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Commodity Market Development in Europe – Outlook

Proceedings of the October 2012 Workshop

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Workshop background

This report contains a summary and the presentations of the 'Commodity Market Development in Europe – Outlook' expert workshop, jointly organised by the European Commission's Joint Research Centre Institute for Prospective and Technological Studies (JRC-IPTS) and the Directorate General for Agriculture and Rural Development (DG AGRI). The workshop took place in Brussels on 16-17 October 2012 and is part of the series of workshops on commodity market modelling and development, held annually since 2006.[1]

The 2012 workshop was envisioned to present and discuss the preliminary results of the European Commission's outlook on EU agricultural market developments. As part of the validation procedure, suggestions and comments made during the course of the workshop were taken into account to improve the final version of the outlook. Thus, for reference to the DG AGRI baseline projections refer to the final report:

> 'Prospects for Agricultural Markets and Income in the EU 2012-2022':
> UTThttp://ec.europa.eu/agriculture/markets-and-prices/reports_en.htm

The workshop gathered high-level policy makers, modelling and market experts from the EU, the United States and international organisations such as the FAO, OECD and The World Bank. The workshop provided a forum to present and discuss recent and projected developments in the EU agricultural and commodity markets, to outline the reasons behind observed and prospected developments and to draw conclusions on the short/medium term prospects of European agricultural markets in the context of world market developments. Special focus was given to the discussion on the sensitivity of the projected market developments to different settings/assumptions (regarding for example macroeconomic uncertainties, biofuel policies, specific drivers of demand and supply, etc.).

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[1] The proceedings of the respective workshops are listed below and can be downloaded from the JRC-IPTS' website (http://ipts.jrc.ec.europa.eu/publications/):

Bartova, L., R. M'barek (Eds.) (2008): Commodity Modelling in an Enlarged Europe. November 2006 Workshop Proceedings. AGMEMOD Report V. JRC Scientific and Technical Reports, European Commission. EUR 22940 EN/5

Bartova, L., S.H. Gay, R. M'barek (Eds.) (2008): Commodity Market Development in Europe – Outlook. November 2007 Workshop Proceedings. JRC Technical Notes, European Commission. EUR 23377EN

Fellmann, T., R. M'barek, S.H. Gay (2009): Commodity Market Development in Europe – Outlook. November 2008 Workshop Proceedings. JRC Technical Notes, European Commission. JRC 51276

Fellmann, T., B. Van Doorslaer, R. M'barek, S.H. Gay (Eds.) (2010): Commodity Market Development in Europe – Outlook. November 2009 Workshop Proceedings. JRC Technical Notes, European Commission, JRC 60425

Fellmann, T., R. M'barek, S.H. Gay (2011): Commodity Market Development in Europe – Outlook. October 2010 Workshop Proceedings. JRC Scientific and Technical Reports, European Commission. JRC 65170

Fellmann, T., S. Hélaine (2011): Commodity Market Development in Europe – Outlook. October 2011 Workshop Proceedings. JRC Scientific and Technical Reports, European Commission. JRC 67918

Acknowledgements

The 'Commodity Market Development in Europe - Outlook' workshop was jointly organised by the European Commission's JRC-IPTS, Agriculture and Life Sciences in the Economy Unit (AGRILIFE) together with DG AGRI, Economic analysis of EU agriculture Unit (L2). We would like to acknowledge contributions made by all participants (a complete list is included in Annex 2) and their consent to share their knowledge and ideas. We thank all contributing and participating colleagues from the European Commission and especially the following invited external experts:

Matt ADEY	DEFRA, UK
Lise ANDREASEN HOEYER	Danish Agriculture & Food Council, Belgium
Ken ASH	OECD, France
John BAFFES	The World Bank, US
Christoph BERG	F.O. Licht, Germany
Maria BLANCO FONSECA	Universidad Politecnica de Madrid
David BLANDFORD	Penn State University, US
Richard BROWN	GIRA, UK
Alison BURRELL	Freelance, France
Gabriele CANALI	Università Cattolica del Sacro Cuore, Italy
Merritt CLUFF	FAO, Italy
Darren COOPER	International Grains Council, UK
Claudiu COVRIG	SUCDEN, Switzerland
Kimberly CREWTHER	Fonterra, The Netherlands
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Aikaterini KAVALLARI	LEI, The Netherlands
Baptiste LELYON	Institut de l'Elevage, France
Rohaise LOW	LMC International, UK
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Seth MEYER	FAO, Italy
Thordis MÖLLER	Nordzucker, Germany
Catherine PAICE	Dairy Industry Newsletter, UK
Ignacio PEREZ DOMINGUEZ	OECD, France
Jan RANDOLPH	IHS Global Insight, UK
Benoit ROUYER	CNIEL, France
Petra SALAMON	vTI, Germany
Rafael TARDAGUILA	Tardáguila Agromercados, Uruguay
Wyatt THOMPSON	FAPRI-MU, US
Bruce TURNER	Fonterra, New Zealand

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Workshop Agenda

Date: 16/17 October 2012
Venue: European Commission,
Centre Albert Borschette, Rue Froissart 36, B-1040 Brussels

Organisers:JRC-IPTS and DG AGRI

AGENDA - DAY I - 16 OCTOBER 2012		
09:30	Welcome. Background of workshop Main conclusions of last year's outlook and introduction of this year's exercise	John Bensted-Smith, JRC-IPTS & Tassos Haniotis, DG AGRI Robert M'barek, JRC-IPTS & Pierluigi Londero, DG AGRI
10:30 – 11:00	***Coffee break***	
11:00 Session 1	**Macroeconomic assumptions and related uncertainties Chair: John Bensted-Smith, JRC-IPTS**	
(10 min) *(10 min)* *(30 min)* *(40 min)*	EU agricultural outlook – settings The macroeconomic context Panel discussion Open discussion	Pierluigi Londero, DG AGRI Jan Randolph, Global Insight Bjorn Döhring, DG ECFIN John Baffes, The World Bank Christopher Gilbert, University of Trento All participants
12:30 – 14:00	***Networking lunch***	
14:00 Session 2	**Biofuels: a key source of uncertainty Chair: Alison Burrell**	
(30 min) *(40 min)* *(50 min)*	EU agricultural outlook and uncertainties Panel discussion Open discussion	S. Hubertus Gay, DG AGRI & Zebedee Nii-Naate, JRC-IPTS Christoph Berg, FO-Licht Wyatt Thompson, FAPRI Seth Meyer, FAO All participants
16:00 – 16:30	***Coffee break***	
16:30 Session 3	**Cereals, oilseeds, sugar: production, productivity and related uncertainties Chair: Chris Horseman, Informa Agra**	
(30 min) *(30 min)* *(45 min)*	EU agricultural outlook and uncertainties Panel discussion Open discussion	S. Hubertus Gay, DG AGRI & Marco Artavia & Pavel Ciaian, JRC-IPTS Thordis Möller, Nordzucker Darren Cooper, International Grains Council All participants
18:15	***End of Day I***	

Workshop Agenda (Day 2)

Date: 16/17 October 2012
Venue: European Commission,
Centre Albert Borschette, Rue Froissart 36, B-1040 Brussels

Organisers:JRC-IPTS and DG AGRI

AGENDA - DAY II - 17 OCTOBER 2012		
09:00	Wrap up day 1	Robert M'barek, JRC-IPTS
9:30 Session 4	**Drivers of supply and demand for milk and dairy markets and related uncertainties Chair: Catherine Paice, Dairy Industry Newsletter**	
(20 min)	EU agricultural outlook and uncertainties	Beatriz Velazquez, DG AGRI, Sophie Hélaine & Ben Van Doorslaer, JRC-IPTS
(25 min)	Panel discussion	Benoit Rouyer, CNIEL Bruce Turner, FONTERRA
(45 min)	Open discussion	All participants
11:00 – 11:30	***Coffee break***	
11:30 Session 5	**Drivers of supply and demand for meat markets and related uncertainties Chair: Richard Brown, GIRA**	
(20 min)	EU agricultural outlook and uncertainties	Alberto D'avino, DG AGRI, Ben Van Doorslaer & Sophie Hélaine, JRC-IPTS
(25 min)	Panel discussion	Meritt Cluff, FAO Rafael Tardàguila, Tardaguila Agromercados
(45 min)	Open discussion	All participants
13:00 – 14:15	***Networking lunch***	
(15 min)	Achieving sustainable agricultural productivity growth	Ignacio Pérez Domínguez, OECD
14:30 Session 6	**Policy challenges Chair: Tassos Haniotis, DG AGRI**	
(10 min)	Wrap up and Income results	Pierluigi Londero, DG AGRI
(15 min)	Introduction	João José PACHECO, DG AGRI
(50 min)	Panel discussion	Ken Ash, OECD Joseph Glauber, USDA David Blandford, Pennsylvania State University Alan Matthews, Trinity College Dublin
(40 min)	Open discussion	All participants
16:25	**Concluding remarks**	DG AGRI & JRC-IPTS

Acronyms

CAP	Common Agricultural Policy
CAPRI	Common Agricultural Policy Regional Impact Analysis
CGE	Computable General Equilibrium
CPI	Consumer Price Index
CV	Coefficient of variation
c.w.e.	carcass weight equivalent
DG AGRI	Directorate General 'Agriculture and Rural Development'
DG ECFIN	Directorate General 'Economic and Financial Affairs'
EC	European Commission
ECB	European Central Bank
ERS	Economic Research Service
EU	European Union
EU-N12	12 newest EU Member States from the 2004 and 2007 enlargements
EU-15	15 EU Member States before May 2004
EU-25	25 EU Member States after 2004 enlargement
EU-27	27 EU Member States after 2007 enlargement
FAO	Food and Agriculture Organization of the United Nations
FAPRI	Food and Agricultural Policy Research Institute, USA
GDP	Gross Domestic Product
IDF	International Dairy Federation
IGC	International Grains Council
ILUC	Indirect Land Use Change
IMF	International Monetary Fund
IPTS	Institute for Prospective Technological Studies
ISO	International Sugar Organization
JRC	Joint Research Centre
LUC	Land Use Change
NPC	Nominal Protection Coefficient
NREAP	National Renewable Energy Action Plans
OECD	Organisation for Economic Co-operation and Development
PE	Partial Equilibrium
PSE	Producer Support Estimate
RSE	Raw sugar equivalent
RFS	Renewable Fuel Standard
RINs	Renewable Identification Numbers
SAPS	Single Area Payment Scheme

SFP	Single Farm Payment
TRQ	Tariff Rate Quotas
US	United States of America
USD	US Dollar
USDA	US Department of Agriculture
WBR	World Beef Report
WSE	White sugar equivalent
WTO	World Trade Organization

Summary of the workshop

The 2012 'Commodity Market Development in Europe – Outlook' workshop forms part of the intensive validation procedure of the results of the DG AGRI outlook on EU agricultural market developments. In the following chapters the presentations and discussions of the workshop are briefly summarised. Suggestions and comments made during the workshop were taken into account to improve the final version of the outlook. Thus, for the baseline projections please refer to the report 'Prospects for Agricultural Markets and Income in the EU 2012-2022' which can be downloaded from the DG AGRI homepage[2].

The workshop (and thus this summary) was structured as follows. First the background of the baseline construction process was delineated (Chapter 1). Projections are always subject to numerous uncertainties. To demonstrate the effects of these uncertainties on the baseline projections some scenarios were carried out; the main assumptions are described in Chapter 2. The macroeconomic environment can strongly influence the projected developments in agricultural markets. Therefore a specific session was dedicated to discussion of the macroeconomic assumptions and uncertainties (Chapter 3). A specific session was also devoted to biofuels, a major source of uncertainty for agricultural markets' development (Chapter 4). A summary of the session on production, productivity and related uncertainties for the cereal, oilseed and sugar markets is given in Chapter 5. The sessions on drivers of supply and demand and related uncertainties are summarised for milk and dairy markets in Chapter 6 and for the meat markets in Chapter 7. The workshop concluded with reflections on the challenges for agricultural policy (Chapter 8).

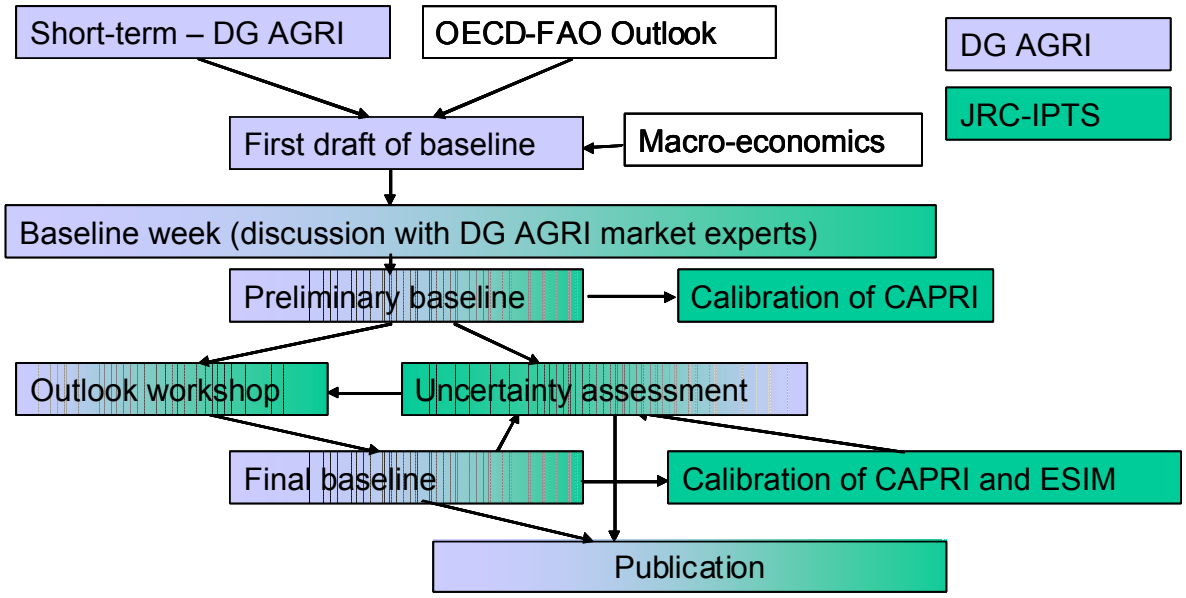
1. Background of the baseline construction process

The European Commission annually constructs an outlook for the medium-term developments in agricultural markets in the EU. This outlook (or 'baseline') permits a better understanding of the markets and their dynamics and also contributes to identify key issues for market and policy developments. Furthermore, the outlook

[2] http://ec.europa.eu/agriculture/markets-and-prices/reports_en.htm

serves as a benchmark for assessing the medium-term impact of future market and policy issues. The model used for the outlook projections is the European Commission's version of AGLINK-COSIMO[3], a recursive dynamic partial equilibrium model with a detailed representation of world agriculture and policy. The data used to construct the outlook is based on the latest available market and policy information (in the case of this year's preliminary outlook this was the data available at the beginning of September 2012). Projection results are presented in balance sheets for the main agricultural commodities, with detailed results for the EU-27, EU-15 and EU-N12 aggregates for cereal, oilseed, sugar, rice, biofuel, meat and dairy markets.

Figure 1: Flowchart of the baseline construction process



Source: Presentation M'barek and Londero (JRC-IPTS and DG AGRI)

The process of the European Commission's baseline construction is depicted in Figure 1. The starting point is the latest available version of the AGLINK-COSIMO model, which was used for the OECD-FAO Agricultural Outlook.[4] The EU module of the AGLINK-COSIMO model is then modified (this year for example the EU biofuel module was updated), and an add-on for agricultural income included. The income module is based on the medium-term projections for the agricultural markets represented in AGLINK-COSIMO, and the remaining agricultural sectors (fruit and vegetables, wine

[3] Note: The results of any analysis based on the use of the AGLINK-COSIMO model by parties outside the OECD are outside the responsibility of the OECD Secretariat. Conclusions derived by third-party users of AGLINK-COSIMO should not be attributed to the OECD or its member governments.

[4] The OECD-FAO Agricultural Outlook 2012-2022 is available online: http://www.agri-outlook.org/

and olive oil) are assumed to follow historical trends. A continued restructuring of the farms is considered.

The EU module of AGLINK-COSIMO is adjusted according to the latest EU short-term outlook (September 2012 version[5]) and as additional ad-hoc input this year the impact of the summer droughts in the US and the Black Sea region in 2012 was also considered. Furthermore, the latest available macroeconomic projections from IHS Global Insight were taken into account, except for the USD/EUR exchange rate which is assumed to remain at the level of the last four years (1.35 USD/EUR) from 2016 to 2022 (at the time of the Workshop preparation DG ECFIN forecasts were not available). An in-depth discussion of the first baseline results takes place between the modelling and market experts of DG AGRI and the JRC-IPTS during a 'baseline week' in September. After further adjustments, the baseline is presented in October at the 'Commodity Market Development in Europe – Outlook' workshop, organised by the JRC-IPTS and DG AGRI. In order to identify and quantify the potential variability of the market projections, the results of additional scenarios with alternative assumptions are also presented during the workshop. Suggestions and comments made during the workshop are taken into account to improve the final version of the outlook, which is then published in the report 'Prospects for Agricultural Markets and Income in the EU' in December.[6]

2. Background of the uncertainty analyses and assumptions of the uncertainty scenarios

Building a baseline and thus an outlook for agricultural market developments is always subject to numerous uncertainties, especially with regard to weather conditions, developments in the wider macroeconomy (e.g. Gross Domestic Product (GDP) growth, exchange rates, oil prices), supply and demand patterns (e.g. yield trends and consumer preferences) or policy issues (like renewable energy policies). However, a deterministic baseline is based on explicit assumptions regarding such exogenous

[5] http://ec.europa.eu/agriculture/analysis/markets/sto-crop-meat-dairy/2012-09_en.pdf

[6] More detailed information on the general baseline construction process is given in Nii-Naate, Z. (Ed.) (2011): Prospects for Agricultural Markets and Income in the EU. Background information on the baseline construction process and uncertainty analysis. JRC Scientific and Technical Reports, European Commission, Luxembourg. Available at: http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=4879

variables, and usually assumes steady yield trends, a specific path for GDP growth, exchange rates, oil prices and demand. Consequently, a deterministic baseline provides a single set of outcomes for a single set of assumptions and it is important to keep the uncertainty of these assumptions in mind when looking at the results of the outlook. In order to show how the projected results of the EU agricultural market outlook are impacted by alternative assumptions, some uncertainty analyses on the baseline were carried out. These uncertainty analyses follow a 'what if' approach, i.e. they try to exemplify *what* would change in the results of the outlook projections *if* a deviation from the 'standard' assumptions were to occur.

