November 20, 2013

Food Security, Sector Instability, and Valuation of Agricultural Enterprises in Ukraine

Food security is likely to become one of the main issues facing the world over the next decades. Growing world population, rapid pace of urbanization, increases in income per capita with richer food diets, and the requirements of agro resources for bio-fuels will all sustain a steady growth in global consumption of agricultural commodities. According to estimates of the European Bank for reconstruction and Development, the Food and Agriculture Organization, The Bleyzer Foundation and other agencies, these trends imply that potential world's agricultural consumption will increase by about 70% over the next 30 years. In fact, world consumption of grains is expected to increase from 1,865 tons in 2011 to 2,387 million tons in 2021 and to 3,215 million tons by 2041, a rate of growth of 1.8% pa during the three next decades.

Unfortunately, on the agricultural supply side, the response of agricultural production to increasing demand is being constrained by a global shortage of crop land, slowing agricultural productivity growth, and environmental degradation of land. These constraints will limit the rate of growth of world production of grains to about 1.3% per annum. Accordingly, world grain production would reach 2,123 million in 2021 and 2,557 million tons by 2041 (OECD-FAO estimates).

These production numbers fall short of potential consumption in those years. Therefore, the potential worldwide shortage of grains may reach 264 million tons per year in 2021 and 658 million tons per year in 2041. These food shortages may lead to social tensions, political disturbances, and even war.

In order to meet future food requirements, significant investments in agriculture will be required. OECD-FAO studies also identified a small number of countries in the world where there is the potential to increase grain exports. These countries are, in order of importance in export potential, Ukraine, Russia, Argentina, the USA, Uruguay, Canada, and Brazil.

Although the economic and social benefits of investments in agriculture should be obvious, it is however quite challenging for potential investors to assess the financial benefits of investments in the agricultural sector particularly in emerging economies. This is principally due to the fact that the agricultural sector is characteristically quite unstable, due principally to unforeseen weather conditions and short-term imbalances between demand and supply. In fact, any unanticipated changes in agriculture demand will produce large supply-demand gaps as agricultural production is not elastic in the short-term. All these changes generate large year-to-year fluctuations in the prices of agricultural products and inputs. These price fluctuations lead to large year-to-year variations in earnings (EBITDA) and make it more difficult to predict future prices in the short-term. They also make it more difficult to use standard *Earnings-based methods*, including the present value of cash flows generated by the firm, and standard industry-wide EBITDA to enterprise-value ratios. Although these methods are still useful, many organizations in developed countries that periodically assess the

value of agricultural land and enterprises use average prices during the last five to ten years to assess the value of their operations. The accuracy of the earning-based methods, including the present value of cash flows, is significantly influenced by the choice of the time periods, over which an average EBIDA is calculated, as well as by the precision of the projections of future cereal yields and prices.

In addition, agriculture still remains one of the sectors where government support is most prevalent, which may create big distortions for earning-based methods, especially when applied to cross country comparisons. For instance, in its latest edition of the Agricultural Policy Monitoring and Evaluation, OECD estimates that about one sixth of gross farm receipts come as a result of government policies supporting farmers. And though, there is an obvious trend toward less market-distorting policies in agriculture, many of these restrictions on markets and trade continue to delay a shift toward more efficient and truly global agricultural markets. In addition, input-based support is particularly wide-spread in emerging economies, such as subsidized production and use of fertilizers and a preferential access to credit. Thus, the use of output and input prices, which are strongly affected by government policies, in the evaluation of agricultural businesses may fail to capture the full extent of the role of market forces on the farms' financial performance and cast doubts over the sustainability of these estimates.

Importantly, institutional and structural characteristics of the farming industry are a big factor affecting the capacity of the agricultural businesses to deliver competitive returns. For example, the predominance of the smaller family-owned farms[1] in the EU as well as their resistance to adopt GMO crops imply that their cost structure and profitability differ compared to farming business in North America as well as in other major grain producing regions (for example, Brazil and Australia), where farm consolidation and the adoption of new agro technologies is happening at a much quicker pace.

