-of-pipe' principle, whereby pervasive sample collection, compulsory certification, and frequent on-site inspections are implemented instead of a comprehensive and robust risk based control system throughout the production process (such as HACCP – hazard analysis and critical control points);
- Testing laboratories mainly do not meet the requirements of the EU and other industrial countries;
- Lack of a well-functioning traceability system to enable prompt recall of unsafe products, identification and sanctioning of non-compliant producers for alleged FS violations.

This results in a situation when a typical dairy value chain ("from farm to fork") needs to (see IFC, 2010):

- comply on average with up to 161 food safety related permits, authorizations, and other regulatory requirements;
- comply with a minimum average of 49 mandatory product standards for each dairy product;
- comply with a minimum of 52 orders and mandatory guidelines from the Ministry of Health and other supervision agencies for each dairy product;

- comply with a total of 112 prescribed testing methods, in spite of the fact that 63% of them are not in line with international best practices;
- receive repeated and overlapping inspections from seven different inspecting agencies.

Quantitatively the food safety compliance in Ukraine results in significant costs for business. For example, according to the IFC (2010) estimates, the FS compliance costs for a typical export-oriented dairy supply chain in Ukraine made up USD 2.24 m in 2010. As there are about 17-22 such chains in Ukraine, it results in USD 38-49 m or roughly 9% tax on Ukraine's dairy export in 2010 (AFPR, 2012c). This significantly undermines Ukraine's dairy export potential and competitiveness. The experience of advanced economies, however, has shown that necessary and adequate levels of safety can be achieved without restrictive, inflexible, and highly administrative processes.

Annexed Figure 5 provides a breakdown of the regulatory burden across the various phases of the dairy value chain. The figure demonstrates that import of raw materials, equipment, and final products, raw milk production and procurement, dairy processing, and even dairy export are the most heavily regulated stages of the dairy value chain (IFC, 2010).

- Import is by far the most heavily regulated stage in the dairy chain. This demonstrates the protectionist nature of the certification and recertification procedures and overlapping requirements by all controlling authorities on imported raw materials, equipment, and food products. This has very little to do with the actual safety but actually taxes the sector. In particular, heavy certification requirements on imported equipment slow down the technological progress in the Ukrainian dairy sector which to the disadvantage vis-à-vis European competitors.
- Regulatory burden at the stage of raw milk production, collection, and procurement is driven by two major groups of factors. The first group of factors stands for significant overlaps and duplication of controls and certification requirements between the veterinary (VET) and sanitary services (SES) of Ukraine at this stage of production. The second group stands significant share of households (about 80%) in the total raw milk supply in Ukraine and resulting significant scattered pattern of raw milk production. Dairies have to collect milk from about 12,000 suppliers on average, with associated multiplication of food safety controls and compliance costs.
- Compliance burden with outdated food safety regulation at the food processing stage is primarily driven by the excessive number of mandatory certifications, conformity assessments, and product standards that are imposed by the State Standardization Committee of Ukraine (DSSU). They should be replaced by modern, voluntary, and internationally recognized food quality certification schemes.
- Surprisingly enough, dairy exports are heavily taxed by food safety regulation of export activities. The reason is low level of harmonization of national food safety requirements with internationally accepted standards and systems.

The break-down of the overall food safety compliance burden reveals that staff costs account for a lion share of the overall burden (49%); other types of costs (including consulting services, acquisition costs, and unofficial payments) account for 29%; and only 22% make up the official fees. This represents a 'hidden' food safety control burden that does not necessarily contribute to the official revenues of food safety authorities and to the overall food safety in the country (IFC, 2010).

3. ROLE OF THE GOVERNMENT TO ENSURE A SUSTAINABLE GROWTH OF THE DAIRY VALUE CHAIN IN UKRAINE: RECOMMENDATIONS

Increased international competitiveness provides better opportunities for sustainable growth of the dairy value chain. It improves competitive positions of domestic dairy value chains on domestic and international markets and thus decreases their vulnerability to such shocks as dairy war with Russia.