For the uncertainty analyses, a set of six scenarios were analysed using different agro-economic models (in addition to AGLINK-COSIMO, CAPRI[7] and ESIM[8] were also applied). All three models are part of the iMAP modelling initiative.[9] An overview of the uncertainty scenarios is given in Table 1, and the assumptions of each scenario are briefly outlined in the following subchapters.

Table 1: Overview on the uncertainty scenarios

Uncertainty analysed	Purpose	Scenario	Model used
Yield and macroeconomic uncertainty	Implications of yield uncertainty	Partial stochastic analysis of arable crop yields (focus Member State level)	ESIM
	Implications of simultaneous yield and macroeconomic uncertainties	Partial stochastic analysis of arable crop yield and macroeconomic variables	AGLINK-COSIMO
Higher input costs in the EU	Implications of an upward development of input prices	Increase of operating costs with a focus on feed costs	CAPRI
Climate Change	Impact of climate change on EU agriculture	Changes in yields due to changes in average temperature and precipitation regime in the EU; 2 technical adaptation scenarios: 'no adaptation', 'maximum yield adaptation'	CAPRI

[7] CAPRI (Common Agricultural Policy Regional Impact): highly disaggregated (regions NUTS 2, products) partial equilibrium (PE) model. A model documentation is provided by Britz, W. and H.-P. Witzke (eds.) (2008): CAPRI Model Documentation 2008, Version 2. Institute for Food and Resource Economics, University of Bonn, Germany. http://www.capri-model.org/docs/capri_documentation.pdf.

[8] Banse, M., H. Grethe (2008): 'European Simulation Model (ESIM) in GAMS: Model Documentation (Version 2.0).' Model documentation prepared for DG AGRI, European Commission, The Hague and Berlin.

[9] M'barek, R., et al. (2012): 'An integrated Modelling Platform for Agro-economic Commodity and Policy Analysis (iMAP)'. JRC Scientific and Technical Report, European Commission, JRC 69667. http://ftp.jrc.es/EURdoc/JRC69667.pdf

Uncertainties related to EU biofuels policy	Non-fulfilment of the 10% target of the Renewable Energy Directive (RED)	EU MS do not reach the target of 10% of transport fuel consumption from renewable energy by 2020 (only 8% are reached)	AGLINK-COSIMO
	Consideration of ILUC factors in the context of the EU biofuel policy	5% maximum from 1st-generation biofuels; favourable counting for 2nd-generation biofuels; use of feedstocks with low ILUC factor implying almost no use of oil crops	AGLINK-COSIMO

2.1 Yield and macroeconomic uncertainty

Among other things, the deterministic baseline assumes steady yield trends (i.e. yields not affected by any weather events) and a specific path for GDP growth, exchange rates and oil prices. Therefore the baseline projections show the agricultural markets developing relatively smoothly. However, and especially in recent years, markets have moved along more volatile paths, and uncertainties related to the development in yields and the macroeconomic environment seem to have increased. In order to assess the sensitivity of the market developments to these uncertainties, partial stochastic simulations were carried out. The ESIM model was used for partial stochastic analysis with respect to crop yields in individual Member States. The AGLINK-COSIMO model gives aggregated results for the EU-15 and EU-N12 and was used for partial stochastic analysis with respect to yields and macroeconomic variables simultaneously.

Partial stochastic analysis of arable crop yields (focus MS level) with ESIM

Fluctuations in weather patterns cause changes in crop yields, which affect supply and may lead to crop price variations. To assess the consequences of arable crop yield uncertainty for EU agricultural markets, the ESIM model was adapted to carry out a partial stochastic simulation of the yields of wheat, barley, maize, sugar, rapeseed, sunflower seed and soybeans. The stochastic analysis covers yield changes in the EU-27 at Member State level, Turkey, the US and the aggregate 'rest of the world'. Two hundred sets of stochastic yields are generated to represent a range of ‘plausible’

yields according to the variability observed in the past (measured as the difference between the trend and the observed yield).[10]

Partial stochastic analysis of yields and macroeconomic variables with AGLINK-COSIMO

Developments in the macroeconomic environment are key drivers for the developments in agricultural commodity markets. However, the macroeconomic variables for the outlook projections are exogenous and their development is rather uncertain. In order to capture the influence of some uncertainties related to macroeconomic developments on the projected results the AGLINK-COSIMO model was adapted to conduct partial stochastic simulations with respect to: GDP growth (EU-15 and EU-N12), GDP deflator (EU-15 and EU-N12), consumer price index (CPI) (EU-15 and EU-N12), the USD/EUR exchange rate and the world oil price (Brent crude oil price in USD per barrel). For the uncertainty analysis, forecasting errors with regard to the respective macroeconomic variables are defined to be the realisation at time t minus the forecast made 18 months earlier by DG ECFIN.

The AGLINK-COSIMO model was also adapted to capture fluctuations in arable crop yields. Therefore past crop yield fluctuations around estimated trends in crop yields were analysed. Regional weather blocks are created, representing the EU (EU-15 and EU-N12), the Black Sea (Russia, Ukraine and Kazakhstan), North America (Mexico and the US), South America (Argentina, Brazil, Paraguay and Uruguay), South East Asia (Indonesia, Malaysia and Thailand) and Australia. While crop yield fluctuations are assumed to be correlated within the regional blocks, they are not correlated across regional blocks and across years.

The impact of uncertainty in both arable crop yields and macroeconomic variables is assessed simultaneously. The stochastic model is simulated 500 times, of which about 80% solve.[11]

[10] For more detailed information on the methodology see: Artavia, M. (2013): 'Stochastic Multi-Market Modelling with Efficient Quadratures: Does the Rotation of Stroud's Octahedron Matter?' Ph.D. Thesis, Humboldt University of Berlin.

[11] For more detailed information on the methodology see: Burrell, A., Z. Nii-Naate (2012): 'Partial stochastic analysis with the European Commission's version of the AGLINK-COSIMO model' JRC Scientific and Technical Reports, European Commission, JRC76019: http://ftp.jrc.es/EURdoc/JRC76019.pdf

2.2 Higher input costs in the EU with CAPRI

In recent years, pressure on the agricultural sector increased on the cost side of production in particular. The main drivers of the increase depend on the sector, for example in the cereal sector the rise was mainly driven by increased costs for fertilisers, machinery, seeds and crop protection[12] while for livestock feed costs are the main concern. In order to analyse the effects of a further increase in input prices on the results of the agricultural market outlook the CAPRI model was applied. To provoke an increase in feed costs, which are endogenously calculated in CAPRI, an exogenous shock had to be introduced into the model. This was done by increasing the demand for meats (beef, pig and poultry) in China by 25-35% while keeping the Chinese trade balance of meats close to the baseline level. The other exogenous operating costs[13] were increased based on an econometric estimation of the observed upward variability (coefficient of variance) of the separate cost items by individual NUTS2 region in the EU Member States.[14]

2.3 Economic impact of climate change in EU regions with CAPRI

The CAPRI model was applied to investigate the medium-term impact of climate change on the projected EU agricultural market developments. The scenario assumes an average temperature increase of 1°C in Europe by 2020 compared to the year 2000, and some changes in precipitation (some regions see increases in precipitation while others have less precipitation during the growing season).[15] Two technical adaptation scenarios were carried out: 'no adaptation' and 'maximum yield adaptation'. The adaptation is captured through adjustment of the crop growth cycle length, crop sowing date and water availability. While the 'no adaptation' scenario

assumes that farmers would not consider any potential adjustments of their production techniques, the 'maximum yield adaptation' scenario assumes that farmers would combine the adaptation elements (cycle length of crop growth, crop sowing date and water availability) in a way that generates the highest possible yield for a given crop.

There are no climate parameters in the CAPRI model, and therefore the modelling of climate change was done through a change in yields. The yield changes induced by climate change for both adaptation scenarios were provided by BIOMA[16] and incorporated into the supply module of CAPRI to determine the related market and income impacts.

2.4 Uncertainties related to EU biofuels policy with AGLINK-COSIMO

The main uncertainties in the context of the EU biofuels policy relate to the fulfillment of the 10 % target of the Renewable Energy Directive (RED)[17] and how the RED might be amended. Both uncertainties have been addressed in two separate uncertainty scenarios.

80 % fulfillment of the EU biofuels mandate

The Renewable Energy Directive established a 20% overall share of renewable energy in EU energy use as a mandatory target for 2020. As part of this overall target, each Member State has to cover at least 10% of its transport fuel consumption from renewable sources (including biofuels). The fulfillment of the mandate is supported by

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[12] DG AGRI (2011): Farm Economics brief N°2: EU production costs overview. DG Agriculture & Rural Development, Microeconomic analyses of EU agricultural holdings, Brussels, http://ec.europa.eu/agriculture/rica/pdf/Brief201102.pdf

[13] Operating costs cover mineral fertiliser, fuel and energy costs, maintenance, pesticides, seeds, services, veterinary costs, feed costs and purchase of young animals (calves, piglets, etc.), cf. the Farm Accountancy Data Network (FADN), http://ec.europa.eu/agriculture/rica/

[14] For more information on the methodology of increasing the operating cost in the model see: Himics, M., Van Doorslaer B., Ciaian P., Shrestha S. (2012): 'Increasing volatility of input costs in the EU agriculture', Presentation to the 123rd EAAE Seminar on Price Volatility and Farm Income Stabilisation, Dublin.

[15] The assumptions are taken from the A1B emissions climatic scenario provided by the ECHAM5 model, cf. IPCC (2012): 'IPCC Special Report on Emissions Scenarios.' Special Report of IPCC Working Group III, Intergovernmental Panel on Climate Change, http://www.ipcc.ch/pdf/special-reports/spm/sres-en.pdf.

[16] BIOMA (Biophysical Models Application) includes a set of biophysical models for different crops. More information is given on the BIOMA webpage: http://bioma.jrc.ec.europa.eu/

[17] Directive 2009/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable sources.

the forecast of National Renewable Energy Action Plans of the EU Member States, and hence the preliminary baseline assumes that the 10% target will be met. However, it is questionable that the targets will really met be by 2020 and therefore an uncertainty scenario was carried out with the AGLINK-COSIMO model, where it is assumed that only 8% of transport fuel comes from renewable sources by 2020.

Consideration of indirect land use change (ILUC) factors

At the same time as the workshop, on 17 October 2012, the European Commission published a proposal to amend the RED in order to reduce the use of food crops for the production of biofuels. [18] A previous version of the proposal had additionally aimed to reduce biofuel production from feedstocks with high ILUC factors (namely oil crops). The scenario analysed for the workshop is based on this previous version of the proposal, assuming that a maximum amount of 5% of first-generation biofuels can be counted towards the 10% renewable energy target; production of biodiesel from vegetable oils is drastically reduced; second-generation biofuels are accounted for at four times their energy content and biofuels from waste oils (e.g. biodiesel produced from used cooking oil) are counted twice. Furthermore it is assumed that the share of second-generation biofuels would slightly increase compared to the baseline settings.

3. Macroeconomic assumptions and related uncertainties

Macroeconomic developments (assumptions) can strongly influence the projected evolution of agricultural markets. Therefore the first session of the workshop was dedicated to a discussion on the macroeconomic assumptions used in the EU agricultural outlook and their general implications for agricultural market developments.

3.1 High degree of uncertainty surrounding the economic outlook

Pierluigi Londero (DG AGRI) explained that the starting point for the EU agricultural outlook projections is the OECD-FAO Agricultural Outlook 2012-2022. Projections for world market prices and also for the rest of the world are taken from this outlook. The

[18] http://ec.europa.eu/clima/policies/transport/fuel/docs/com_2012_595_en.pdf

macroeconomic assumptions are updated for GDP growth, inflation rates, exchange rates and oil prices. Regarding the updates, Londero pointed out that there is always a question as to whether to take the data from one (coherent) source or take data that seems to be more plausible from various sources. For this year's outlook a mixed approach was chosen. The draft baseline assumptions on key macroeconomic variables are shown in Table 2.

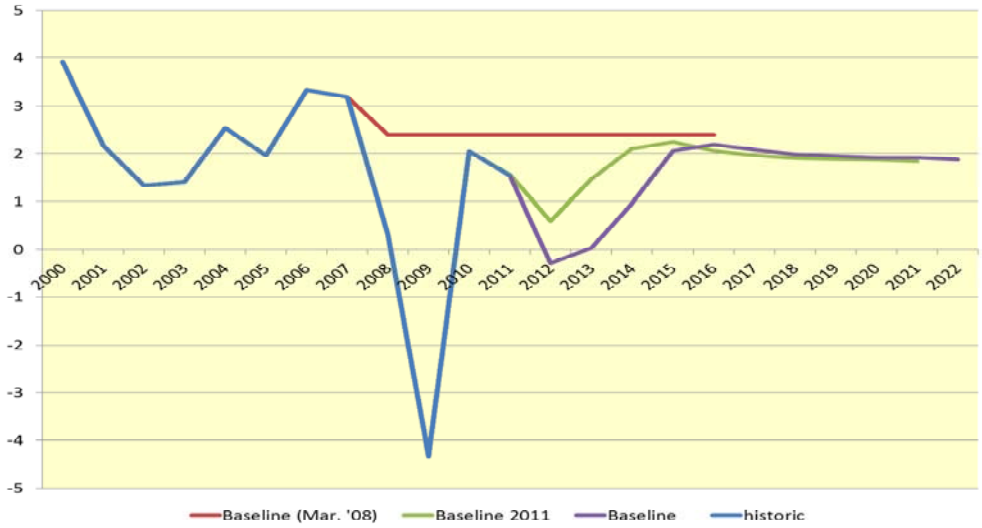
Table 2: Draft baseline assumptions on key macroeconomic variable, 2010-2022

		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Population growth	**EU-27**	**0.3%**	**0.3%**	**0.3%**	**0.2%**	**0.2%**	**0.2%**	**0.2%**	**0.2%**	**0.2%**	**0.2%**	**0.2%**	**0.2%**	**0.2%**	**0.1%**
	EU-15	0.4%	0.4%	0.5%	0.4%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.2%	0.2%	0.2%	0.2%
	EU-N12	0.0%	-0.1%	-0.1%	-0.2%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	0.0%	-0.1%	-0.1%	-0.1%	-0.1%
Real GDP growth	**EU-27**	**-4.2%**	**2.0%**	**1.5%**	**-0.3%**	**0.0%**	**1.0%**	**2.1%**	**2.2%**	**2.1%**	**2.0%**	**1.9%**	**1.9%**	**1.9%**	**1.9%**
	EU-15	-4.3%	1.9%	1.4%	-0.4%	-0.1%	0.8%	1.9%	2.0%	1.9%	1.8%	1.8%	1.8%	1.8%	1.8%
	EU-N12	-3.7%	2.2%	3.1%	1.0%	1.2%	2.6%	4.4%	4.4%	4.3%	4.2%	4.0%	4.0%	3.9%	3.7%
	World	0.9%	3.4%	4.2%	2.6%	2.4%	2.7%	2.9%	2.9%	3.0%	2.9%	2.9%	2.9%	2.8%	2.8%
Inflation	**EU-27**	**0.8%**	**2.0%**	**3.0%**	**2.4%**	**2.0%**	**2.4%**	**2.2%**	**2.1%**	**2.0%**	**1.9%**	**2.0%**	**2.0%**	**2.0%**	**2.0%**
(Consumer Price Index)	EU-15	0.7%	1.9%	2.9%	2.3%	1.9%	2.4%	2.1%	2.0%	2.0%	1.9%	1.9%	2.0%	2.0%	1.9%
	EU-N12	3.2%	2.9%	3.9%	3.7%	3.3%	3.2%	2.7%	2.5%	2.4%	2.3%	2.3%	2.3%	2.4%	2.4%
Exchange rate (USD/ EUR)		**1.39**	**1.33**	**1.39**	**1.27**	**1.16**	**1.25**	**1.34**	**1.35**	**1.35**	**1.35**	**1.35**	**1.35**	**1.35**	**1.35**
Crude oil price (USD per barrel Brent)		**62**	**79**	**111**	**108**	**93**	**90**	**85**	**90**	**94**	**98**	**102**	**105**	**108**	**110**

Source: Preliminary baseline

The baseline assumes that the world economy growth rate is slowing down to 2.6% in 2012 and 2.4% in 2013 and will stay between 2.8% and 3.0% from 2015 onwards. Inflation is assumed to be about 2% from 2016 onwards and the population in the EU-27 will only grow slightly over the projection period. While IHS Global Insight's September forecasts assume a constantly increasing exchange rate over the projection period, the exchange rate is capped at 1.35 USD/EUR in the Commission's baseline from 2016. Londero highlighted that there is always a high degree of uncertainty surrounding the economic outlook, which he illustrated with a graph comparing the assumptions taken in recent baselines regarding the EU-27 GDP growth (Figure2).

Figure 2: Comparison of assumptions regarding EU-27 GDP growth



Source: Presentation Londero (DG AGRI)

3.2 A synchronized global economic slowdown and 'the butterfly effect'

Jan Randolph (IHS Global Insight) gave a presentation in which he reflected on the probable macroeconomic developments over the next 10 years and highlighted key risks for global economic developments over this time horizon. Randolph first outlined the synchronized global economic slowdown that has been observed in recent years between advanced and emerging economies. From IHS Global Insight's point of view the global recession is not likely to last over the whole projection period without further shocks, as the medium- to long-term prospects for the US and some other industries are looking more upbeat.