Lastly, heightened volatility of the farm profitability and incomes seems to be a fairly recent phenomenon, which was mostly due to a peak in the global commodity cycle. Indeed, as the charts in Annexes 1 to 4 illustrate, following a decade of a relative stability, farm incomes surged despite unusually bad weather conditions and increasing costs as grain stocks hit historically low levels and demand for food, feed and biofuels surged in the emerging markets. However, despite the current downward adjustment of crop prices, long-term fundamentals remain supportive of higher farm income (and valuation) in the future, especially for grain-producing countries with the biggest capacity to expand production for exports.

The remaining of this note discusses a methodology to establish a "floor" value for an agricultural enterprise, considering "long-term" valuation factors that are less susceptible to year-to-year changes. In particular, we consider an alternative valuation method for agricultural enterprises, based on asset values. This a*sset-based method* is particularly useful when product demand is expected to exceed supply in the foreseeable future, which is the case of agriculture, as discussed earlier. Institutions, such as the World Bank, have used asset-based methods to estimate the marginal

[1] There are about 13.7 million farmers in Europe and an average farm size is 12 hectares versus about 2 million farmers in the U.S. and an average farm size of 180 hectares.

cost of producing a commodity and to forecast future product prices and the future value of enterprises. In fact, in a sector which is likely to suffer from excess demand, long-term future prices and enterprise values will be primarily driven by the marginal cost of bringing new supplies into the sector.

Accordingly, for the purpose of assessing the value of an ongoing agricultural enterprise, we will first calculate the start-up investments required per hectare of land properly equipped with all necessary facilities and elements to produce agricultural commodities with good yields. That is, the valuation will take into account the full value of a properly "capitalized" hectare of land capable of producing high yields, including the cost of raw land, working capital, machinery and equipment, infrastructure, and intangible assets, such as technical knowledge and managerial know-how. This *capitalization value* – based on investments needed to achieve a competitive return on capital put into a farming enterprise – provides a useful benchmark for company valuation in the agricultural industry where earning and input costs are prone to sharp cyclical fluctuations.

I. Raw Land Value per Hectare

One of the main obstacles for the proper assessment of the market value of farm businesses in many emerging countries is the lack of institutions and legal frameworks supporting the existence of an open, competitive and liquid market for the right to own, rent and operate farm land. Nevertheless, agricultural land values across the world are highly correlated with the profitability that the land could generate, which is greatly influenced by the country's ability to export and access global agricultural markets, as well as by the type of crop produced. In particular, access to global food markets allows farming businesses to have more diversified sources of income by lessening the susceptibility to local conditions and domestic economic difficulties. After all, leading global agricultural producers, such as Ukraine, USA, Canada, Brazil, Australia, and New Zealand, are capable of sustaining profitable and competitive agricultural business largely thanks to their strength as major exporters of food commodities. On the other hand, countries, where farming policies gravitate toward self-sufficiency, trade restrictions and isolation or where geography, land and water scarcity are major constraints on farm exports, tend to have rather inefficient and underdeveloped farming industries. On that count, Ukraine's high agro-export potential, superior cropland quality and farmland availability make the value of its agricultural land more comparable to farmland in other major exporting countries, where the potential to boost grain exports in the future is on par with Ukraine. According to FAO/OECD, the countries that will have the highest grain export potential during the next 10 years are Ukraine, the USA, Argentina, Canada, and Brazil.

The table below presents most recent agricultural land values (in US$ per ha) in these grain export oriented countries as well as for some countries neighboring Ukraine (Source: Savills, International Farmland, 2012):

USA	$12,000 /ha in the Corn Belt region
Canada	$12,000 /ha in Ontario
Argentina	$6,500 /ha
Brazil	$5,245 /ha
Poland	$5,685 /ha
Romania	$5,000 /ha
Hungary	$3,860 /ha
Czech Rep	$3,130 /ha

Based on this table, the value of agricultural land in Ukraine should be about $3,000 to $5,000 per ha, on a very conservative basis.