Two main groups of factors drive international competitiveness: i) technology/efficiency/productivity and ii) prices (von Cramon-Taubadel and Nivievskyi, 2010). According to the 2012 OECD-FAO Agricultural Outlook, dairy prices on world markets are currently high and projected to remain strong in the foreseeable future. At the same time the prices for feed crops are also expected to remain strong, and combined with strong livestock products prices this will likely further boost the prices for fuel and fertilizers. So the net impact of high agricultural output and input prices on competitiveness of dairy sector is not clear.

The net impact of high dairy output and input prices on the competitiveness of the dairy sector will to a great extent depend on how efficiently the inputs are converted into the output along the dairy value chain, i.e. on efficiency and productivity growth. In the section above we discussed the key problems in the dairy values chain that ultimately hamper productivity improvements in the sector. Moreover, the Government should play a crucial role in solving these problems. In this regard the following steps should be taken to boost efficiency and productivity in the dairy value chain in Ukraine:

i) Critically assess the role of agricultural education and research system as well as the scope for reforming this system

Investing in training, education, extension services and applied agricultural research. Modern agriculture is increasingly capital intensive, and especially human capital plays a vital role in determining productivity and competitiveness. The entire agriculture education system, from apprenticeships to technical colleges and universities needs to be overhauled as the managers of agricultural enterprises complain about the shortage of adequately trained young Ukrainians at all levels of qualifications. Domestic scientists are entirely absent from international scientific community, suggesting that the agricultural research and education system as a whole in Belarus has not managed to keep up with international standards.

ii) Commitment to non-interventionist trade and agricultural market policy

This is a crucial condition for successful implementation of the below followed recommendations. As the section above demonstrated the risk of the Government interventions is very high in Ukraine with corresponding negative economic consequences for the market players and loss of trust in the GoU. Therefore, Ukraine should send a clear signal to agricultural producers, traders and customers that it is committed to being a trustworthy source of non-interventionists trade and agricultural policy. To this end it should make a binding 5-year commitment that it will not to interfere on agricultural markets.

iii) Complete refusal from minimum farm-gate raw milk prices

One might consider this recommendation as individual case of the preceding recommendation. Nevertheless in case of the dairy supply chain, we believe it is important to emphasize it explicitly. Minimum farm-

gate prices allow inefficient dairy farms to generate some profits but remain in the sector rather than being forced to improve their production efficiency and reduce costs or exit. This prevents the sector from restructuring, thus adding the costs to the entire value chain and diminishing its international competitiveness. Moreover, in the economics literature the minimum price regime has been shown to be the least efficient policy instrument for increasing the incomes of producers, and it is incompatible with WTO standards.

iv) Taxing the profits of agricultural enterprises and treating agriculture/dairy farming the same as other sectors

Ukrainian agricultural enterprises/dairy farmers enjoy a preferential FAT. Its main advantage is it eliminates the need for detailed bookkeeping systems for tax purposes. On a closer examination, however, this advantage of the FAT is actually a disadvantage. It is impossible to efficiently manage a modern agricultural enterprise without detailed and accurate accounting. In the long run, the introduction of international bookkeeping standards would benefit farmers since it would help them make better production and marketing decisions, increase their efficiency and productivity, and thus increase their outputs and revenues. Also, the privileged taxation of agriculture does not come at no cost since other sectors must be taxed correspondingly more to maintain a given level of budget revenues.

So coupled with recommendation (iii), the government should announce the date for implementation of the system of taxation based on actual profits/incomes in agriculture – growth stimulating taxation. At least two years should be given for a smooth transition to this system. Two years' advance warning will provide agricultural enterprises with enough time to adapt to the new system and in particular to adopt the bookkeeping practices that it will require. The FAT could be retained for small farmers.

The special VAT regime for agriculture should also be abolished with a minimum two years' advance warning. Agriculture should be treated as a "normal" sector of the economy and thus become part of the general system of VAT.

v) Improving access to credits

There are several ways to support the access of agricultural enterprises/dairy farms to finance. They include: microfinance, co-operative banks, credit guarantee schemes, and supply chain financing. These options are well covered in the literature (see e.g. OECD, 2012; BCF, 2012).