Focusing on the economic outlook for the US, Randolph pointed out that while the US economy is stuck in a low gear, a 'fiscal cliff' will likely be avoided. It is expected that after the presidential elections the automatic spending cuts will be replaced by entitlement savings and tax increases, most likely beginning in 2014 (and not already in 2012). The tax cuts introduced by the Bush government are assumed to stay in place in 2013, and the 2% payroll tax cut and the emergency federal unemployment insurance benefits might be extended again for 2013 and later phased out (and not suddenly removed). These assumptions hold the dept-to-GDP ratio in the US below 80% over the next ten years.

Commenting on the economic outlook of China, Randolph explained that the risks of a double squeeze downturn in China remains due to several reasons, mainly because (i)

external demand remains weak as exports to the EU decline, (ii) domestic demand is restrained due to a downturn in the construction sector, (iii) inflation diminishes (which is seen as another sign of demand weakness) and (iv) over-capacity dampens investment demand (despite easing monetary policy). Nonetheless, IHS Global Insight does not expect an abrupt shock in China's economic growth but instead foresees a soft landing, because so far the slowdown is much milder than the downturn experienced in 2009 and the Eurozone crisis should not have the same impact for China as the 2009 US financial crisis. However, Randolph further pointed out that over the longer term the risks of an economic slowdown in China are higher due to the following reasons: the local debt bubble highlights the difficulty for China's state to control the banking sector, major US and EU export markets will undergo a prolonged demand consolidation, the boost to China's exports due to its 2002 WTO entry will diminish over time, and China has not implemented any major economic reforms since the reforms dealing with state-owned enterprises.

Regarding global economic developments, the IHS sees a probability of 10% to 15% that the 'worst case' scenario of a deep global recession in 2013-2014 taking place. Randolph pointed out that there are basically four risk triggers for such a worst case scenario: a Euro area meltdown, conflicts in the Middle East and a related oil price shock, the US 'fiscal cliff' and a hard economic landing of China. The narratives for these four risk triggers are summarised in Table 3.

Focusing specifically on the Euro area, Randolph presented four scenarios: Euro extinction, fringe breakaway of Greece, multiple fracture with a 'north-south' split, or a hold together and expand scenario. Regarding the extinction of the Euro, IHS Global Insight sees only a very low chance (3%) of this actually happening within the next five years, mainly because the known and unknown costs of such a break-up would be simply too great. According to IHS Global Insight a multiple fracture within the Euro area with a north-south split is also not very likely. Nevertheless, IHS Global Insight sees a 60% likelihood of Greece leaving the Euro area within the next five years (raised considerably from 20% in November 2011). However, IHS Global Insight sees the same probability (60%) that the Euro area muddles through its current crises, holding together and overcoming the current troubles in a stronger economic condition than before the crisis.

Table 3: Triggers and narratives of the worst case scenario of a deep global recession in 2013-2014 (10-15% probability according to IHS Global Insight)

Risk Triggers	Narrative
Euro area Meltdown	▪ Greece exits Eurozone, causing financial market contagion. ▪ Sovereign bond yields spike as private funding dries up. ▪ Spain, Italy, Portugal, Ireland and Cyprus exit Eurozone. ▪ European recessions deepen, new currencies depreciate.
Middle East Conflicts and Oil Price Shock	▪ Syria unravels and conflict spreads into Lebanon. ▪ Israel and Iraq feel increasingly threatened. ▪ Nuclear talks break down, Iran veers toward confrontation. ▪ Supply disruptions send oil prices past USD150 per barrel.
US 'Fiscal Cliff'	▪ Deadlines at start of 2013 pass with no action, resulting in a fiscal contraction equal to USD488 billion, or 3.0% of GDP. ▪ Tax cuts expire and sequestration leads to spending cuts. ▪ Middle East instability prompts reversal of defense cuts.
China Hard Landing	▪ Real estate market bubbles burst. ▪ Loan defaults by developers and local governments trigger a banking crisis and credit squeeze. ▪ Investment and consumption are scaled back in 2013-16.

Source: Presentation Randolph (IHS Global Insight)

3.3 The outlook for the EU economy has worsened again

Björn Döhring (DG ECFIN) gave a brief overview of recent developments and a short-term outlook for the EU economy. The outlook for the EU economy has worsened again and, within the EU-27, recovery of GDP growth is slow and the picture for next year is fairly bleak. DG ECFIN expects that the effects of the sovereign debt crisis and problems in the labour markets will not only have negative effects for the EU economy in the short-term but will also affect economic recovery in the medium-term. Therefore Döhring agrees with the assumption in the agricultural markets outlook of lower economic growth rates; however he pointed out that the assumption regarding world growth is about 1% lower than the growth forecasted by the IMF. Nonetheless, and even though global GDP growth has lost steam in the course of 2012, Döhring also highlighted that, with gradually strengthening growth in advanced non-EU economies and more balanced growth in emerging markets, the current weakness of global demand is expected to be only temporary.

Employment in the EU is expected to contract for some time and as wages increase only modestly (which is very unlikely to change in the upcoming year) domestic demand continues to decrease, with consumption being held back by decreases in real

disposable income and deleveraging (in some MS). However, the implementation of the policy measures announced at the EU/Euro area level and by Member States should further reduce financial stress and lead to a gradual increase in confidence across the EU, a precondition to increase investment and private consumption.

3.4 Perfect storm conditions - what matters most for commodity price developments?

John Baffes (The World Bank) highlighted that most commodity prices are still high by historical standards. When looking at the cause of this increase in prices, it can be noted that most (though not all) of the conditions for a 'perfect storm' are in place: in the past six years all factors moved together in a way that reasonably explains the high commodity prices observed: increasing crude oil and fertiliser prices, increasing biofuel production, decreasing global stocks of several agricultural commodities, decreasing interest rates, increasing investment in commodity funds, a depreciation of the US dollar and general changes in the world economy (cf. Table 4).

Table 4: Factors for a 'perfect storm' and their developments

	1997-04	2005-12	Change
Food price index (nominal, 2005 = 100)	**89**	**154**	**73%**
MACROECONOMIC DRIVERS			
GDP growth (middle income countries, % p.a.)	4.6	6.2	35%
Industrial production growth (middle income countries, % p.a.)	5.4	7.3	35%
Crude oil price (nominal, US$/barrel)	25	79	216%
Exchange rate (US$ against a broad index of currencies, 1997 = 100)	118	104	-12%
Interest rate (10-year US Treasury bill, %)	5.2	3.6	-31%
Funds invested in commodities (US$ billion)	57	230	304%
SECTORAL DRIVERS			
Stocks (total of maize, wheat, and rice, months of consumption)	3.5	2.5	-29%
Biofuel production (tousand b/d of crude oil equivalent)	231	892	286%
Fertilizer price index (nominal, 2005 = 100)	69	207	200%
Growth in yields (average of wheat, maize, and rice, % p.a.)	1.4	0.5	-64%
Yields (average of wheat, maize, and rice, tons/hectare)	3.7	4.0	8%
Natural disasters (droughts, floods, and extreme temperatures)	174	207	19%
Policies (Producer NPC for OECD countries, %)	1.3	1.1	-15%

Sources: Barclays Capital, Center for Research for the Epidemiology of Disasters, Federal Reserve Bank of St. Louis, Organization of Economic Cooperation and Development, US Department of Agriculture, US Treasury, World Bank, and author's calculations.
Note: 2012 data for some variables are preliminary.

Using data from 1960 to 2012, the World Bank assessed the impact of specific factors on agricultural market prices. Results indicate that oil prices account for more than

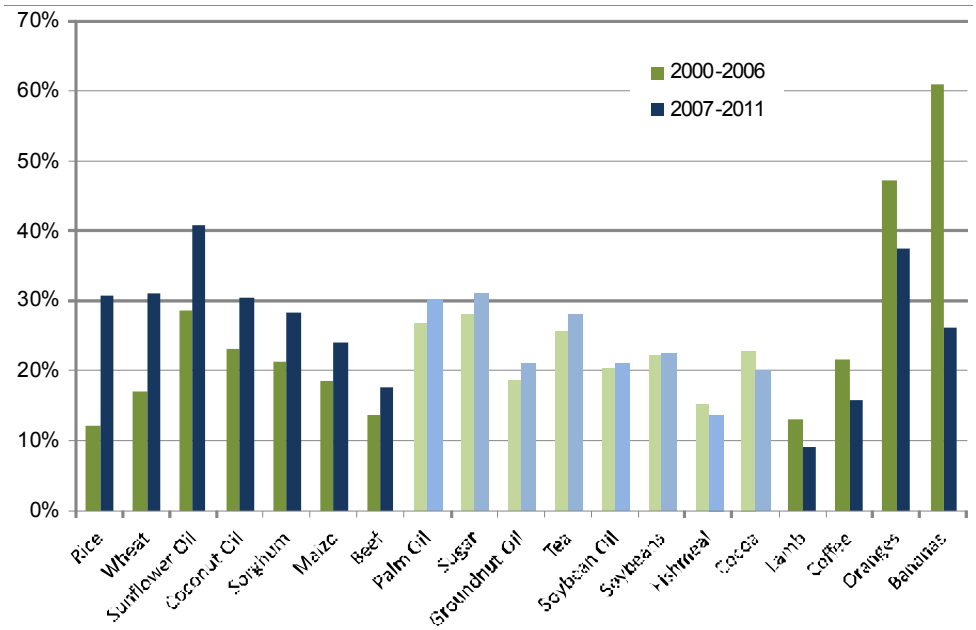
half of the price variability, while the stock to use ratio explains about 15% and exchange rates about 10%. Thus, as the remaining variables do not explain much of the agricultural commodity price developments, the most important uncertainty for agricultural markets seems to come from the energy markets. Baffes went on to outline that although price volatility declined and is now down to 'historical' norms, price co-movement remains high by historical standards, even compared to the inflationary 1970s. Furthermore, and despite moderation during the past 2.5 years, correlation between crude oil and other prices is still high and the increase in oil consumption in non-OECD countries is very significant and could bring additional volatility to agricultural markets.

3.5 The volatility of agricultural prices and the role of speculation

Christopher L. Gilbert (University of Trento) also focused in his presentation on the volatility of agricultural prices. He first highlighted the distinction that has to be made between volatility and high prices. In common discussions, people often say a price is volatile when they actually want to imply that it has risen. While volatility indeed tends to be positively correlated with price levels since both are symptomatic of tight markets, prices can be high but exhibit low volatility. Concern in relation to food price volatility was stimulated by the grains price spike of 2007-08. Many commentators jumped to the conclusion that food prices would become both permanently higher and more volatile. Using monthly data, Gilbert and his colleague Wyn Morgan analysed the volatility of 19 food commodities over the 40-year period 1970-2009. They found that volatility had only increased significantly over the second half of the period (1990-2009) relative to the first two decades for two of the 19 commodities (bananas and rice) whereas it had decreased significantly for nine of the commodities. The food price rises of 1972-74 were much larger than those of 2007-08 and 2009-10. However, when taking a shorter term perspective and updating the analysis with data for 2010-11, Gilbert stressed that there is indeed some evidence of increased volatility in grains prices, with beef (as it is dependent on maize feed) and sunflower oil also showing increased volatility. The chart in Figure 3 presents the difference between the 2000-06 and 2007-11 volatilities. Dark bars indicate cases where the change in volatility is statistically significant. There are statically significant increases for seven (rice, wheat,

sunflower oil, coconut oil, sorghum, maize and beef) of the 19 food commodities analysed and decreases for only four (lamb, coffee, oranges and bananas).

Figure 3: Volatility in agricultural prices



Source: Presentation Gilbert (University of Trento)

Turning to the analyses of the sources of increased price volatility, Gilbert assessed the impact of biofuels and speculation in more detail. Regarding biofuels, Gilbert noted that most of the work on the effects of biofuels on food prices has focused on price level effects, as the use of maize for ethanol and vegetable oils for biodiesel shifts the demand curve to the right. As higher prices will eventually bring forth additional production this impact will be larger in the short run than the long run. The attractiveness of converting food crops into biofuels depends on energy prices. Shocks to energy prices are therefore likely to transmit to food prices and this volatility impact will not diminish with the passage of time. Gilbert also highlighted that inflexible mandates (quantities are fixed) reduce demand elasticities and hence increase volatility.

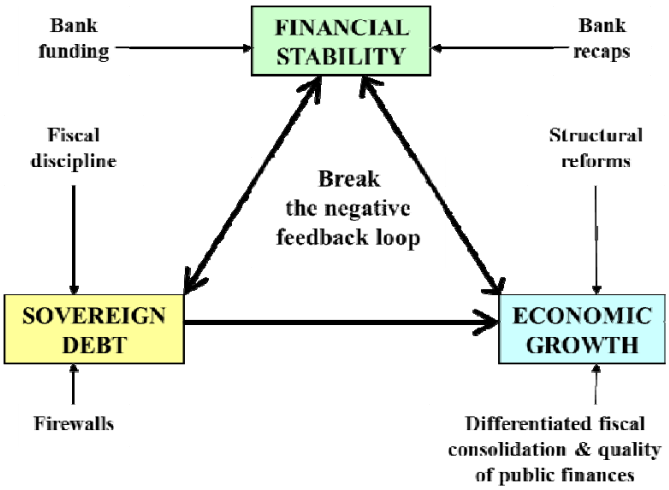
Regarding the impact of speculation on agricultural prices, Gilbert's analyses show that index investors (traders, producers and merchants) probably did contribute to the rise in food prices in 2007-08 and the subsequent fall in late 2008. However, with regard to price volatility, econometric tests show that both the trading of index investors and traditional speculators tends to reduce volatility. Therefore, according to Gilbert's analyses the most likely culprit for increased volatility in agricultural commodity markets seems to be diversion of food crops to biofuel uses.

3.6 Main points of the session discussion

The discussion of this session focused on the general assumptions regarding macroeconomic developments and their importance for the projections of agricultural commodity markets. The macroeconomic assumptions underlying the projections for the EU agricultural markets take a business as usual approach after the difficulties in the short run, i.e. a return to a stable economic growth path along the lines of the previous decade is assumed from 2015 in the EU. However, participants of the workshop emphasised that these underlying assumptions are still very uncertain and some of the participants stated that they are generally more pessimistic with regard to global macroeconomic developments. They do not expect such a rapid return to normal growth rates due in particular to the financial crisis in the Euro area and the public debt levels in the US.

It was stressed that the negative feedback loop that currently exists in the triangle of 'financial stability' (weak banks), 'sovereign debt' (weak public finances) and 'economic growth' (weak growth) needs to be broken to bring trust back into the markets and solve the economic crisis (cf. Figure 4). While this feedback loop leads downward due to the financial and economic turmoil, the same loop will lead upward to resolve the economic crises once trust returns to the markets. Many workshop participants are convinced that, after some more time spent further muddling through the economic crises, confidence will come back into the markets and the negative feedback loop will be broken.

Figure 4: Feedback loops and crisis resolution



Source: Presentation Döhring (DG ECFIN)

The preliminary baseline assumes a capped exchange rate of 1.35 USD/EUR. This assumption was the subject of some discussion, and while about 20% of the workshop participants see the exchange rate in the year 2022 being at the currently assumed level between 1.25 and 1.35 USD/EUR, about 50% expect it to be above and about 22% for it to be below 1.25 USD/EUR. Regarding the oil price, the preliminary baseline assumes a price for crude oil of 110 USD/barrel in the final projection year 2022. While about 42% of the workshop participants agree with this assumption and expect the oil price to be between 90 USD/barrel and 120 USD/barrel, 50% expect a level above 120 USD/barrel and 8% a level below 60 USD/barrel. The voting on the expectations of the workshop participants regarding exchange rate and oil price underlined the fact that the developments of macroeconomic variables are rather uncertain and may differ from the assumptions used for the baseline exercise. Therefore workshop participants explicitly appreciated the partial stochastic analysis of macroeconomic variables in the context of the uncertainty analyses performed on the European Commission's outlook, as this helps to highlight and better understand the sensitivity of the baseline results to the related uncertainties.

4. Biofuels: a key source of uncertainty

In recent years the grains markets have been increasingly affected by developments in the biofuel markets, which are themselves still strongly dependent on biofuel policies. Biofuel mandates in the US and targets in the EU are considered especially key for biofuel demand. This session was dedicated to the preliminary baseline results for biofuels and the related uncertainties like the fulfilment of the EU biofuel targets, a mandate waiver in the US, and the development of second-generation biofuels production.

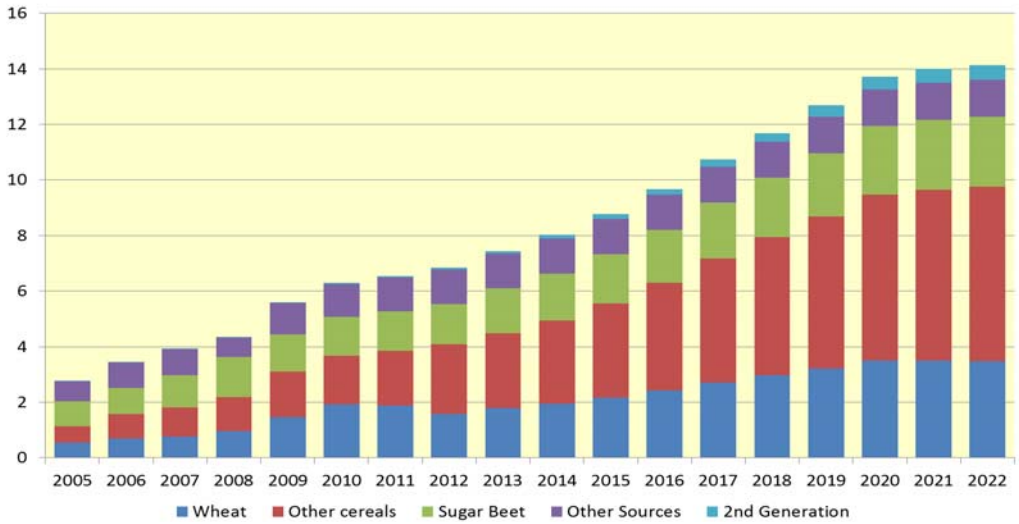
4.1 EU to become second largest biofuel user

Stephan Hubertus Gay (DG AGRI) presented the preliminary outlook results for the EU biofuel markets. For the preliminary outlook it is assumed that no changes are made with regard to the existing EU biofuel policy and that the mandate of the Renewable Energy Directive (RED) is met in the year 2020. With respect to the fulfilment of the 10% transport fuel target, second-generation biofuels, including biodiesel from waste oils, are counted as double, and their shares in biofuels' use are assumed at 0.2% and

0.9% respectively. A further assumption is that ethanol develops more favourably than biodiesel. In addition, in a context of slightly declining overall fuel consumption, the share of diesel over petrol is increasing.