Current rental prices can also be used to calculate implied market value of the land. Annual data from Eurostat and the USDA show that the ratio of rent to value of agricultural land is around 1% to 3% in most European countries and the US. Thus, based on an average annual rental price of farmland in Ukraine of $95 per ha, the implied land value should be at about $3,200 - $9,500 (with average $6,300 /ha) for the rent to value ratio to stay at the levels observed in other countries. Just for comparison purposes, agricultural land values in other European countries are as follows (according to Savills, International Farmland, 2012): Netherlands, $65,500/ha; Ireland, $29,920/ha; Denmark, $26,346/ha; United Kingdom, $22,264/ha; Spain, $16,100/ha. As Ukraine reaches the agricultural yields and profitability of European countries, its land values should increase substantially.

In Ukraine, land cannot be purchased; however, it can be leased. Therefore, the most relevant land value is the "acquisition of leasing rights" for land for about 5-year leases. This value should be about 10% of the land value (assuming a reasonable land ownership period). On the basis that land values in Ukraine should range from $3,000 to $5,000 per ha, the acquisition of leasing rights in Ukraine should be about $300 to $500 per ha, which is quite consistent with prices in the Ukrainian land leasing market today. Current prices to acquire leasing rights in the more productive north-eastern part of the country range from $500 to $700 per ha.

II. Working Capital Value per Hectare

A second investment value for a fully capitalized agricultural enterprise is investment in working capital requirements. In Ukraine, as in many other emerging economies, during the initial year of operations, agricultural inputs and other costs would need to be fully funded. Spending on fertilizers, seeds, fuels and labor are by far the largest components of the short-term costs in the farming industry. More specifically, the share of each cost component in total costs is a result of the profit-maximizing choices of firms investing into these inputs to grow crops at the lowest marginal costs possible. Thus, the breakdown of the investments into variable inputs provides a valuable insight on the optimal deployment of the short-term investments by a representative farming entity. On this basis, we estimate the Working Capital Value per ha in Ukraine at $500 to $700 per ha. The beak-down of this number is as follows:

Fertilizers:	$200-250
Seeds:	$100-150
Other costs:	$200-300

This working capital calculation is consistent with the data provided by 7 agricultural enterprises operating in Ukraine, which are listed in stock exchanges and which hold more than 50,000 ha of land. Based on this data, working capital per ha in Ukraine ranges from a high of $1,650 per ha to a low of $500 per ha, with a median value of $630 per ha.

The above estimates are also consistent with estimates based on the operating expenses of European and American grain producers (Source: European Commission - The Farm Accountancy Data Network, USDA, World Bank and FAO), with an adjustment for the lower rate of fertilizer consumption in Ukraine compared to the EU and OECD countries. This data is provided in Annex 5.

III. Machinery and Equipment per Hectare

Based on experience in some Ukrainian agricultural firms, we estimate the Machinery and Equipment value in Ukraine at $600 to $800 per ha. This number is consistent with estimates in other countries (Source: European Commission - The Farm Accountancy Data Network, USDA and FAO) as shown in the charts in Annex 6. These charts show that the total non-land costs (including machinery and equipment, storage, buildings) of running a farm may be a double of the operating costs, meaning that the costs of machinery and equipment are likely to add about $600-$800 per ha to the cost of operating a farm business in Ukraine. Moreover, the capital consumption (depreciation) for a typical farm in North America or Europe stands at about $150 dollars per hectare, which, assuming the average depreciation period for machinery and equipment of 5-7 years, translates into the total stock of $750-$1,050 per hectare.

IV. Going-Concern Value - Intangible Assets per Hectare

Intangible assets (human capital, accumulated knowledge, managerial know-hows), especially in countries, where labor supervision and management is a big factor in agricultural productivity, are key to ensure that invested capital earns good agricultural yields and generate competitive returns. This implies that large established commercial farms enjoy an improved capacity to generate profits versus other farming businesses. In fact, the economies of scale alone can yield substantial cost savings thanks to the ability of the consolidated agro business to produce more output per unit of employed labor and capital and apply innovative agro technology (such as zero-tillage agriculture and GMO crops). For example, as shown in Annex 7, machinery investments per hectare tend to decline with the farm size, which offers a large potential to improve the efficiency of capital spending. We estimate that these intangible assets in a company generating high and above average agricultural yields as well as economies of scale have a value of about 30% of a company's physical assets, or about $300 to $500 per ha.