As it was outlined in the section above, there has been a sizeable and persistent risk of policy intervention in Ukraine with usually negative economic consequences for the market operators. This makes even safe investments seem highly risky to lenders. In this regard our recommendation about commitment to non-interventionist trade and agricultural market policy will decrease the riskiness of investments in agriculture/dairy supply chain.

Another abovementioned problem was the lack of creditworthiness, financial illiteracy of farmers, lack of sector-specific knowledge with the loan officers in the banks. To allow lenders to accurately assess the creditworthiness of agricultural enterprises in Ukraine, these enterprises should be legally required to

implement professional bookkeeping systems. This could be accomplished in conjunction the recommendation to eliminate the FAT and replace it with a system of agricultural profit/income taxation (see recommendation iv above). Implementing this reform will require large investments in education and training for the bookkeepers that agricultural enterprises will require and also for loan officers for banks and other lending institutions. Training programs for loan officers that are already provided by multilateral financial institutions such as IFC would have to be scaled up considerably.

vi) Complete refusal from Import Substitution Policy

It seems that the new GoU has taken a direction to pursue so-called Import Substitution policy⁹. The GoU should be strongly advised to learn the lesson of Latin America countries and refuse from this policy. International experience of pursuing Import Substitution Policy proved to be a failure. Coupled with different problems, in the end, the countries pursuing this policy grew more slowly than the others, not adopting it. Moreover, this policy is against WTO rules as it clearly discriminates among domestic and foreign products.

As far as agricultural machinery and equipment are concerned, the discrimination between domestic and foreign agri-machinery and equipment in the state support programs should be eliminated.

vii) Harmonization with international food safety and quality standards, streamlining and simplifying regulatory procedures

Standards play a vital role in agri-food systems, and they are especially demanding in livestock production and trade. However, they should be applied only to the extent necessary to protect life, health and security, and they should rely on international standards whenever possible. These principles are embedded in the WTO Agreements on TBT and SPS. Harmonisation of national regulations with international rules and norms, as well as mutual recognition of conformity assessment procedures and accreditation of related institutions is a cornerstone of trade and production facilitation. and for accessing the common markets of the EU (BE, 2011). As a member of the WTO, Ukraine is committed to base its national legislation on the TBT and SPS Agreements, and to harmonize its national standards and technical regulations with respective international standards. Ukraine should harmonize its legal base with the EU Acquis and adopt technical regulations based on the relevant EU Directives.

Recommendations on the harmonization in the field of food safety and quality control system are well presented in publications IFC (2009) and IFC (2010). The main elements include: i) one FS controlling government body (State Veterinary and Phytosanitary Service); ii) mandatory introduction of HACCP and of traceability and food reclaiming system; iii) simplification and streamlining the requirements with respect to production hygiene, registration and permit procedures, state control procedures, labeling etc. These measures are expected to significantly decrease the FS compliance costs and thus to support the

⁹ Vice Prime-Minister Mr. Arbutov asserts this to be the priority for the Government, see the Business magazine #7 (1046), 18/02/13 (<http://www.business.ua/archive/46189/>)

competitiveness of domestic producers. Moreover, these measures are expected to improve the effectiveness of the FS control system.

As far as new seed varieties are concerned, the testing and registration of imported seed varieties could be facilitated by harmonizing the technical standards with those of Ukraine's trading partners. In particular, the internationally accepted system of plant variety protection needs to be fully implemented in Ukraine and effectively enforced.

viii) Facilitate the development of cooperatives

The prevalence of households in total raw milk supply results in high costs of collection and transportation and difficulties in quality control. Sometimes the radius of procurements for some big processors reaches 150-200km. Clearly this is costly and costs of collection and transportation usually make up 25-40% of the raw milk price. Experience in other countries suggests that agricultural cooperatives could be a solution to this problem and, in fact, it has been the most successful in dairy farming in Ukraine. Agricultural (milk) service cooperatives bring their members opportunities that they could not achieve individually. Higher economic power of cooperatives via pooled resources allows their member to achieve cheaper input supplies and higher revenues on sales of their produce. Members of cooperatives benefit from improved access to agricultural services, for example to veterinary service, extension, information, milk collection, and marketing services. Advice to the members of cooperatives on all the elements of technological processes in raw milk production can increase the yields and quality of raw milk. Combined with organized milk collection system this improves and increases the competitiveness of the entire dairy supply chain in Ukraine. Additionally, agricultural cooperation plays a role in rural development as it retains employment in rural areas.