Projection results show that the EU would become the second largest biofuel user over the projection period. Thus, although still well behind the biofuel consumption of the US, biofuel consumption in the EU would be above the level of Brazil. While the share of first- and second-generation biofuels is determined exogenously, the allocation of ethanol versus biodiesel consumption is determined endogenously in the model. The main results on energy shares show that ethanol would represent 11.3% of EU petrol consumption and biodiesel 7.9% of EU diesel consumption in 2022. To reach this level, EU ethanol production would further increase over the medium term, with an acceleration projected after 2013. Wheat and especially maize would remain the major ethanol feedstocks, with projection results showing a considerable increase in other cereals (maize), and the share of sugar beet is also projected to increase (cf. Figure 5). In addition, about three million tonnes of ethanol in oil equivalent would be imported. The increase in EU biodiesel production expected to be fairly gradual.

Figure 5: EU ethanol production by feedstock (million litres)



Source: Presentation Gay (DG AGRI)

4.2 Uncertainties in the EU's biofuel sector

Zebedee Nii-Naate (JRC-IPTS) presented the uncertainty analysis for the biofuel sector. The main uncertainties are related to the EU biofuels' policy, and therefore one uncertainty analysis assumes that only 80% of the biofuels mandate would be realised, i.e. EU Member States achieve only 8% of transport fuel consumption from

renewable energy by 2020 (instead of the 10% mandated). A second scenario (ILUC) assumes a modification of the RED to foresee that a maximum amount of 5% of first-generation biofuels can be counted towards the 10% renewable energy target, the use of oil crops as feedstock is to be reduced drastically and second-generation biofuels are accounted for at four times their energy content and biofuels from waste oils are counted twice (c.f. Table 5).

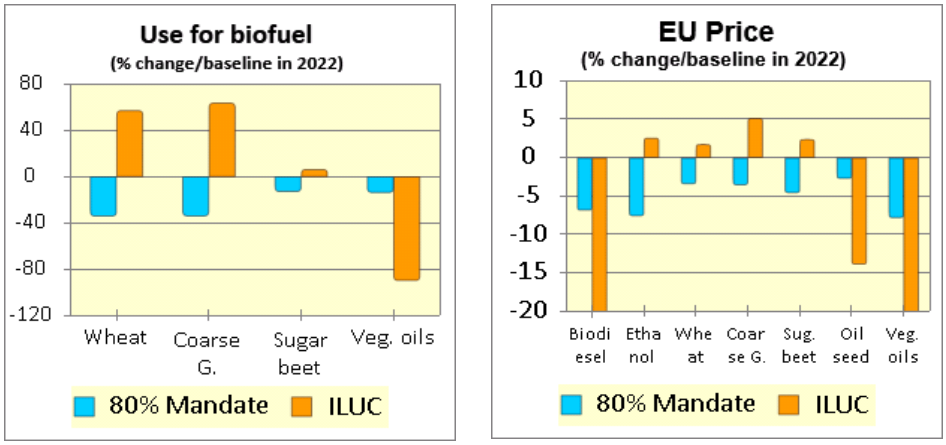
Table 5: EU-27 biofuels energy shares, 2020 (%)

	2020 Baseline	80% Mandate	ILUC
Biofuel (in fuel)*	10%	8%	9.2%
1st generation (in fuel)	7.8%	6.1%	5%
2nd generation (in fuel)	0.2%	0.2%	0.6%
Waste oil (in fuel)	0.9%	0.8%	0.9%
Biodiesel (in diesel)	8.1%	6.9%	2.7%
Ethanol (in petrol)	11.1%	7.4%	16.4%

Source: Presentation Nii-Naate (JRC-IPTS); * Renewable Energy Directive accounting

In the uncertainty scenario of an 80% fulfillment of the mandate less arable crops are used for biofuel production. EU biofuel and feedstock prices decrease, which would also lead to a small decrease in world prices. Furthermore, a large decrease in ethanol imports is projected whereas exports of arable crops would increase. In the ILUC uncertainty scenario projections show an extreme decrease in the use of vegetable oils for biodiesel. This decrease is partially offset by an increased use of cereals for ethanol. Prices for biodiesel and vegetable oils are expected to fall significantly. Imports of biodiesel are projected to collapse and EU net exports of vegetable oils would improve. As in this scenario more cereals would be used for the production of ethanol, cereal imports would increase and exports decrease (cf. Figure 5). However, the resulting share of ethanol in petrol would imply a modification of the car industry towards more flexible-fuel cars and the adaptation of more cars for the use of fuel mixtures with 85% and 15% ethanol respectively.

Figure 6: EU biofuel feedstocks and prices, 2022



Source: Presentation Nii-Naate (JRC-IPTS)

Interesting results for the biofuels sector were also obtained by the partial stochastic analysis of macroeconomic variables and crop yields (cf. section 2.1). Nii-Naate thereby focused on the example of low maize yields in the US and either high or low crude oil prices. Scenario results indicate that if crude oil prices were higher than those assumed in the preliminary baseline, limited net exports of maize from the US and a binding EU mandate would favour biodiesel because the feedstock price increases for ethanol would outstrip biodiesel. Thus, high oil prices incentivise production and consumption increases of biodiesel. By contrast, low crude oil prices would lead to decreases in domestic biofuel production, resulting in increased imports of ethanol and biodiesel. Coarse grain prices would increase because of low maize yields in the US, with high oil prices exacerbating this increase. Furthermore, high oil prices would lead to improvements in the EU's trading position in coarse grains and ethanol, whereas low oil prices would result in a deterioration of the EU's arable crops trading position.

4.3 Outlook for second-generation biofuel production

Christoph Berg (F.O. Licht) first commented explicitly on the biofuel results of the preliminary baseline projections and stressed that the Commission seems to be too optimistic and the numbers are well above the current production capacities in the EU. Taking into account that presently production capacities are only used to about 50%, there is currently no incentive for business to invest in biofuels, and Berg does not expect the situation to change in the near future. Moreover, as it takes about 4-5 years from the time the building of a new production plant for first-generation biofuel

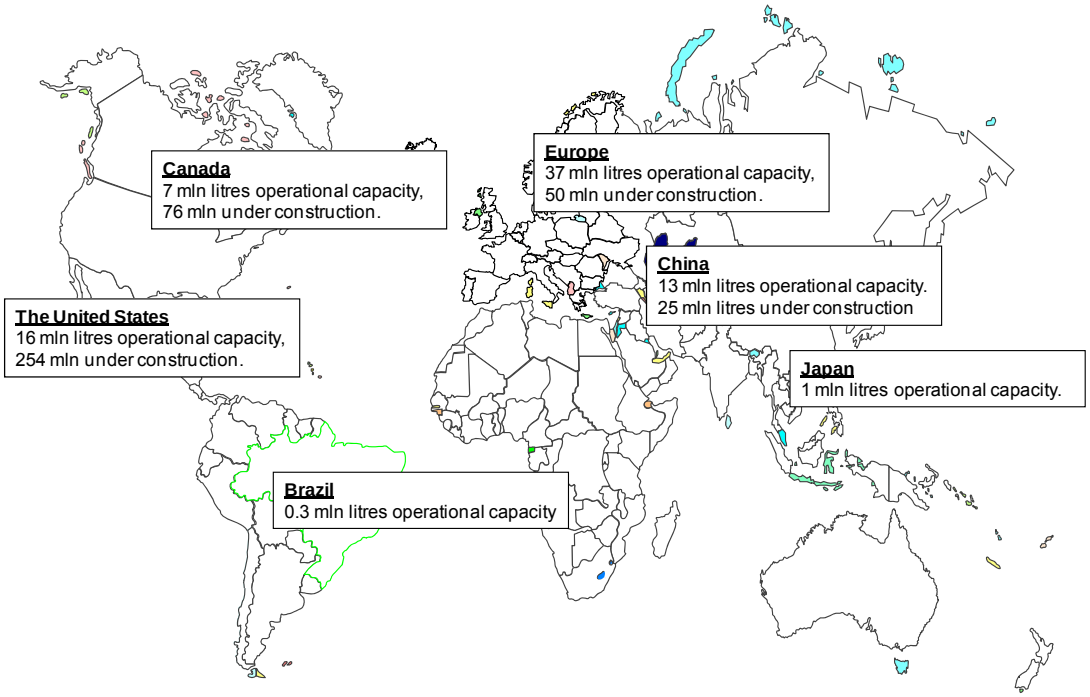
is announced until it actually begins to function, Berg does not expect new production capacities before 2022.

Berg further explained that the projected baseline demand for bioethanol of almost nine million tonnes implies an excessively high market share, as it would require widespread use of E-85 fuel[19] with flexible-fuel cars, which in the EU are currently only used in Sweden. With regard to feedstock, Berg agrees with the projections that maize in particular would increasingly be used for bioethanol. However, he also pointed out that there is an increasing competition for maize for other bioenergy production, such as for biogas. Regarding sugar beet ethanol, Berg does not expect the production increases projected in the preliminary baseline as currently not much investment can be observed. With respect to biodiesel, even though production capacities are actually already above the 2022 figures (i.e. there is more than enough capacity), Berg does not really expect the EU biodiesel production to expand up to the projected amounts. Berg concluded that the EU will not meet its biofuel targets in 2020.

Turning to the general outlook for second generation biofuels production, Christoph Berg focused on the prospects of cellulosic ethanol production. Global cellulosic ethanol capacity slowly but steadily increased over the past few years and there are plans to reach a capacity of about 800 million litres by 2014. Worldwide currently operational cellulosic ethanol plants have a capacity of about 75 million litres and plants with an overall capacity of about 400 million tonnes are currently under construction and should be operational in 2013 (cf. Figure 7).

[19] E-85 is a fuel that contains 85% ethanol and 15% petrol.

Figure 7: Cellulosic Ethanol Plants 2012



Source: Presentation Berg (F.O. Licht)

Berg presented some Lighthouse projects for cellulosic ethanol plants in the world that will lead the market in the near future. The only project in the EU is being constructed by Chemtex in Crescentino, Italy. The Chemtex plant costs about 140 million Euros, will have a production capacity of 50-76 million litres and the feedstock used will be wheat straw. The operators of Chemtex plan to license their knowledge with roll-outs in Brazil and the US. Enerkem is building a cellulosic ethanol plant in Edmonton, Canada. The Enerkem plant will have a capacity of 38 million litres, will cost about 70 million Canadian Dollars and its feedstock will be municipal solid waste (MSW). Roll-outs of three plants are planned in Canada. In the US, POET is currently constructing a plant in Emmetsburg (Iowa), with a capacity of 76 million litres. Construction costs for the POET plant will be about 250 million USD and the feedstock used will be maize stover. POET plans several roll-outs in the US. The biggest plant currently under construction is being built by Abengoa and is planned to be finished in 2014. The plant has rather massive costs of 467 million USD and will have a production capacity of 90 million litres. Feedstock for the plant will be maize stover and the company plans several roll-outs in the US and also in the EU.

Concluding his presentation, Berg highlighted that second-generation biofuels are gaining momentum, and 2013 will be a milestone year. Most growth will take place in

the US and Brazil (in the latter because there is good feedstock due to sugar cane). Regarding the developments in the EU, Berg thinks that incentives for investment in second-generation biofuels are too weak (i.e. it is currently not attractive to invest in cellulosic ethanol plants in the EU).

4.4 US ethanol market, mandates and wavers

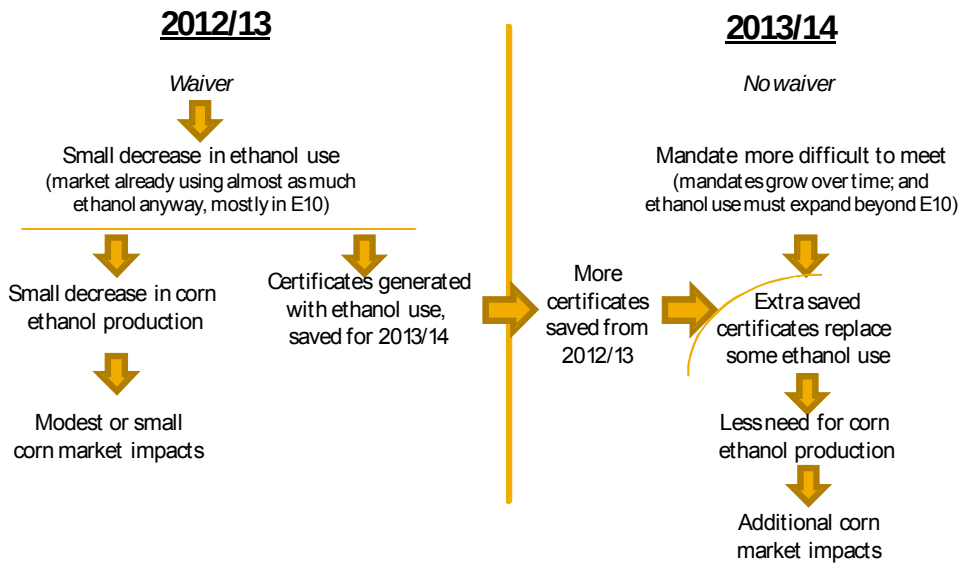
Wyatt Thompson (FAPRI) presented the results of an analysis of waiving the biofuel use mandates, or Renewable Fuel Standard (RFS) in the US[20]. Waiving the mandates is currently under discussion in the US as it could reduce demand for agricultural feedstocks, and potentially offset some of the impacts of the 2012 drought in the US. The waiver option analysed is a reduction of the overall mandate and the model used for the analysis is the FAPRI-MU model that includes biofuel and agricultural commodity markets.

Results of the analysis indicate that a reduction of the overall RFS would only have a small negative effect on the maize price in 2012/13 relative to the baseline. The effect is small because the mandate is not very binding, in other words overall ethanol production is motivated by the current market conditions for crop, fuel and oil markets and not by the RFS. However, the effects of a 2012/13 mandate waiver could be greater in 2013/14. In the US, extra biofuel use in one year allows counting biofuel use against the mandate in the next year via a certificate system. Thus, if the waiver allows saving certificates for the next year, then the mandate might be easier to meet in 2013/14. In this case, maize prices in the year 2013/14 would be lower than in the baseline (cf. Figure 8).[21]

[20] The mandates are minimum levels of biofuel use.

[21] More information is given in Thompson, W., P. Westhoff, J. Binfield (2012): 'Renewable Fuel Standard Waiver Options during the Drought of 2012'. FAPRI-MU Report No 11-12, Food and Agricultural Policy Research Institute (FAPRI) at the University of Missouri (MU), Columbia, US.

Figure 8: Delayed impacts of a RFS waiver in the US



Source: Presentation Thompson (FAPRI)

4.5 Ethanol cross-trade due to biofuel policies: fuelling resource use and GHG emissions

Focusing on two-way trade in ethanol between the US and Brazil, Seth Meyer (FAO) gave a presentation on how environmental legislation on biofuels actually encourages resource use and greenhouse gas (GHG) emissions. A new phenomenon in the global biofuels economy can be observed: the mutual exchange of bioethanol between the US and Brazil. In Brazil ethanol is mainly produced from sugar cane and in the US primarily from maize; however, irrespective of its source, the produced bioethanol in both countries is physically a homogeneous product. Ethanol cross trade increased considerably in 2011 and 2012 with large quantities of ethanol crossing paths between the two countries. In a study done by Meyer, Schmidhuber and Barreiro-Hurlé the authors found that the notable volumes of the two-way trade in ethanol could not be explained by traditional market factors (seasonality, border trade, tariff disaggregation). Instead, Meyer and his colleagues found that the driving forces behind this trade are environmental policies, which make a physically homogeneous product a differentiated one by intending to foster carbon saving production methods of the underlying feedstocks (and processing methods).

The US mandate system, known as the Renewable Fuel Standard 2 (RFS2)[22], is governed by the Energy Independence and Security Act of 2007 (EISA).[23] The legislated biofuel mandates in the US are minimum quantities set for the following four categories of biofuels (segmented based on feedstocks, process, fuel type and GHG reduction score): renewable fuel, advanced biofuel, bio-based diesel and cellulosic biofuel. While the overall biofuel mandate (renewable fuel) explicitly includes maize starch ethanol, the specific mandate for 'advanced fuels' excludes maize starch ethanol but includes sugar ethanol[24]. Advanced fuels are supposed to be 'cleaner', i.e. they have a higher potential for reduced GHG emissions, and advanced fuels blended in excess of the advanced mandate can therefore be used to satisfy the total renewable fuels mandate (i.e. advanced ethanol can crowd out conventional ethanol, but not vice versa). Furthermore, within the advanced fuel category, other advanced ethanol (like cane-based ethanol) can substitute for mandated cellulosic ethanol. This opens up an import opportunity for sugar cane-based ethanol from Brazil.