Total Capitalization Enterprise Value

Based on the above calculations the Capitalization Value of a big commercial farm operation in Ukraine is estimated at about $1,700 to $2,500 per ha, with a mean value of $2,100/ha:

Land Leasing Acquisition:	$300 /ha	to	$500 /ha	
Working Capital	$500 /ha	to	$700 /ha	
Machinery and Equipment	$600 /ha	to	$800 /ha	
Intangible Assets	$300 /ha	to	$500 /ha	
Total	**$1,700 /ha**	**to**	**$2,500 /ha**	**averaging $2,100 /ha**

For instance, a company that owns leasing rights to operate 100 thousand hectares in Ukraine and produces about 400 thousand tons of grains a year should have an average total capitalization value of about $210 million.

In fact, this enterprise valuation of $2,100/ha appears to be consistent with the latest land deals in Ukraine and neighboring countries, as noted below. It is also consistent with the current average enterprise valuation of $2,000 per hectare for all Ukrainian agricultural companies listed in stock exchanges.

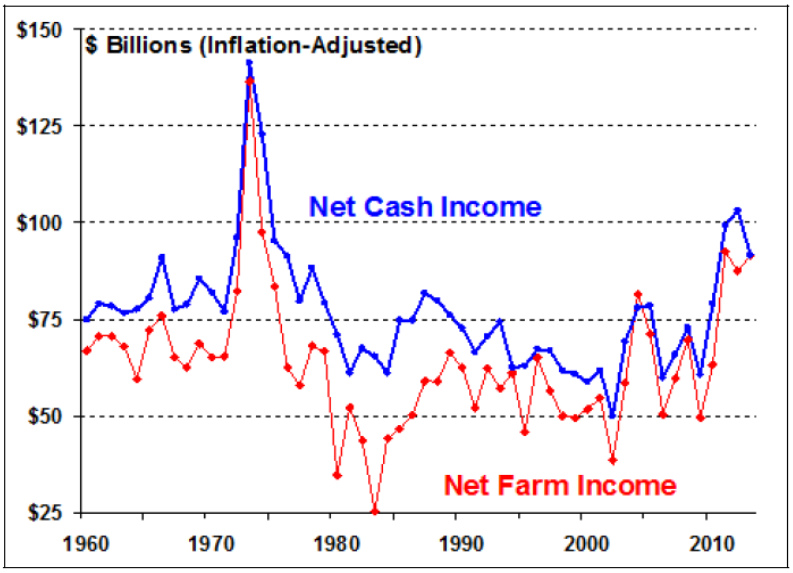
- In June 2013, the Continental Farmers Group, which controls about 33 thousand ha in Ukraine and Poland, was acquired by United Farmers Holding Company - a consortium of the Saudi Arabian investors, which valued the company at about $93 million – or $2,800 per ha.

- In April 2013, Kernel, the biggest publicly trade agro company in Ukraine, bought 80% of the Druzhba Nova agricultural company with 108 thousand ha of land for $68 million (equity value of $85 million). Considering that the Druzhba Nova had about $100 million in debt, the deal valued the company at about $185 million or $1,710 per ha.

- In 2012, the Bulgarian real estate investment fund Advance Terrafund, which owns over 24 thousand ha of agricultural land and it is the largest public owner of agricultural land in Bulgaria, sold farmland at an average price of $5,950 per ha. In the first six months of 2013, Advance Terrafund was selling farmland at an average price of $7,442 per ha, and its annual rental rate was at $190 per ha for 2012-2013 marketing year.