The problems faced by agricultural cooperatives in Ukraine are poor management, lack of capital resources, inadequate training, extension and education programs, inadequate government policies, to name a few. Basically these problems are not unique for cooperatives, small and medium and to a great extent large agricultural enterprises also face these problems (see BE, 2011). The main feature of cooperatives vis-à-vis agricultural enterprises is taxation.

First of all, despite the fact that agricultural services cooperatives are non-profit organizations, they are still charged with profit tax in Ukraine. As a result, the members of the cooperatives face double profit taxation, first at the cooperative level and then at individual one. Assigning agricultural service cooperatives with non-profit status in the Tax Code would eliminate double taxation.

Another issue is the VAT. Agricultural service cooperatives are on the general VAT system, but some of its members might not be VAT payers. This does not allow agricultural cooperatives to deduct its VAT payables by the amount of input VAT which puts them in a disadvantage vis-à-vis agricultural enterprises and reduces the incentive to participate in the agricultural service cooperatives.

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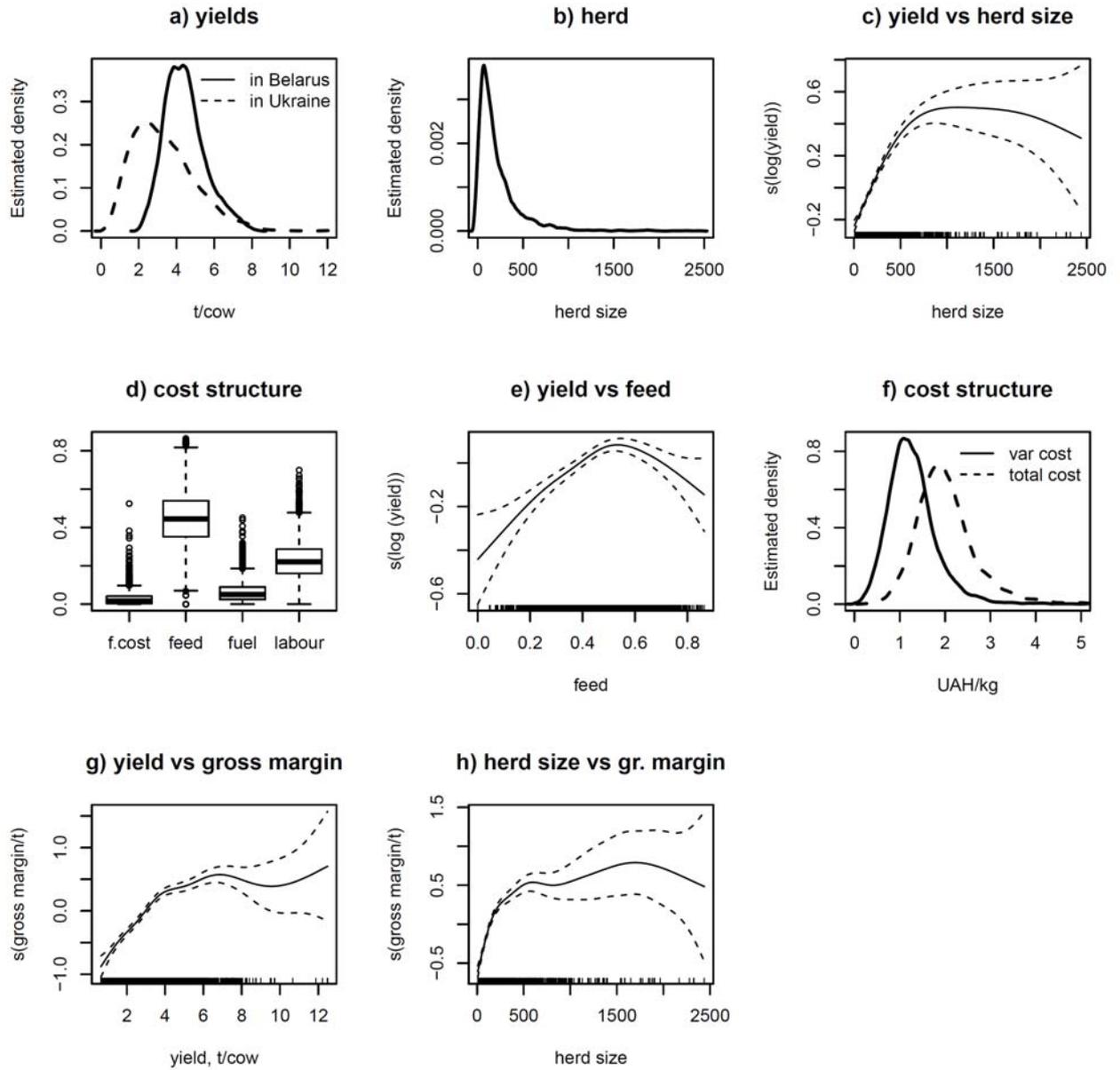
ANNEX