Figure 9: US mandate classification of biofuels

Mandate	GHG reduction minimum	Feedstocks, fuels and processes
Renewable Fuels (T)	20%	(all of below and) Ethanol from maize starch
Advanced Fuels (A)	50%	(all of below and) Sugar, Starch other than maize, bio-based diesel from co-processing with petroleum, butanol, biogas
Bio-based Diesel (B)	50%	Distillate replacements produced from: Vegetable oil, animal fats, waste grease, animal waste and byproducts, excluding co-processing with petroleum
Cellulosic Biofuel (S)	60%	Derived from cellulose, hemi-cellulose or lignin from Renewable Biomass (from existing lands in production): Dedicated crops, crop residues, planted trees and residues, algae, yard waste and food waste

Other feedstocks possible in each class unless explicitly excluded (such as maize starch in advanced) which meet the GHG reduction minimum
Source: Presentation Meyer (FAO)

Due to the limited abilities to produce advanced biofuels in the US, prices are higher in the US than they are for (cane-based) ethanol in Brazil, which gives an incentive to

[22] http://www.epa.gov/otaq/fuels/renewablefuels/

[23] Energy Independence and Security Act (EISA) of 2007: http://www.gpo.gov/fdsys/pkg/PLAW-110publ140/pdf/PLAW-110publ140.pdf

[24] Meyer pointed out that the idea behind this legislation may be to not only capture environmental concerns (GHG emissions) but also food security concerns (by explicitly excluding maize from the advanced biofuels quota and thus limiting maize as a feedstock for fuel production).

trade. Ethanol exports from Brazil to the US obviously result in a decrease in the amount of bioethanol available in Brazil, provoking a price increase for ethanol in the domestic market. This opens up the possibility for conventional (maize) ethanol to be exported from the US to Brazil. The total volume of the ethanol cross trade between Brazil and the US (for every gallon of advanced ethanol drawn into the US, how much conventional ethanol is sent back) is determined by the relative demand and supply elasticities in the two markets (as influenced by policies and the blend wall) and the market context (mainly oil and feedstock prices). However, it is likely that cross trade will increase (at substantially larger volumes) as the size of the mandate for advanced fuels in the US will expand rapidly over the next decade.

Turning to the environmental effects of the ethanol cross trade between Brazil and the US, Meyer emphasized that considerable amounts of transportation fuel are consumed in the mutual exchange of ethanol, which means that (i) additional fossil energy is consumed along with the associated GHG emissions and (ii) transportation costs increase the final product price for consumers and may reduce demand for renewable fuels. Both issues are in direct conflict with the stated objectives of reducing the consumption of fossil fuels and lowering GHG emissions. Meyer highlighted that cross trade could be eliminated (and consequently both costs and GHG emissions reduced) by an inter-country 'book and claim' system based on (international) Renewable Identification Numbers (RINs).[25] With such a system between the US and Brazil it would actually not be necessary to trade the biofuels physically, which would not only save transport costs and GHG emissions from shipping, but also lead to lower ethanol prices in both markets and potentially induce domestic consumption increases in both countries.

4.6 Summary of the session discussion

In the discussion some comments were made on the externalities related to biofuel policies (like ILUC or the ethanol cross trade) which are not taken into account equally in all countries. It was stressed that assumptions on biofuel developments do indeed matter as they are a driving force for agricultural market developments. Therefore

[25] In the US a RIN is a serial number that indicates the biofuel type. RINs are used to track biofuel production, use and trade. The RINs are used by blenders to prove that they meet the mandates.

most of the session discussion was dedicated to whether or not the EU will be able to fulfil its biofuel mandates in 2020. Even though the ethanol and biodiesel forecasts according to the National Renewable Energy Action Plans (NREAP) of the EU Member States foresee that the mandate will be met, workshop participants consider the Member States forecasts overly optimistic. In addition, the use of second-generation biofuels will be limited as production is still expected to stay at a low level.

Workshop participants highlighted that one of the major risks for the EU biofuels sector is the slow implementation of the RED in EU Member States. Another risk is related to potential policy changes that could impose more stringent sustainability requirements and the consideration of ILUC factors, which could affect biodiesel supply especially.

Members of DG AGRI and the JRC-IPTS involved in the baseline construction process agreed that the assumption of a fulfilment of the EU biofuel mandate seems to be too optimistic. However, the baseline approach is usually to take existing and already agreed policies as given, and therefore it is also assumed that the EU mandate of the Renewable Energy Directive will be met. To capture the uncertainty involved, the conducted uncertainty analysis includes one scenario where the biofuel mandate would only be fulfilled by 80%.

5. Cereals, oilseeds, sugar: production, productivity and related uncertainties

This session was dedicated to the discussion of the preliminary baseline results for cereals, oilseeds and sugar, and related uncertainties like the impact of yield uncertainties and climate change, use of sugar for ethanol, or the implications of the recent US drought for the developments in world grains and oilseeds markets.

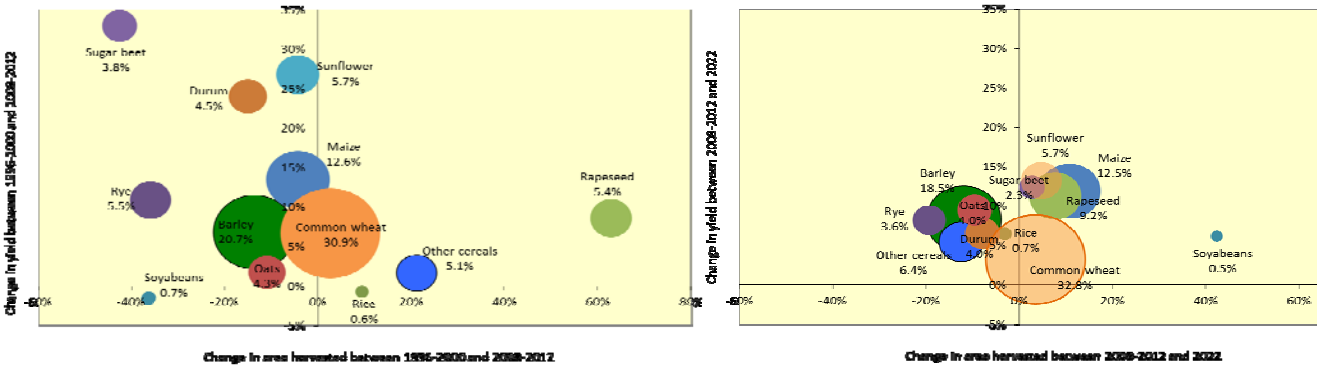
5.1 Decreased yield dynamics in the EU

Stephan Hubertus Gay (DG AGRI) presented the preliminary outlook results for cereals, oilseeds and sugar. The arable crop area in the main exporting countries is expected to expand over the projection period, especially in Russia and Ukraine. Yields are also

projected to increase, with the biggest yield increases expected in Russia for wheat and oilseeds, in the US for coarse grains and in Australia for all arable crops. In the EU, even though the overall utilised agricultural area is projected to further decrease (due to the use of land for building purposes and also for the protection of forest land and other habitats), the decline is expected to be slower than in the last decade. While the barley area is likely to decline, the areas for wheat and oilseeds in the EU are expected to slightly increase. In the past, developments with respect to yield and area changes have been quite diverse, with rapeseed area and sugar beet yield progressing most, but the preliminary projections indicate that arable crops' area and yield will move closer together over the medium term. Projected yield increases are based on recent trends and are especially low for common wheat whereas they are more dynamic for sunflower seed, maize, rapeseed and sugar beet (cf. Figure 10).

Figure 10: Changes in area and yields by main crops

between 1996-2000 and 2008-2012 between 2008-2012 and 2022



Source: Presentation Gay (DG AGRI); Note: the size of the bubble refers to the share in area harvested on average in the years 1996-2000 (left panel) and 2008-2012 (right panel).

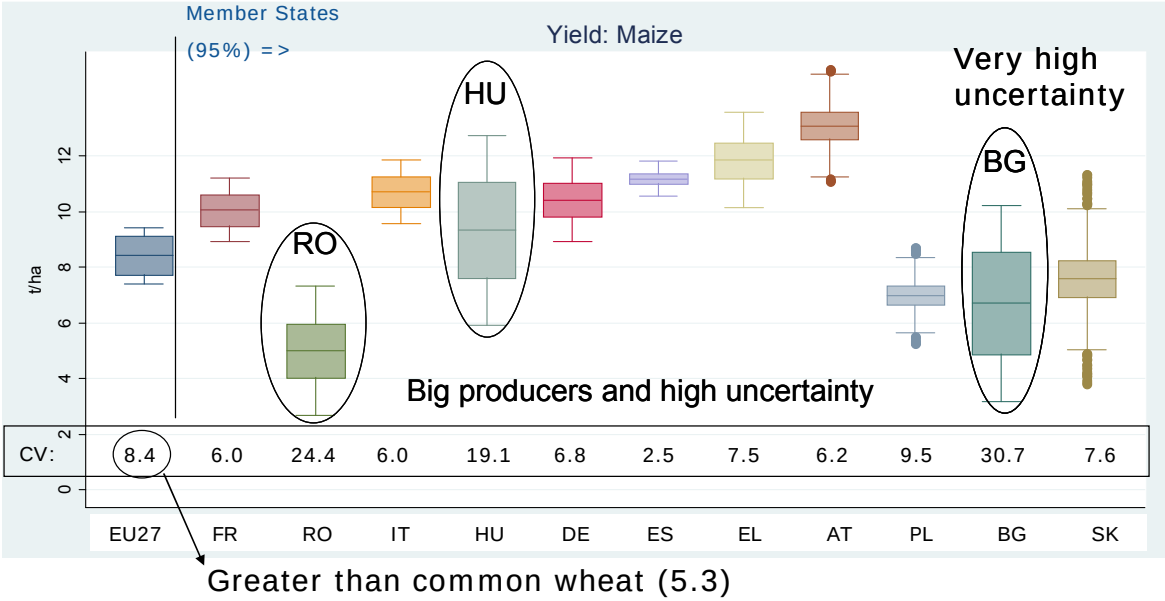
Preliminary projection results put the total wheat production in the EU-27 at 148.4 million tonnes in 2022 and production of coarse grains and total oilseeds at 160 and 34.5 million tonnes respectively. Regarding the EU net trade position, the EU is expected to remain a considerable net importer of oilseeds (mainly soybeans) and a net exporter of cereals. Even though the cereals outlook for the EU is generally positive, the stock to domestic use ratio is projected to remain tight (and below the ratio of the last decade). After the 2012 price spike due to the drought, world and EU grain prices may be lower for a few years before reaching high levels again driven by the dynamic world demand.

Sugar production in the EU is expected to increase over the projection period, mainly driven by increasing world prices and growing demand for bioethanol, as well as by the end of the EU sugar quota regime. Competition on the domestic sugar market is also expected to come from the increasing use of isoglucose. The EU has been a net importer of sugar since the EU sugar reform in 2006, but preliminary projection results indicate that the EU will come close to self-sufficiency by the end of the projection period.

5.2 Impact of yield uncertainties and climate change

Marco Artavia and Pavel Ciaian (both JRC-IPTS) presented the major results of the uncertainty analyses for the grains sector with respect to the impacts of yield uncertainties and climate change. The impacts of yield uncertainties on the EU-27 agricultural markets were depicted at Member State level with the ESIM model (cf. section 2.1). The stochastic shocks were introduced in 2022 and no land adaptation was assumed (which reflects farmers' inability to change land allocation in the same year the extreme weather event occurs). Scenario results reveal that while yield uncertainty may not be a very important factor at the aggregated EU-27 level it most certainly is at Member State level, especially in the EU-N12 (cf. Figure 11). In particular, in Romania, Bulgaria and Hungary the weather uncertainty seems to be greater than in other EU regions because of a higher frequency of extreme weather events and a lower level of mechanisation (irrigation, etc.). In addition, yield variability is much higher for maize than for common wheat. Turning to the effects of short-run yield uncertainty on prices, Artavia highlighted the different levels of price variability between the crops, with wheat, barley and soybeans showing a relatively high variability and maize, rapeseed and sunflower seed a relatively low variability. The difference can be explained by the demand elasticity of the world market players and their market share.

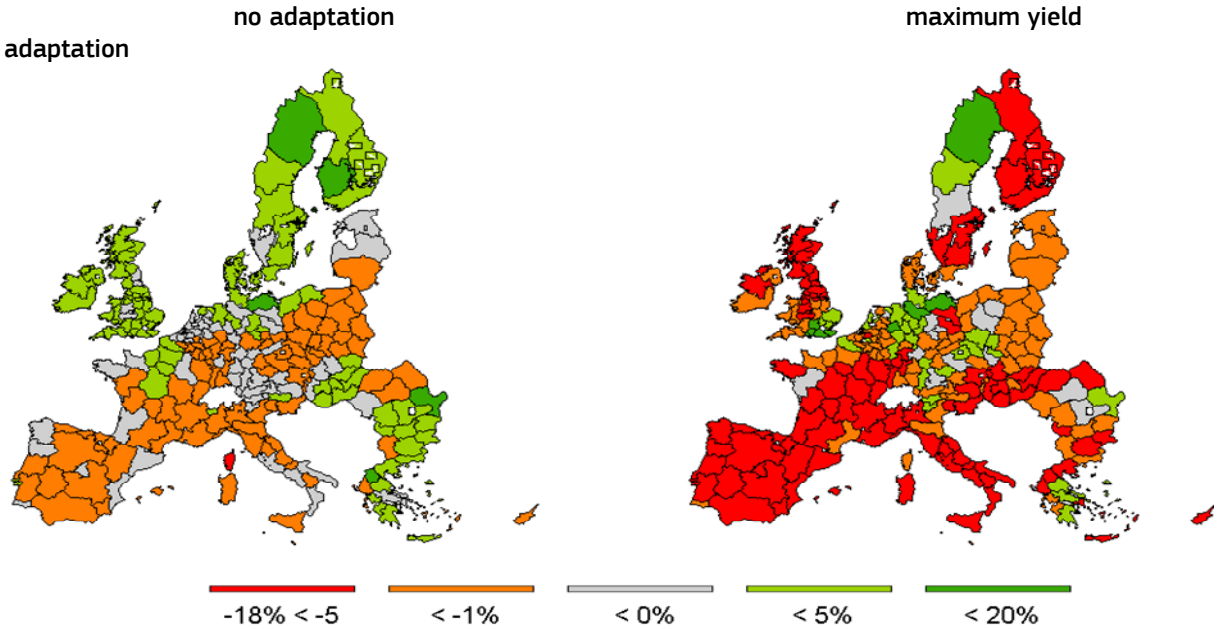
Figure 11: Distribution of maize yield in the EU (in t/ha)



Source: Presentation Artavia and Ciaian (JRC-IPTS)

The medium-run economic impacts of climate change on EU agriculture were assessed using the CAPRI model. Climate change is reflected through yield changes provided by the BIOMA biophysical modelling platform and for the uncertainty analysis only the EU is considered. The scenarios conducted were 'no adaptation' (i.e. the same as in the baseline) and 'maximum yield adaptation' (cf. section 2.3). Scenario results indicate that climate change has an overall positive effect on yields in the EU, except in the case of sunflower seed in the no adaptation scenario. The yield changes in the maximum yield adaptation scenario are higher and lie between 2% and 33%. The higher yields convert to production increases in the EU, but there are significant differences in adjustment patterns between sectors and EU regions. As yields increase the most in maize, production increases in maize are much higher than for other crops. Furthermore, the simulation results indicate that prices of agricultural commodities will decrease due to the higher output levels. Overall, the change in the total value of EU production is projected to be relatively small at the aggregated level, with -0.1% in the no adaptation scenario and -5% in the maximum yield adaptation scenario (cf. Figure 12). However, in the latter scenario, many of the Southern regions of the EU see larger decreases in production value while in the south of England, north of Germany or Sweden the yield gains offset the decreases in prices and the production value is higher than in the baseline.

Figure 12: Regional changes in the value of production due to climate change (2020, % change relative to baseline)

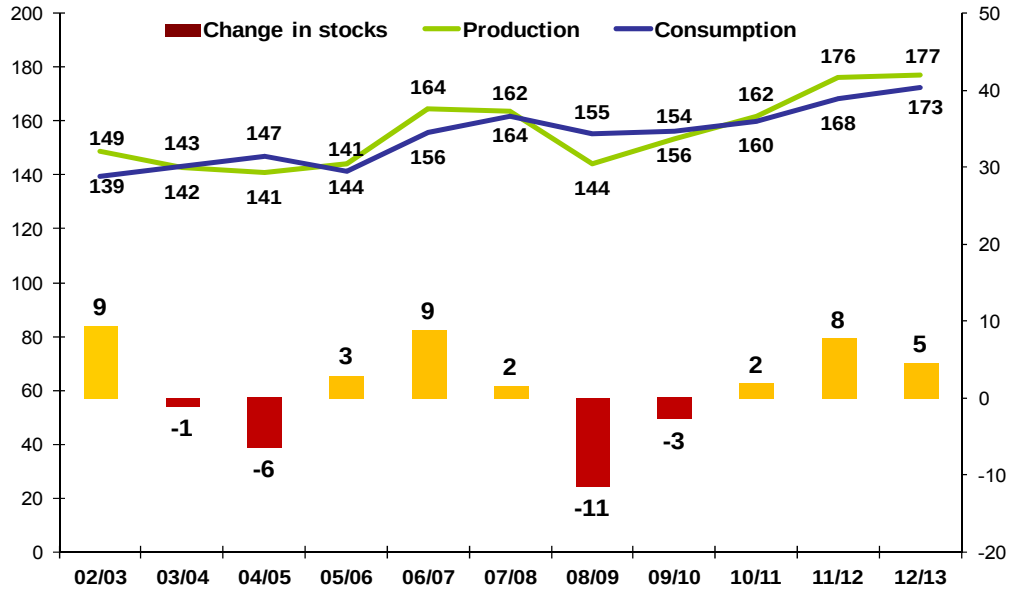


Source: Presentation Artavia and Ciaian (JRC-IPTS)

5.3 Sugar markets and ethanol use of sugar

Thordis Möller (Nordzucker AG) presented information on the EU and world sugar markets in 2012/13 and also on the use of sugar for energy. Reflecting on the current situation and the very recent past of the EU sugar market, Möller highlighted that the high beet and sugar yields in 2011/12 led to the highest level of EU production in six years at 18.4 million tonnes of raw sugar equivalent (rse). Although the 2012/13 season started with good conditions similar to the previous season, 2012/13 will not reach the record level of 2011/12. While the sugar beet area in the EU remained unchanged (14.2 million hectares), the average sugar yield is expected to be around 12 t/ha in 2012/13, compared to the 13 t/ha of 2011/12. Therefore, compared to the previous season, overall production is expected to decrease in 2012/13 by 1.7 million tonnes (-4%) to 17.7 million tonnes. France with about 4.2 tonnes (i.e. -10% compared to the previous season), Germany with 4.1 million tonnes (-7%) and Poland with 2 million tonnes (-2.5%) remain the three biggest sugar producers in the EU. Despite the decrease in production, the EU quota limit of 13.3 million tonnes of white sugar equivalent (wse) will be exceeded in 2012/13.