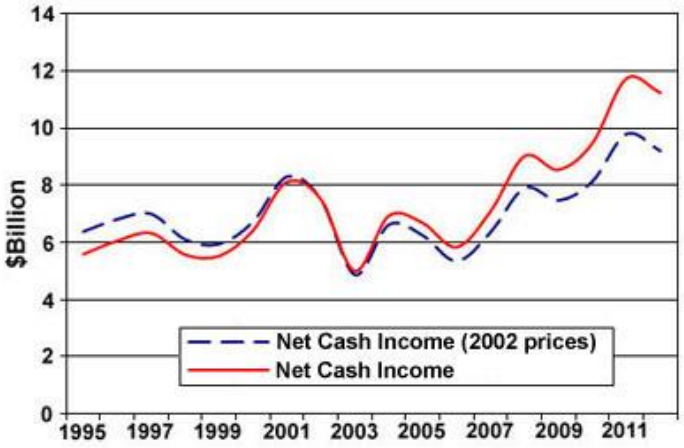
- Also in Bulgaria, in August 2013, Rompharm Company, the biggest private owner of farmland in Bulgaria, purchased Ceres Fund (controls 18.6 thousand ha of agricultural land in Bulgaria) for about $70 million or $3,700 per ha.

Annex 1. Annual U.S. Farm Sector Inflation-Adjusted Income, 1960 to 2013F

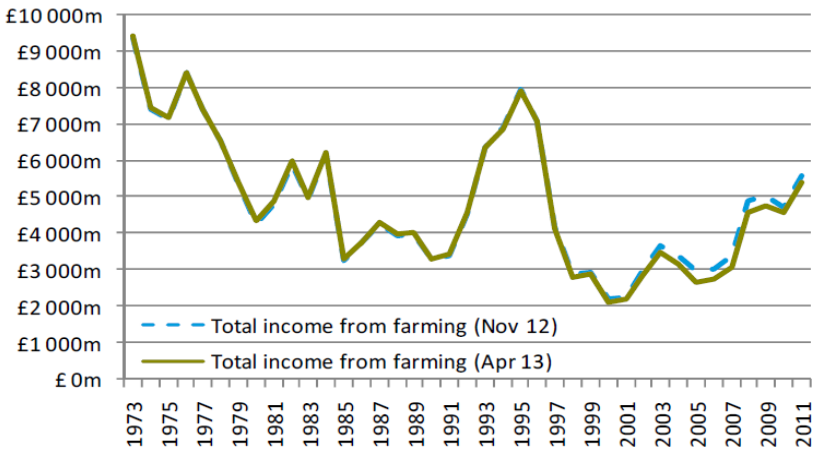


Source: USDA, ERS, "2013 Farm Income Forecast," August 27, 2013.