Table 1 Ukraine's dairy farming profile, m t

	1990	1995	2000	2001	2005	2006	2007	2008	2009	2010	2011
Production	24.51	17.27	12.66	13.44	13.71	13.29	12.26	11.76	11.61	11.25	11.09
Dairy farms	<i>18.63</i>	<i>9.44</i>	<i>3.67</i>	<i>3.64</i>	<i>2.58</i>	<i>2.45</i>	<i>2.18</i>	<i>2.09</i>	<i>2.24</i>	<i>2.22</i>	<i>2.25</i>
Households	<i>5.87</i>	<i>7.83</i>	<i>8.99</i>	<i>9.81</i>	<i>11.13</i>	<i>10.83</i>	<i>10.08</i>	<i>9.67</i>	<i>9.37</i>	<i>9.03</i>	<i>8.84</i>
Imports	-	0.06	0.05	-	0.11	0.15	0.20	0.23	0.46	0.27	-
Total Supply	24.36	17.18	12.66	13.44	13.71	13.18	12.26	11.76	11.61	11.25	11.10
Utilization	24.36	17.18	12.66	13.44	13.71	13.18	12.26	11.76	11.61	11.25	11.10
Consumed in the country	24.36	17.18	12.66	13.44	13.71	13.17	12.26	11.75	11.59	11.23	11.09
Ind.consumption	19.49	13.68	7.90	8.44	7.00	5.91	7.36	7.20	7.09	4.79	4.60
Exports	-	1.42	1.10	-	1.90	0.95	0.94	1.14	0.92	0.96	0.00
											-
<i>cows in milk, 000 heads</i>	<i>8.38</i>	<i>7.53</i>	<i>4.96</i>	<i>4.96</i>	<i>3.64</i>	<i>3.64</i>	<i>3.10</i>	<i>2.86</i>	<i>2.74</i>	<i>2.63</i>	<i>2.58</i>
Dairy farms	<i>6.19</i>	<i>4.60</i>	<i>1.85</i>	<i>1.85</i>	<i>0.87</i>	<i>0.87</i>	<i>0.68</i>	<i>0.62</i>	<i>0.60</i>	<i>0.59</i>	<i>0.58</i>
Households	<i>2.19</i>	<i>2.94</i>	<i>3.11</i>	<i>3.11</i>	<i>2.77</i>	<i>2.77</i>	<i>2.42</i>	<i>2.23</i>	<i>2.13</i>	<i>2.04</i>	<i>2.00</i>
Yield, kg/cow	2.86	2.20	2.36	2.71	3.49	3.66	3.96	3.79	4.05	4.08	4.17
Dairy farms	2.94	1.91	1.59	1.96	2.95	2.83	3.21	3.37	3.89	3.98	4.11
Households	2.64	2.72	2.96	3.16	3.64	3.91	4.17	3.90	4.09	4.11	4.19