Figure 13: Developments on the world sugar market (rse, million tonnes)



Source: Presentation Möller (Nordzucker AG)

Regarding world sugar markets in 2012/13, production increases in the main producing countries (Brazil, China and Australia) are expected to offset decreases in Europe and Thailand, and global production will remain at a level around 177 million tonnes. The International Sugar Organization (ISO) predicts that global consumption will increase by 1.9% to 172 million tonnes in 2012/13, thus consumption will be about 5-6 million tonnes below production (cf. Figure 13). Even though this development might bring an end to the period of low stocks, no huge price decreases are expected.

Official data on global sugar use for ethanol production indicate that of the total sugar production of 154 million tonnes in 2009/2010 about 30% was used for ethanol (about 1.1 million tonnes of EU beet sugar, and 44 million tonnes of cane sugar). Möller highlighted that regarding the production capacity of EU beet ethanol it seems that the EU has already reached its limits (cf. Table 6). Thus, to match the results of the EU preliminary baseline major investments would be necessary. Möller stressed that it is hard to predict if such investments will occur in the EU as the future of sugar for energy use seems to depend mainly on EU policies (blending mandate, ILUC, etc.).

Table 6: EU Beet Ethanol - Capacity and Production, 2009

	Beet Ethanol Production Capacity		Sugar Needs (1000 t White Value)
	Capacity (1000 cbm)	Sugar supply (1000 t White Value)	2009
Czech Republic	100	147	103
France	905	1327	1239
Germany	265	389	330
UK	70	103	92
Europe total	1340	1965	1764
Only pure fuel ethanol	885	1298	1119

Source: Presentation Möller (Nordzucker AG)

5.4 The US drought and implications for world grains and oilseeds markets

Darren Cooper (International Grains Council) presented an overview of the IGC projections for grains and oilseeds production. He first described the development of the IGC Grains and Oilseeds Index (GOI), an index for the monitoring of price trends in key global agricultural markets.[26] The GOI shows a modest recovery for the grains and oilseeds complex at the beginning of 2012, led by soybeans due to poorer harvests in Brazil and Argentina. With the announcement of harvest losses due to the drought in the US, the GOI surged between June and August. Now it is still fairly volatile but prices are decreasing again.

Commenting on soybeans, Cooper explained that the underlying fundamentals brought the world soybean market to a record high, with the main drivers being first the declining 2011/12 crop prospects of key exporters in South America and then the 2012/13 yield potential forecasts in the US. World market prices weakened again as crop prospects for the key exporters in South America are now good for 2012/2013. However, even though an increase in world soybean ending stocks is forecast in 2012/13, the stocks of the major exporters will be still rather tight and below the 5-year average.

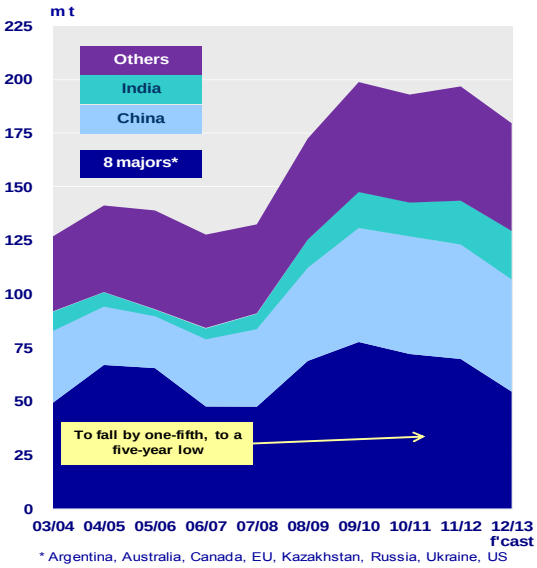
The global maize market has rallied sharply and prices have outperformed those of other grains, notably since the US yield potential diminished. Maize stocks tighten markedly, especially in the four major exporting countries (US, Brazil, Ukraine,

Argentina), where stocks may fall to their lowest level in 16 years. Tight supplies, high prices and larger crop harvests in some importing countries may limit the world maize trade and therefore total use is forecast to decline for the first time in 19 years.

For the wheat market, attention is drawn to the Black Sea region (Russia, Ukraine and Kazakhstan) where production is expected to fall by nearly 40% in 2012/13 compared to the previous season. This production decrease significantly curtails the export potential of the region, and the IGC forecasts a fall in Black Sea wheat exports of almost 50% to about 20 million tonnes (cf. Figure 14). Speculation as to whether Ukraine will curb its wheat exports might further influence world market price developments. Due to the relatively high wheat prices, the total harvested wheat area for 2013/14 is expected to increase by about 2%.

Figure 14: Fall in global wheat stocks led by trade declines in major exporters

Wheat stocks (million t)



Wheat trade in 2012/2013 (million t)

m t	Trade	y/y change
World Trade	**132**	**- 13**
Black Sea	*20*	*-18*
US	*32*	*+ 4*
EU	*19*	*+ 2*
Canada	*19*	*+ 1*
Argentina	*7*	*- 4*
Australia	*22*	*- 2*
Major exporters	**118**	**-19**
Others:	*14*	*+5*
India	*4*	*+3*

Source: Presentation Cooper (International Grains Council).

The IGC forecasts a decline in total grains production in 2012/13 of about 5% compared to last year and, even though consumption is contracting for the first time in 14 years, stocks are expected to decrease by about 45 million tonnes. Commenting on the projections up to the year 2016/17, Cooper emphasized that the current tight situation in major wheat and maize exporters' closing stocks will probably not ease much over the next five years.

[26] The IGC Grains and Oilseeds Index (GOI) follows the day-to-day price changes for wheat, maize, barley, sorghum, rice, soybeans and canola. The index is calculated using 22 USD-denominated daily export quotations at leading origins. More information on the IGC GOI is given at www.igc.int/grainsupdate/igc_goi.xls

5.5 Summary of the session discussion

In the open discussion the reasonably optimistic outlook for developments in the grain markets was confirmed. However, the general tendency towards low stock levels was emphasised, as this makes the market vulnerable to any interruptions or shortcomings on the supply side. Moreover, price volatility is a logical consequence of insufficient stocks. It was also pointed out that, even though they are not really available to the world market, stocks in China are quite important for world market developments. Furthermore, it was highlighted that India might become a significant exporter of low quality wheat.

Discussing the uncertainty analysis with respect to the effects of climate change on grain production in the EU, it was emphasised that due to the underlying trend assumptions for yields in the model, climate change adaptation is already to a certain extent considered and hence the effects might be overestimated. On the other hand, it was also stressed that the most 'optimistic' scenario was used for the analysis, which implies that climate change could obviously also provoke much stronger effects than those presented. Whether climate change will be an important cause of uncertainty in agriculture over the next ten years elicited differing opinions from the workshop participants, with 43% thinking that it would be, but 50% thinking it is overstated and 7% considering it unimportant in the medium term.

It does not seem to be clear what the actual effects of the abolition of the sugar quota in the EU will be for the market. The resulting production effects of the quota abolition will mainly depend on the relation of the sugar price to wheat and oilseed prices. While the general assumptions in the Commission's preliminary outlook for sugar were widely accepted by the workshop participants, the projected increase in sugar production due to a higher use for biofuels was questioned due to the level of investments this development would require and the low incentives to go in that direction.

6. Drivers of supply and demand for milk and dairy markets and related uncertainties

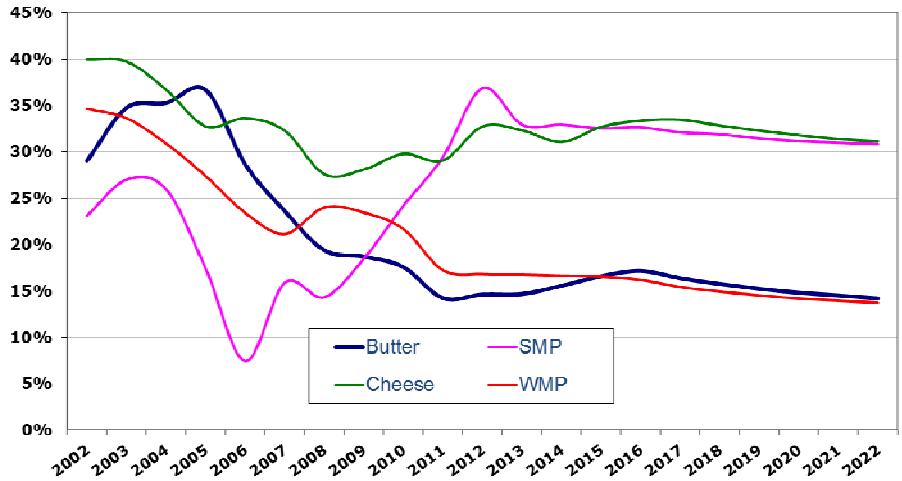
In this session the focus was on the preliminary baseline results for the EU milk and dairy markets and uncertainties related to exchange rates, higher input costs in the EU and general developments in the world markets.

6.1 Favourable prospects for EU dairy products

Beatriz Velazquez (DG AGRI) presented the preliminary outlook results for the dairy markets. The medium-term projections for milk and dairy products are favourable. Global demand will continue to increase, mainly driven by global population and economic growth and an increasing preference for dairy products. In the short-term, farmers' margins could be under pressure in the EU, due to the high feed prices following the 2012 drought. Furthermore, the expected increase in milk production in the first two years following the milk quota expiry could also have a negative impact on dairy prices.

Looking into the specific dairy commodities, Velazquez pointed out that EU demand is a key factor in the sustained expansion of the production of fresh dairy products (including drinking milk, cream and yogurt). This is a projected increase of 6% by 2022 compared to 2011. EU cheese and SMP production and exports are projected to increase, especially due to growing world demand. EU cheese production could expand 6% by 2022 compared to 2011 and exports by more than 36%. SMP production is expected to increase by 22% and exports by 28% by the end of the projection period compared to 2011. A lower increase in butter production is projected, with a total increase of 2.5% by 2022 compared to 2011, although exports could nonetheless rise by 24%. WMP prospects depict a stable EU market and a small decrease in export possibilities as production in Oceania dominates the WMP world market. Despite the increase in EU exports of dairy commodities, the respective EU world market shares remain almost unchanged in 2022 compared to 2012, albeit at a high level for SMP and cheese (around 30%). This is the result of a very dynamic world market, with exports growing at a faster rate outside the EU (cf. Figure 15).

Figure 15: EU world market shares in dairy commodities

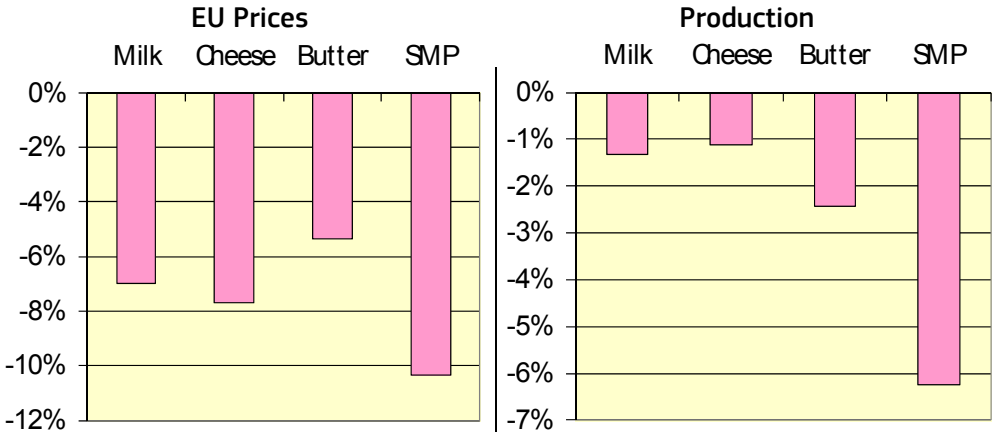


Source: Presentation Velazquez (DG AGRI)

6.2 Uncertainties related to exchange rates and higher input costs

The main results of the uncertainty analyses for the dairy baseline projections were presented by Sophie Hélaine and Ben Van Doorslaer (JRC-IPTS), focusing specifically on the dairy trade flows' sensitivity to exchange rates and the regional impact of higher input costs in the EU. The impacts of exchange rate uncertainties on dairy trade flows were assessed through the analysis of the mean results of a subset of the partial stochastic simulations run with the AGLINK-COSIMO model (cf. section 2.1). As could be expected, the results of the simulations with the Euro at 1.2 USD/EUR (i.e. weaker than in the baseline where the exchange rate is set at 1.35 USD/EUR in 2022) show that the EU is more competitive on the world market and can export more dairy products, especially butter. By contrast, if the Euro is stronger than in the baseline, at 1.60 USD/EUR in 2022, results indicate less dairy exports, with the smallest decreases being projected for cheese, because the EU is the major player on the world cheese market. Regarding the effects of a different exchange rate for EU dairy prices and production, Hélaine concentrated on the scenario results of a stronger Euro (but she highlighted that the results with a weaker Euro show effectively a symmetrical mirror image). With an exchange rate of 1.60 USD/EUR (i.e. stronger than in the baseline) the EU prices for all dairy products would be lower. Production would decrease (SMP the most with -6%) as the lower feed costs resulting from a stronger Euro would not compensate for the decrease in prices following the lower export demand (Figure 16).

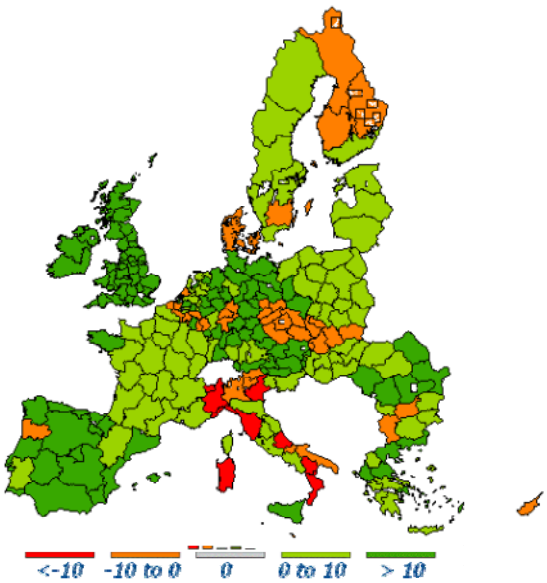
Figure 16: Effects of a stronger Euro, % change in comparison to the baseline (2022)



Source: Presentation Hélaine and Van Doorslaer (JRC-IPTS).

The CAPRI model was used to analyse the regional impact of higher input costs in the EU (cf. section 2.2). Scenario results indicate that increased input costs provoke only a small decrease in total EU milk production (-0.6%). However, the impact is quite diverse at regional level with lower production in many Italian regions, Denmark and Finland and higher supply in most Spanish regions, Ireland and the UK for example. The regional differences reflect the different production systems (i.e. high vs. low input; grass-fed vs. concentrates) (cf. Figure 17). The increasing input costs and resulting production decreases are offset by higher milk prices. Thus, with milk prices increasing between 1% and 6 %, income increases in the milk sector in most regions.

Figure 17: Change in EU milk supply (1000 tonnes) in the scenario with higher input costs

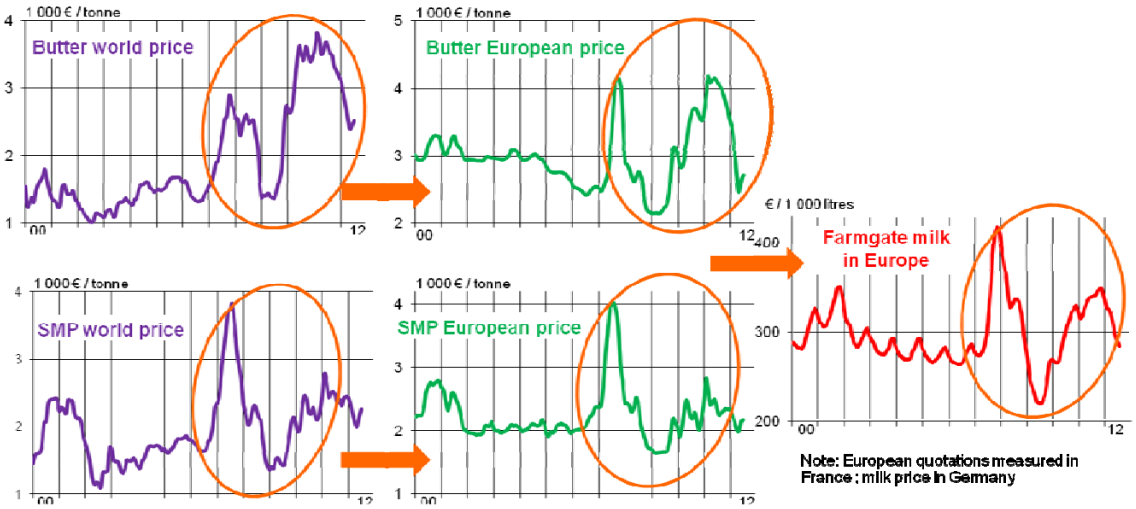


Source: Presentation Hélaine and Van Doorslaer (JRC-IPTS).