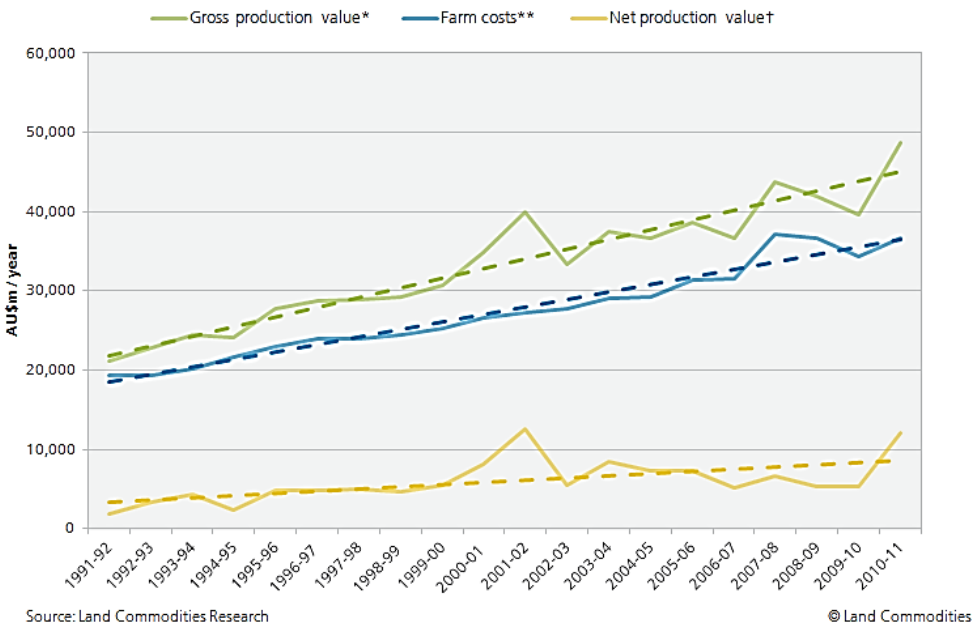
Annex 2. Net Cash Farm Income in Canada



Annex 3. Total Income from Farming in UK in real terms



Annex 4. Trend in farm finances in Australia



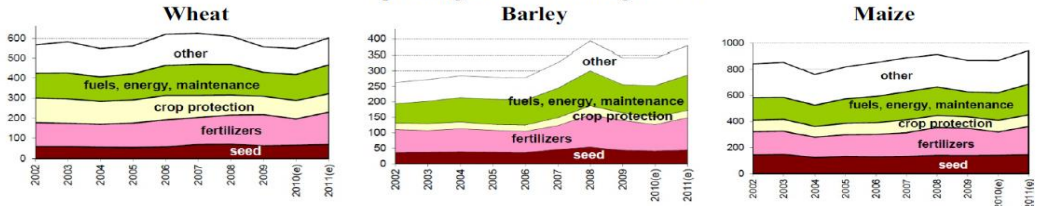
Source: Land Commodities Research

Annex 5. Fertilizer Costs, and Operating Costs in Various Countries

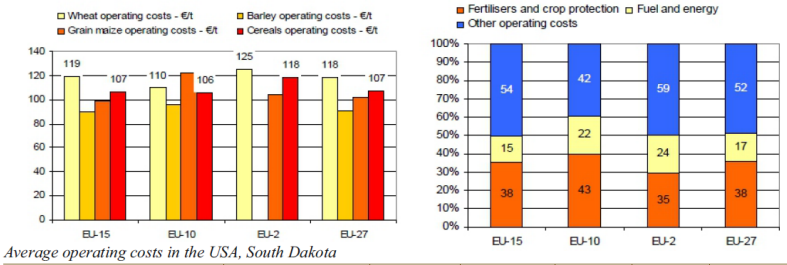
Fertilizer use, Kg/ha

	2007	2008	2009	2010	2011
European Union	167.34	136.23	129.10	145.50	144.30
OECD members	125.47	107.57	102.20	115.22	118.31
Ukraine	**27.64**	**32.79**	**27.30**	**32.66**	
United States	123.27	111.56	106.96	120.48	
World	126.35	124.68	126.81	132.55	133.46

Operating costs, EU average, €/ha



Cereals operating costs, 2007, €/t

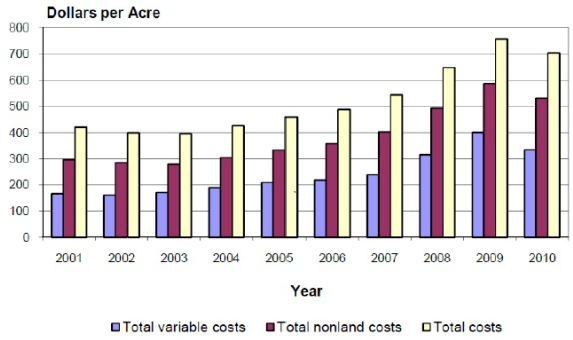


Average operating costs in the USA, South Dakota

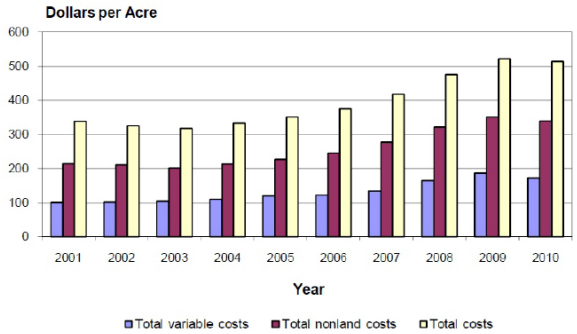
	Corn (corn/soybean rotation)	Continuous corn	Soybeans	Winter wheat	Spring Wheat	Sunflowers
Variable costs $/ha						
Seed	281.5	281.5	150.2	53.4	53.4	71.8
Fertilizer	308.9	308.9	101.2	222.4	200.2	164.3
Herbicide	60.5	60.5	30.1	24.6	24.6	96.4
Insecticide			23.5			
Fungicide					31.6	
Crop Insurance	61.8	61.8	46.0	48.9	48.9	49.4
Machinery Costs (Operating)	140.8	140.8	116.1	116.1	111.2	135.9
Drying	74.1	66.7	0.0	0.0		0.0
Operating Interest	32.5	32.2	16.4	16.3	16.4	18.1
Total operating costs, $/ha	*960.1*	*952.4*	*483.5*	*481.7*	*486.3*	*535.9*
Machinery (Ownership Costs)	165.6	165.6	165.6	165.6	160.6	160.6
Land Charge	395.4	395.4	395.4	395.4	395.4	395.4
Total Costs, $/ha	**1,521.0**	**1,513.3**	**1,044.4**	**1,042.6**	**1,042.3**	**1,091.9**