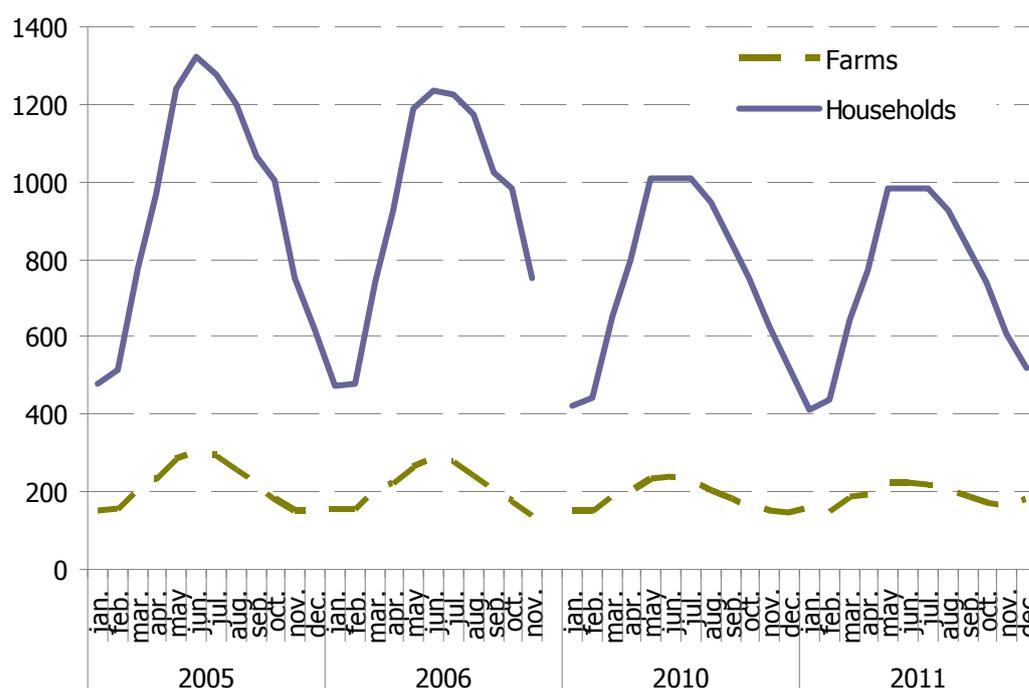
Source: Ukrstat; USDA

Figure 1: Dairy farm economic in Ukraine, 2010



*Note: the dashed curves on the panel e) are pointwise 2*standard-error bands, which can be viewed as approximate 95 percent pointwise confidence intervals. Source: Own presentation using Ukrainian and Belarusian farm-level data.*

Figure 2: Monthly raw milk production by households and farms in Ukraine



Source: own presentation on Ukrstat data

Table 2 Quality standards for raw cow milk for food production in Ukraine, the EU and the USA

	EU*	USA		Ukraine			
		Federal	California	Extra grade	Highest grade	1st grade	2d grade
Plate count ('000 per ml)	30 oC ≤100	≤100	≤50	≤100	≤300	≤500	≤3000
Somatic cell count ('000 per ml)	≤400	≤750	≤600	≤400	≤400	≤600	≤800

Source: (EU Council Directive 92/46/EEC, Chapter IV, A); (Grade "A" Pasteurized Milk Ordinance revised 2003), DSTU¹⁰ 3662-97; * differs among the Member states, e.g. the requirements in Germany are at ≤ 100 000 plate count and ≤ 400 000 somatic cell count, while France requirements are two times stricter, i.e. ≤ 50 000 and ≤ 200 000 respectively.

Table 3 Fat and protein content of raw milk

	Ukraine	Russia	Belarus	Poland	Latvia	Germany	Netherlands	New Zealand
Milkfat, %	3.4	3.4	3.6	3.7	3.7	4.0	4.2	4.2
Protein, %	3.0	3.0	3.0	3.4	3.4	3.4	3.4	3.4