6.3 Demand from emerging countries supports milk production everywhere

Benoît Rouyer (CNIEL) focused his presentation on demand developments for dairy products worldwide. He explained that world demand is increasingly coming from emerging economies, notably India and China. Most emerging countries, especially in Asia and Africa, present a trade deficit for dairy products, and therefore their demand will support milk production everywhere, including Europe. Total international trade (excluding intra-EU trade) of dairy products is about 49 million tonnes in liquid milk equivalent, which is about 7% of world milk production. The main suppliers of the world dairy markets are New Zealand (with a share of 30% of the total world dairy trade), the EU (25%), the US (10%), Australia (6%), Belarus (5%) and Argentina (4%). In recent years an increase in price variability on the world market can be observed, which is also reflected in the European domestic dairy product market of and in the farm gate milk price (cf. Figure 18).

Figure 18: World and EU price developments, 2000-2012



Source: Presentation Rouyer (CNIEL); primary sources: CNIEL, France AgriMer, ZMB

Rouyer agrees that the outlook for the European dairy sector seems positive. Nonetheless the situation is not perfect, as there are three important challenges that should be addressed soon, namely the adaptation of dairy operators to price volatility, the transmission of higher input prices (especially feed costs) downstream to consumers and the future of less-favoured dairy areas with no (or few) agricultural alternatives. If the dairy industry in the EU manages to deal with these important challenges, the mid-term outlook for the European dairy sector will definitely be bright, although dairy farms remain in a financially precarious situation in most parts of Europe and very sensitive to any economic shocks. Rouyer sees the schedule of

changes (post-quota milk increase in Northern Europe and full regionalisation of the single farm payment per hectare) as decisive in determining if the European dairy sector will make it through the 2015-2020 period in good shape.

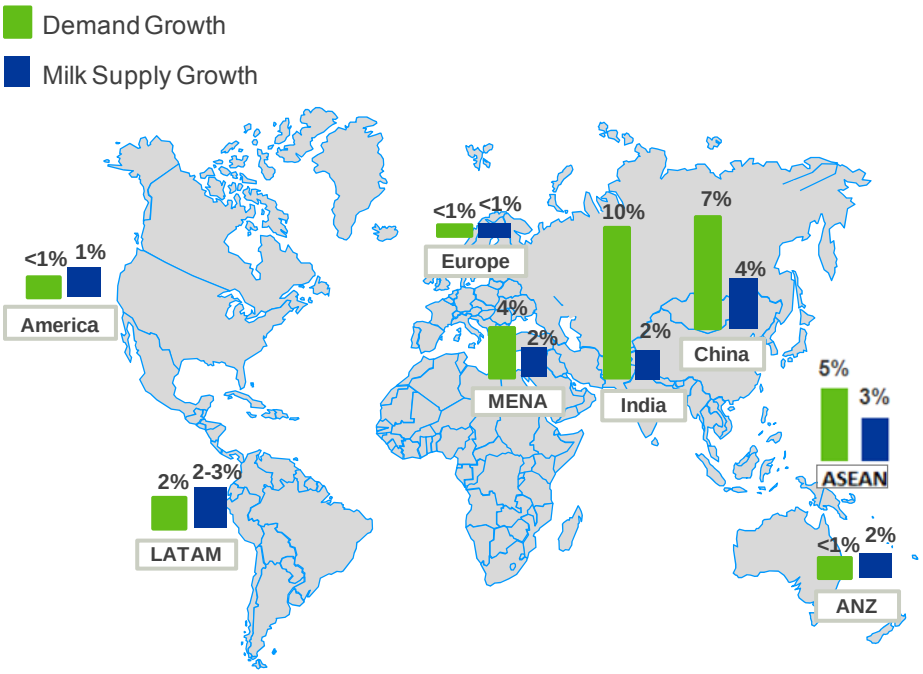
6.4 Rising prosperity fuelling demand for dairy, but the global context is shifting

Bruce Turner (Fonterra) gave a dairy market overview with a focus on emerging countries and outlined some longer term trends in global trade. Turner presented the variability of world dairy product prices over the long run as measured by Fonterra. For example, butter prices could range between 3,800 USD/t and 5,140 USD/t with a median of 4,200 USD/t and a competitive Fonterra butter price of 3,800 USD/t. For cheese, the spread is smaller and the Fonterra price is only slightly lower than the median level. Regarding the key exporters of dairy products, it is evident that exports from the US and the EU have picked up substantially in recent years on the back of strong production and weak domestic demand. Looking at the key importers of dairy products in 2012, a continuing trend can be observed, with imports of powders in developing markets and of proteins and cheese in developed countries. In general, rising prosperity is fuelling demand for dairy products. Fonterra's global demand forecasts show an annual growth at around 3% till 2020, with growth concentrated in emerging economies which all show rising deficits in dairy products. Drawing on the question of how this demand will be satisfied, Turner pointed out that there will be significant local supply growth, with India, China and Latin America predicted to be the key sources of growth in the milk industry (cf. Figure 19). Latin America, where production costs are low, is expected not only to be largely self-sustaining but also to export. In China and India it seems unlikely that production will keep pace with demand.

With respect to longer term trends in the global dairy trade, Turner highlighted that the global context is shifting due to changes in general (economic) growth patterns. Prior to 2000, 70% of growth was driven by the demographic dividend (i.e. development opportunities related to declining fertility rates as a result of faster rates of economic growth and human development combined with effective policies and markets) mainly in OECD countries. The remaining 30% of growth was achieved by underlying productivity improvements. As major shocks that shift the global context

Turner drew attention to the demographic dividend in non-OECD countries, urbanisation, the aging of the populations in OECD countries and China and increasing trade and non-trade related linkages from technology and globalisation. As a result, Turner expects that by 2030 in OECD countries only about 30% of growth will originate from the demographic dividend. This would actually mean that 70% needs to come from productivity improvements, which is way above what was experienced in the fastest growing decade ever (US in the 60s). Thus, Turner pointed out that in the coming decade capital and resources will be more expensive and this, together with deleveraging (from both governments and consumers), will imply lower growth especially in developed countries. These changes will certainly influence global dairy market developments, and as markets are more and more correlated Turner expects that the relatively high volatility in dairy market prices of recent years will remain over the next decade. Therefore a detailed procurement portfolio that secures supply and manages volatile prices is essential for the dairy industry.

Figure 19: Fonterra's outlook for milk supply and demand annual growth by 2020



Source: Presentation Turner (Fonterra)

6.5 Summary of the session discussion

In the open discussion it was highlighted once again that income is the main driver for global dairy demand growth, but also that the globalisation of dairy companies is an

important issue for development in the dairy sector. However, it was also stressed that food is mostly consumed where it is produced, implying that an increase in demand in some countries will also trigger an increase in domestic production in these countries, minimising the effects on the world markets for dairy products. Consequently, the shares of dairy commodities traded on the world market could remain fairly similar in the long run. Nevertheless, some experts pointed out that the production increase in emerging countries may take some time to catch up with the higher consumption. Therefore, the production projections of the European Commission's preliminary baseline could also be considered too low, especially with regard to WMP in the medium-term. It was emphasised that the picture for the milk and dairy markets is generally positive, with consumption and prices fairly high and likely to continue to grow further. For this reason it is probable that dairy prospects are indeed the most optimistic among those of the agricultural commodities in the medium term. While workshop participants agreed that world demand for dairy products will increase, they were divided over the time it will take for this to happen, with 52% of the participants expecting demand to grow at a slower pace and 43% expecting a higher growth rate than in the past decade.

Another major point in the session discussion was productivity growth in the EU. Further to the expiry of the production quota, efficiency gains should follow in the EU. Hence, productivity growth could probably be higher than indicated in the preliminary baseline. Indeed the baseline results show only a slow growth, but this may be due to fairly high input costs (especially for feed). Furthermore it was stressed that at Member State level the milk quota is currently only relevant in Ireland, Denmark and the Netherlands where the national production growth is limited by the quota level. Nonetheless, what is important for milk production development at Member State and hence EU level is structural adjustment.

7. Drivers of supply and demand for meat markets and related uncertainties

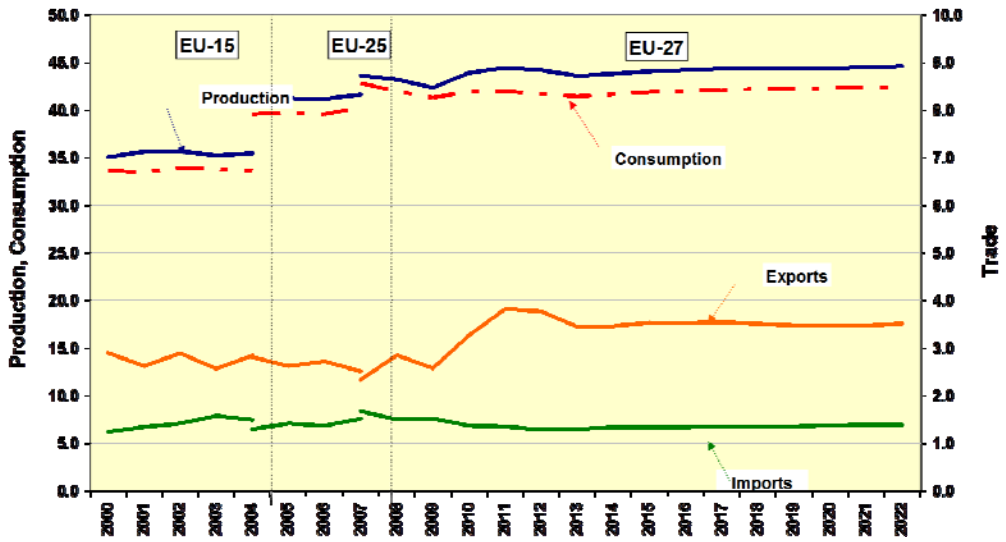
This session was dedicated to the discussion of the preliminary baseline results for meat markets and the uncertainties related to higher input costs in the EU, general

developments in the world meat markets, and specific beef production developments in Mercosur.

7.1 Production and consumption recovery in the EU

The preliminary results of the European Commission's outlook on meat markets were presented by Alberto D'Avino (DG AGRI). Meat production is under pressure due to higher costs, especially for feed. In addition, the economic turmoil and historically high level of unemployment in the EU tend to push EU demand further towards poultry, a cheaper meat option. Total meat production in the EU is expected to decline in the short-run. However, the results of the preliminary baseline point towards total EU meat production steadily recovering over the projection period, reaching about 44.7 million tonnes in 2022. Aggregated meat consumption in the EU is expected to slightly increase over the projection period. In the short-term, aggregated meat demand is expected to be constrained by limited supply (due to a reduction in beef livestock and the implementation of a welfare regulation in the pig sector in 2013). Nonetheless, aggregated meat consumption in the EU is expected to increase slightly over the projection period (cf. Figure 20).

Figure 20: Total EU meat balance 2000-2022 (million tonnes)



Source: Presentation D'Avino (DG AGRI)

Looking into the developments of the specific meat markets, D'Avino pointed out that EU beef production is projected to recover steadily until 2016, driven by the positive development of dairy herds, but will then stagnate somewhat. By the end of the

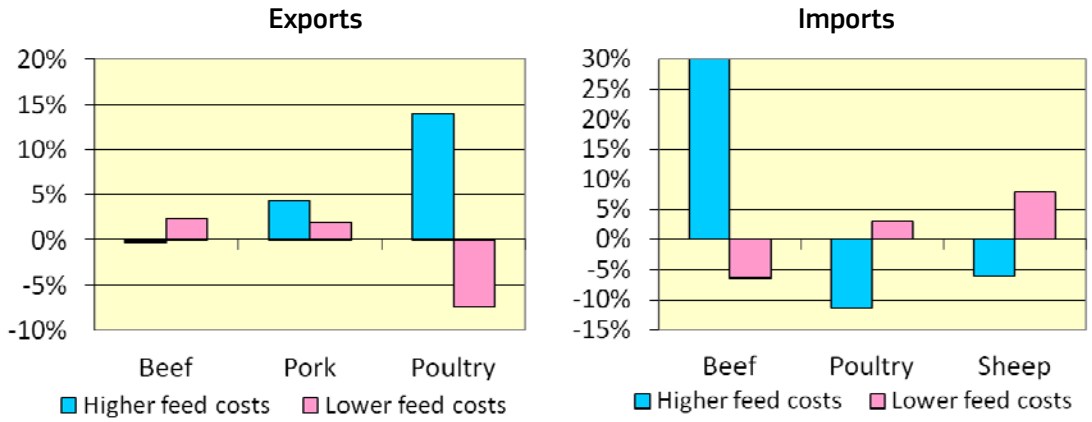
projection period EU beef production is expected to be about 7.96 million tonnes. EU beef and veal consumption is set to decrease in the short-term as a result of its limited availability on the domestic market and in South America, but then to increase again to about 8.09 million tonnes by 2022. This implies that the per capita beef consumption within the EU would decrease slightly over the projection period to about 15.7 kg. As production in the EU is projected to grow at a slower pace than consumption, the EU net trade position for beef deteriorates further over the projection period. Meanwhile, EU pork production is projected to respond to higher prices and grow from 2013 onwards, to about 23 million tonnes in 2022 (and thus almost reach the level of 2011). Pig meat is expected to remain the most consumed meat in the EU, and even though the per capita consumption is projected to decrease slightly to about 40.8 kg, total consumption will increase marginally to almost 21 million tonnes by 2022. The EU would remain a substantial net exporter, but at lower levels than in 2011 and 2012 when exports were particularly high. Prospects for the EU poultry market are positive, with further increases in EU production to about 12.9 million tonnes in 2022, supported by higher EU demand and a relatively good competiveness compared to other meats. Consumption is projected to increase to about 12.4 million tonnes, with a per capita consumption of 24.1 kg. Prospects for EU sheep and goat meat production are rather negative and production and consumption are expected to decline further. EU net imports are projected to remain stable over the projection period.

7.2 Meat trade flow sensitivity to feed costs and the general impact of higher input costs

The main results of the uncertainty analyses for the meat baseline projections were presented by Sophie Hélaine and Ben Van Doorslaer (both JRC-IPTS). For the analysis of the sensitivity of meat trade flows to feed costs the AGLINK-COSIMO model was applied incorporating a partial stochastic analysis of arable crop yield and macroeconomic variables' uncertainties. Out of the whole set of simulations run, Hélaine concentrated on the results of two subsets of around 60 simulations, with an average of 20% lower and higher feed costs respectively than in the baseline for the

period 2020-2022 (cf. section 2.1).[27] The analysis shows that an increase in feed costs (provoked by higher crop prices) also leads to higher meat prices in the EU. While the higher prices lead to decreases in pig and poultry consumption, poultry production would increase. The increase in poultry production comes from the increased competitiveness of the EU, which is attributable to both a weaker Euro and globally higher feed costs (to which the US for example reacts rather sensitively with a decrease in poultry exports of 4%). As a result, EU poultry exports are projected to increase by almost 15% and imports to decrease by 10%. While in the analysis the sensitivity of EU pork to feed costs is rather low, EU beef production would become less competitive with higher feed costs, and beef imports would increase by 30%, accompanied by decreases in EU beef production but slight increases in its consumption (cf. Figure 21). One of the main beneficiaries of increased feed costs in the EU would be South America, which would gain competitiveness and increase its beef exports due to beef production there being more grass-based.

Figure 21: Change of EU trade with higher or lower feed costs compared to the baseline, 2022



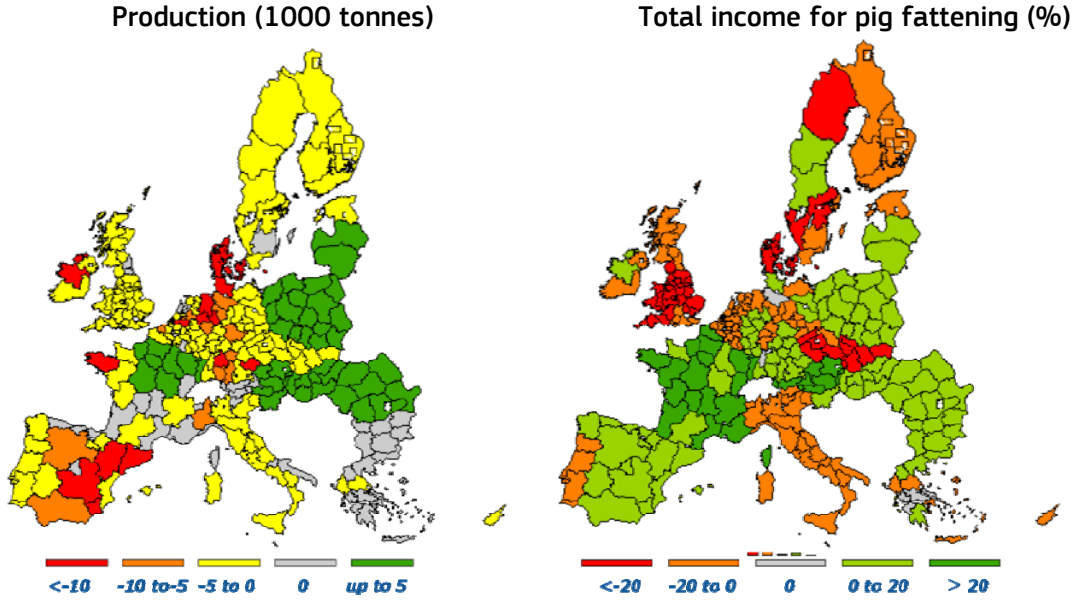
Source: Presentation Hélaine and Doorslaer (JRC-IPTS)

For a closer look at the impacts of higher input (i.e. not only feed) prices on the meat baseline results at regional level in the EU the CAPRI model was applied (c.f. section 2.2). The scenario results reveal that the actual impact of increased input costs varies considerably at regional level as it greatly depends on the particular production system and its cost structure. Thus, the differences in the regional impacts are principally due to the general productivity of the activity, the level of input use (low vs. high) and the protein content of the feed mix. On average in the EU, beef production is

[27] It has to be kept in mind that in this analysis the higher feed costs come together with a weaker Euro

projected to decrease by 2.1%, which would provoke an increase in the EU beef price of about 7.2% and result in lower beef consumption in the EU. The total income changes by region would be largely positive; however margins would still be low. With respect to the effects for the pig fattening sector, the higher input costs would lead to a decrease in EU pork production of 1.8% and an increase in the EU pork price of 6.1%. The total income change for pig fattening in the EU shows a rather diverse picture at regional level, with many input intensive regions like the Netherlands, Denmark or Italy suffering (cf. Figure 22).