Annex 6. Total costs and Machinery Costs

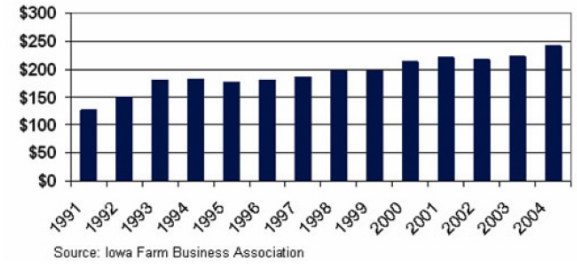
Total costs per acre to grow corn on Illinois grain farms, 1 hectare = 2.47105 acres



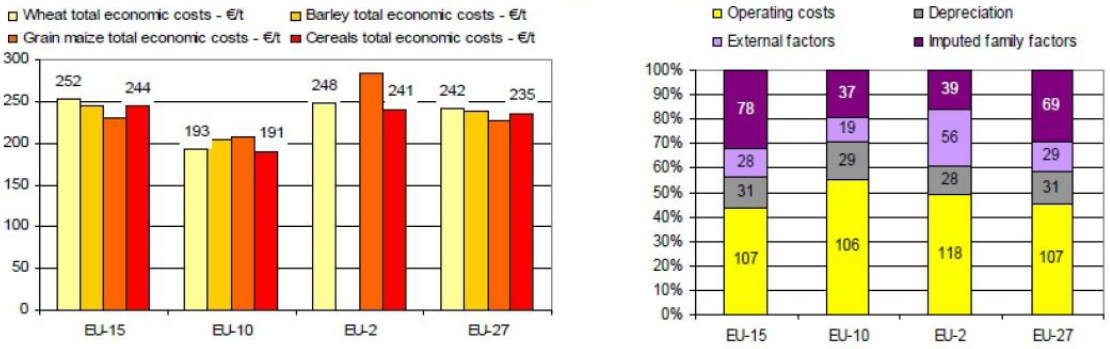
Total costs per acre to grow soybeans on Illinois grain farms, 1 hectare = 2.47105 acres



Machinery investment per Crop Acre, 1 hectare = 2.47105 acres



Cereals total economic costs, 2007, €/t



Annex 7. Economies of Scale

Labor and capital on corn, soybean, and wheat farms

	Harvested acres					
	Less than 100	100-249	250-499	500-999	1,000-1,999	2,000 or more
	Mean hours per harvested acre					
Labor (all)						
Corn	38.6	12.3	7.8	5.7	3.5	2.7
Soybeans	45.7	10.4	7.3	5.8	3.8	3.0
Wheat	40.4	8.7	5.8	5.3	3.2	2.2
	Hired labor hours as a percent of total labor hours					
Hired labor						
Corn	5.0	2.9	4.6	10.2	16.9	31.2
Soybeans	2.7	5.2	7.4	14.6	16.4	36.0
Wheat	4.0	3.2	3.4	16.3	19.5	20.5
	Equipment and structures assets ($) per harvested acre					
Capital						
Corn	2,532	847	683	568	505	432
Soybeans	2,880	826	640	535	387	332
Wheat	3,325	588	396	320	278	242

Source: USDA