Source: www.milkua.info

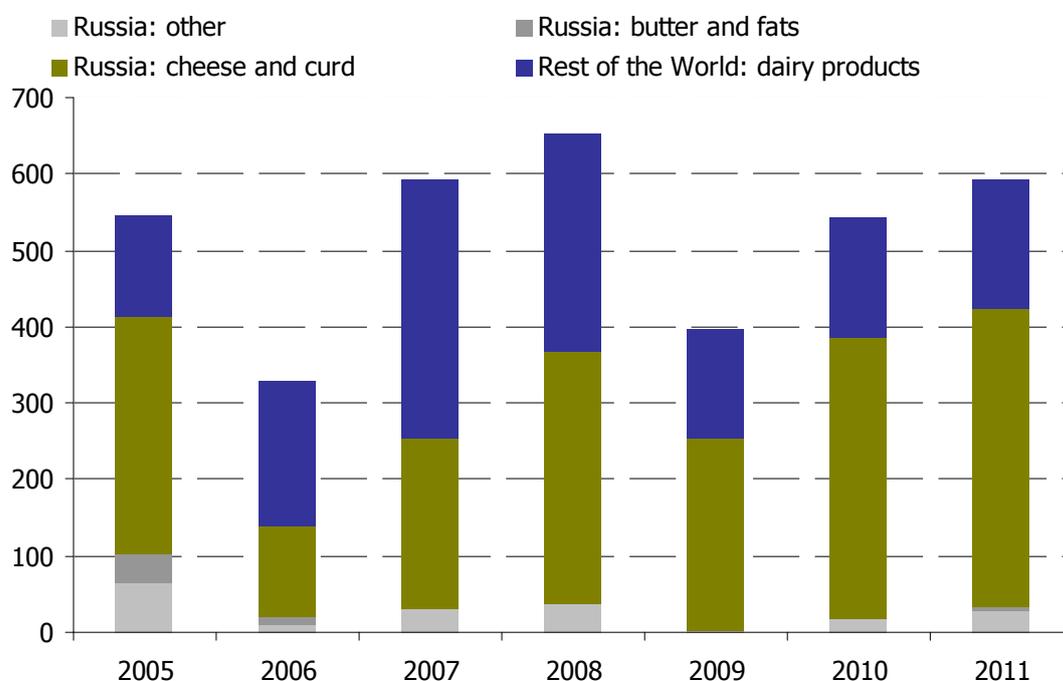
¹⁰ DSTU – abbreviation for the State Standards of Ukraine.

Table 4 Dairy products output in Ukraine, 1000t

	2004	2005	2006	2007	2008	2009	2010	2011
Butter	116	120	104	100	84.8	74.7	79.5	76.2
Cheese	224	274	217	246	236	224	207	178
Curd	71.3	83.5	93.2	92.6	91.9	84.8	78.5	75.3
Whole-milk products	716	864	820	863	808	770	801	858
Fermented milk products	467	499	524	532	532	492	479	468

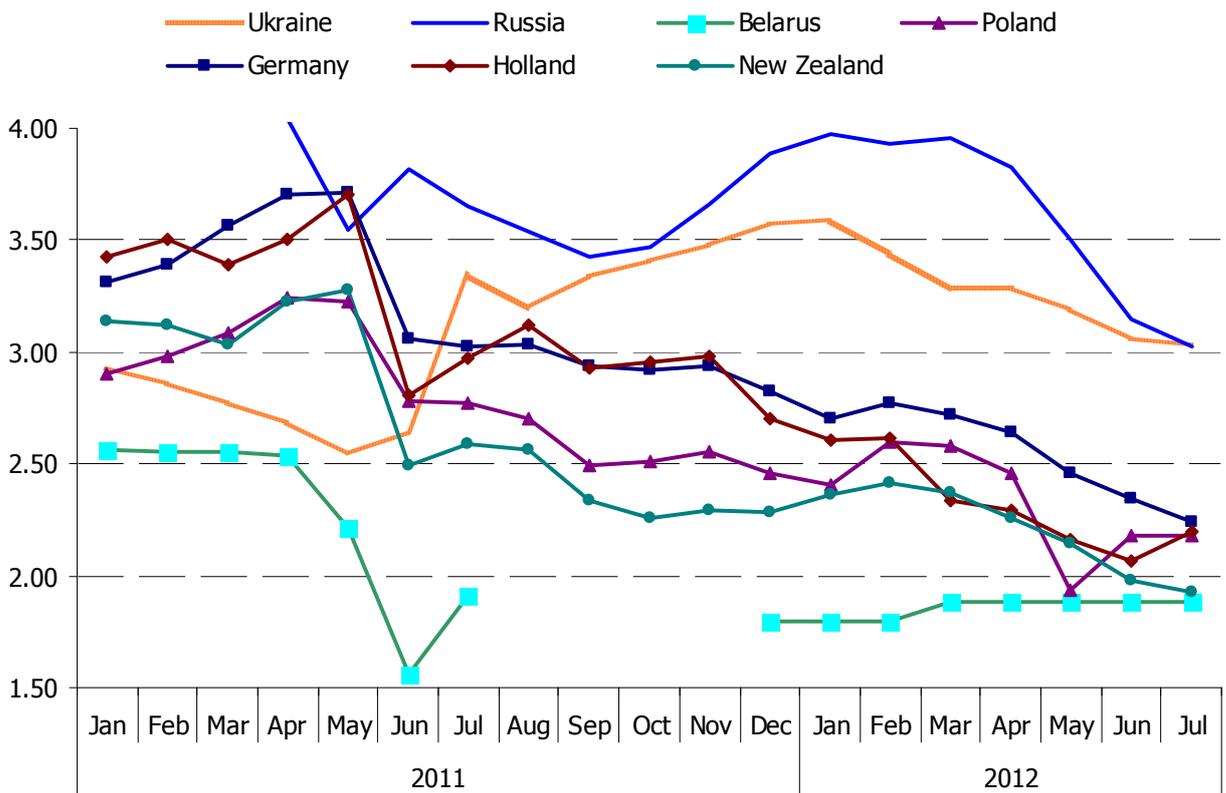
Source: Ukrstat

Figure 3 The destinations and structure of Ukrainian dairy exports, USD m



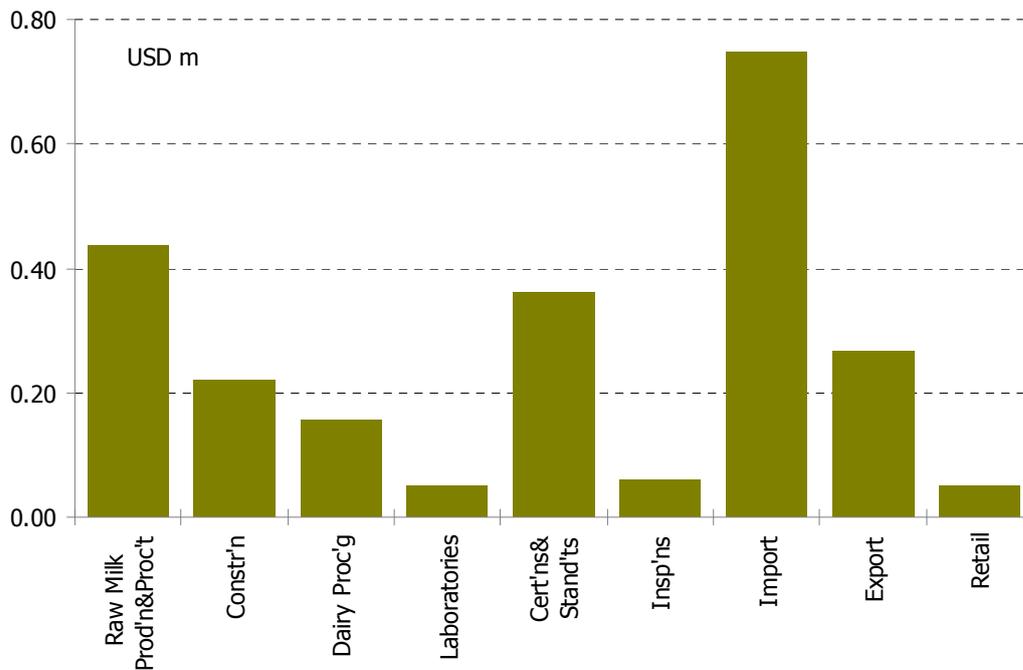
Source: Own presentation using the trade data from UN Comtrade (www.comtrade.un.org)

Figure 4 Raw milk farm-gate prices in different countries (adjusted for quality), UAH/kg



Source: milkua.info; prices adjusted for 3.4% milkfat and 3.0% protein content

Figure 5 Food safety compliance costs at different stages of a typical dairy supply chain



Source: IFC (2010)