Figure 22: Changes in EU pig sector due to higher input costs (2020 relative to the baseline)



Source: Presentation Hélaine and Doorslaer (JRC-IPTS)

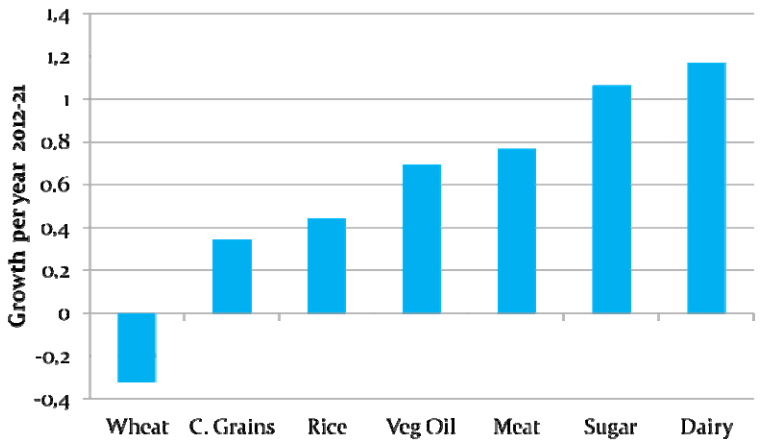
7.3 The global meat market environment and the key drivers for meat markets

Merritt Cluff (FAO) gave a presentation on the key drivers affecting the meat markets and their general global environment. Cluff highlighted the fact that animal diseases are critical to meat markets as they have the potential to affect domestic and regional meat production. In addition meat trade can immediately be affected by outbreaks of animal diseases, causing considerable risks in markets. Therefore countries are eager to maintain a disease-free status. In the past, some animal disease outbreaks have had drastic effects on the meat trade and consumer behaviour (as can often be observed with foot and mouth disease and as was also experienced with BSE and other

than in the baseline (cf. section 2.2).

outbreaks like avian flu). Another key driver for meat markets is GDP growth as reflected in income per capita. Regarding consumption, emerging economies in particular will increase their demand due to income growth. On the other hand, a deceleration in income growth in developed countries (in combination with other factors like a decrease in population growth and a general saturated demand) will reduce demand for meats. Although world population growth, an important factor for meat consumption, is slowing down, significant growth will still occur in Asia and Africa. At the global level, virtually all population growth is in urban areas, and the general shift in global consumption from staple foods to value-added products continues (cf. Figure 23).

Figure 23: Shift in global consumption from staple foods to value-added products (growth per year, 2012-2021)



Source: Presentation Cluff (FAO)

Looking at trends in the meat trade, Cluff revealed that, according to the latest OECD-FAO projections, global annual trade growth for poultry is expected to slow down compared to the previous decade. Nonetheless, it is anticipated that the poultry industry will adapt its production to higher input costs (feed and energy) with structural and technological changes and that these adaptations will lead to higher productivity and thus increased production and exports. The largest contributors to growth in the poultry trade are expected to be the US and Brazil. According to the OECD-FAO projections, the beef trade will further increase at a relatively low rate, with the US and Brazil showing the biggest increases in beef exports. Increases in US beef exports will be mainly due to better market access into FMD-free markets and into the EU. The dynamic US beef exports might particularly impede the export growth of Australia, Canada and New Zealand. Brazilian beef exports are set to grow due to

increased production on the one hand and better compliance with the sanitary regulations of importing countries and import demand from the Middle East on the other. Regarding the trade of pig meat, OECD-FAO projections show relatively modest growth in overall trade, although the US might be able to increase its pork exports. Meanwhile, China, where about half of the world's pig meat is produced and consumed, is not expected to change its net trade position in the medium-term. However, and even though the pork industry in China is supported by government policies, it is unclear whether the domestic industry will really be able to keep pace with the increase in domestic consumption.

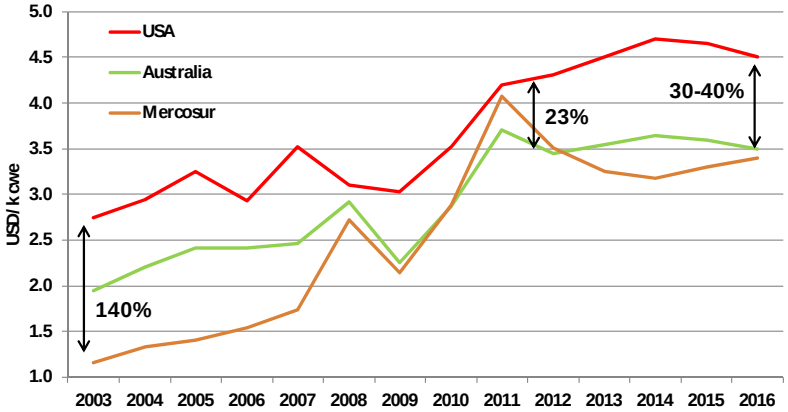
With respect to price developments, Cluff stressed that while food commodity prices have generally risen, meat prices have been less variable and slower to rise. Cluff ended his presentation by pointing out that the latest OECD-FAO projections depict lower EU net trade for poultry but higher net trade for beef than in the preliminary EU baseline.

7.4 Mercosur beef exports will grow, but only to a certain extent to the EU

Rafael Tardáguila (TARDÁGUILA Agromercados) focused his presentation mainly on beef production developments in Mercosur[28]. Tardáguila delineated that Mercosur beef production shows an increase in 2012 and will further increase in 2013 and 2014 (probably not in Uruguay). Tardáguila emphasised that the common belief that South America produces cheap meat seems to be outdated, as regional beef prices have risen significantly over the past decade. However, despite the price increase, Mercosur beef prices are still (and will continue to be) lower than those of other major exporters, which is mainly attributable to relatively low production costs as cattle production in Mercosur is mainly forage-based (cf. Figure 24). For example, beef exports from the US, one of the biggest players on the world market, have higher prices because their cattle herd is currently at its lowest level in 55 years and US cattle prices are more dependent on feed prices. Beef exports from Mercosur currently also benefit from higher prices for other meats (pork, poultry) as this makes beef cheaper relatively speaking. In addition, Brazil is benefitting from the devaluation of its currency, which has experienced a depreciation of about 25-30% since March 2012. Tardáguila

emphasised that Mercosur beef exports will also grow due to a slowing of domestic consumption growth, which can be attributed to slower economic growth rates.

Figure 24: Mercosur production systems (share of feedlots) and prices in comparison to the US and Australia (USD/kg cwe)



Cattle production systems in Mercosur			
Mainly forage intensive			
Grainfed cattle increased in the last 10 years			
Actual estimated numbers		Million	%
Brazil	Feedlots	4,0	10%
	Total slaughter	40,0	
Argentina	Feedlots	3,2	29%
	Total slaughter	11,0	
Uruguay	Feedlots	0,3	15%
	Total slaughter	2,0	
Paraguay	Feedlots	0,2	11%
	Total slaughter	1,4	
Total	Feedlots	7,7	14%
	Total slaughter	54,5	

Source: Presentation Tardáguila (TARDÁGUILA Agromercados); primary sources: USDA, MLA, WBR.

Regarding the quantity of Mercosur exports that will actually reach the EU, Tardáguila expects only a slight increase in the years to come. One of the reasons he gave was the falling number of Brazilian establishments approved in the EU Traces List[29]. While in 2007 more than 10,000 Brazilian establishments were listed, at the end of 2010 there were only 2,229 and as of today 1,858 establishments are listed.

7.5 Summary of the session discussion

In the open discussion it was emphasised that Brazil could easily intensify its beef production and probably reach up to 2.5 cattle per hectare through intensification of pasture management. Brazilian cattle production might also continue to move further to the north of the country, which would leave land for crops, and extensive grassland could be turned into cropland, mainly for soybeans (for poultry and pig fattening). The same development is occurring in Argentina too. However, it was argued that the extent of these movements in Brazil and Argentina might be limited, especially due to

[28] Mercosur (Mercado Común del Sur) is an economic and political agreement between Argentina, Brazil, Paraguay, Uruguay and Venezuela, with the status of a full customs union. Note that Venezuela was not covered in the presentation of Tardáguila.

[29] Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 lays down health rules with regard to animal by-products and derived products. In accordance with this regulation establishments and plants handling animal by-products and derived products must be approved or registered. In order to export animals or animal products to the EU, non-EU establishments have to be approved and listed in the 'TRAde Control and Expert System' (TRACES) system.

sustainability issues. It was also highlighted that South American slaughterhouses have, in recent years, had difficulties passing on higher prices to consumers, though the situation is changing and beef production appears to be on the up again.

It was also pointed out that the relatively high meat prices put the meat processing industry under stress globally, as the situation on the selling side has become tougher. With the current global economic crises still unsolved, some participants doubt that this situation will ease in the near future, which would certainly affect meat production negatively. On the other hand, it was emphasised that world meat expenditure still shows positive trends and global meat consumption continues to grow, mainly pulled by the per capita demand in emerging markets. Due to the increase in demand from emerging countries, some participants were reasonably optimistic with respect to the development in meat prices. By contrast, other participants stated that demand growth for meat might slow down in certain regions, as there are alimentary limits to meat consumption and such a slowdown would have an adverse effect on prices.

Regarding the meat consumption trend in the EU, workshop participants had mixed opinions on what the main driver for EU meat consumption would be, with 32% of the participants considering income the main driver and 30% expecting a constant meat consumption but changing preferences between meat, while 23% of the participants expect a lower meat consumption trend in the EU, as depicted in the preliminary EU market outlook.

8. Agricultural market developments: policy challenges

A sustainable agricultural productivity growth

Before the session on policy challenges, Ignacio Pérez Domínguez (OECD) gave a presentation on the need to achieve sustainable agricultural productivity growth. Pérez Domínguez outlined that, according to FAO estimates, agricultural production would need to increase by 60% globally to cope with food and feed needs by 2050. The possibility of meeting this rising demand by increasing the amount of agricultural land is limited and therefore it will need to be achieved mainly through increased

productivity. However, the results of the latest OECD-FAO agricultural outlook, as well as the preliminary results for the EU outlook, indicate that annual growth in agricultural production over the next ten years will actually be lower than in the previous decade. Some of the major constraints to productivity growth are rising input costs, degraded agricultural land, increasing water stress and general limits to irrigation, growing environmental pressures (especially with regard to GHG emissions, biodiversity and groundwater pollution) and the impact of climate change. In light of these constraints, the main task for the agri-food sector will be to increase agricultural productivity in a sustainable way. In order to tackle this challenge a multiple approach needs to be taken, comprising (i) the encouragement of better agronomic practices, (ii) creating the right enabling environment (including well functioning markets, giving the right price signals, clear property rights, limiting trade and domestic policies that distort production and investment), (iii) strengthening the agriculture innovation system (including institutional design, regulatory environment, innovation policy coherence, private public partnerships, R&D expenditures, education and extension programs), and (iv) the reduction of crop losses and food waste.

Agricultural market developments: policy challenges

As an introduction to the final session on policy challenges, Pierluigi Londero (DG AGRI) presented a wrap-up of the price and income developments in the preliminary agricultural outlook. In terms of important drivers for the outlook results, Londero highlighted the bleak economic outlook for the EU in the short-term, oil prices, the USD/EUR exchange rate, a slowdown in EU yield growth, tight markets for grains and oilseeds and the rate of fulfilment of the EU biofuels targets. Under the assumptions used for the preliminary baseline, the projection results indicate a continuation of the downward trend of real income in the agricultural sector in the EU. However, the trend of real income per labour unit continues its upward trend due to the fact that the number of farmers is steadily declining. While agricultural income per labour unit is expected to stagnate in the EU-15 over the projection period, projections show significant growth in agricultural income per labour unit in the EU-N12. However, the gap in real income per labour unit between the EU-15 and EU-N12 will still remain despite the stronger income growth in the EU-N12.

In the final discussion, João José Pacheco (DG AGRI) gave an overview of the state of play regarding the situation of the CAP 2020 reform. He pointed out that the decision on the reform now has to be taken and agreed on by both the European Council and the European Parliament, which makes the process of reaching a final agreement more complex. The European Parliament received suggestions for about 7000 amendments as a reaction to the reform proposal of the European Commission. The discussion on direct payments has been fairly difficult but it looks like the negotiations are close to achieving a compromise on amendments, and the same holds for the measures with regard to rural development. An important issue for the final decision on the CAP 2020 reform relates to the budget and its distribution (with regard to greening etc.). A group of Member States is in favour of general reductions in the CAP budget, and the convergence of direct payments between MS and within MS is also under discussion. A further issue regards the strengthening of the producers' position in the food chain. Pacheco also emphasised that much more attention in the public debate is now directed at food security and this affects how the CAP is received in public.

Ken Ash (OECD) pointed out that the EU has come a long way with its reforms in the CAP, but further improvements could be made. In view of a rather positive agricultural market environment, as also projected in the preliminary outlook, Ash emphasised that this might actually be a good moment for some further changes to the CAP, especially for shifts in income support towards strategic investments (for example to respond to climate change issues, towards a productivity increase, efficient use of resources, risk management, etc.). Looking at policy challenges outside the EU, Ash stressed that the positive agricultural market developments should actually also be used in other countries to undertake the necessary reform steps. As an example, Ash suggested that as net farm income in the US is actually quite high the US should also take this opportunity to implement further reforms. Ash concluded by saying that the projected high prices are good news for farmers but less so for poor consumers.

Joseph Glauber (USDA) concentrated on the reform process in the agricultural policy of the US. He remarked that the current debate on the new Farm Bill in the US is also characterised by discussions on the budget. It seems obvious that the budget for agricultural policy will be cut, but the crucial question of 'how much' still remains open. So far, cuts of about 30 billion USD are proposed, but Congress is actually pushing for

further budget cuts. Turning to the question on how the savings will be achieved, Glauber emphasised that in the current debate on the new Farm Bill particular dissatisfaction with decoupled direct payments has been expressed. The debate is centred on several aspects, notably the need for payments in times of high prices, the fact that benefits accrue largely to landowners and on the decoupled nature of the payments (as it is not necessary to produce to receive them). In addition, there is only limited public support for decoupled payments as few people are aware that there are cross-compliance conditions in place that must be fulfilled to receive the payments. It is therefore possible that in the US decoupled payments will be drastically reduced and partially converted into more coupled ones. Nonetheless the current Farm Bill proposal is in line with the commitments on the reduction of distortive payments agreed at the Uruguay Round.

David Blandford (Pennsylvania State University) particularly questioned the general assumption used in most baselines (i.e. not only the baseline of the European Commission) that macroeconomic conditions will return to the trend. Blandford expressed his pessimism about future developments in agricultural markets, especially due to the significant downside risks of the current macroeconomic developments. It is possible that the financial crisis has provoked fundamental changes in behaviour both on the consumer and the producer side. It is clear that, despite a wealth of resources, companies hold back investments because consumers do not spend their money (as they seem too uncertain of further developments). Blandford further argued that if no fundamental changes take place the current approach of muddling through the economic crises would imply low economic growth for a fairly long time. Thus, with most of the risk being on the downside, Blandford does not expect a rapid return to pre-crisis macroeconomic developments. To get a better picture regarding the implications for agricultural policy, Blandford advised studying more catastrophic scenarios for the agricultural market outlook as uncertainty is growing.

Alan Matthews (Trinity College Dublin) addressed the policy challenges in the EU and stressed that the current CAP reform seems to be different to previous reforms as the adjustment needs are different. With regard to the redistribution of direct payments, the questions that need to be addressed not only comprise the redistribution of money between and within Member States but also issues regarding the declining number of

farms and inactive farmers' needs. The increased diversity within the EU due to the presence of the EU-N12 Member States will also require a move towards greater flexibility (with regard to greening options etc.). Matthews further highlighted that the context of the CAP 2020 reform is also different to previous reforms and that it is especially altered by higher and more volatile commodity prices and the discussion on food security. With productivity figures diminishing, one policy challenge will be to enhance innovation and induce more productivity. Matthews considers the greening of direct payments a very important issue, but he pointed out that within Pillar I the use of direct payments is not as flexible as within Pillar II.

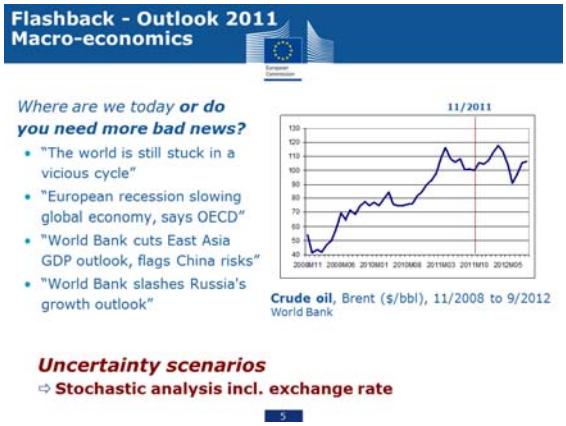
In the open part of the final discussion, the importance of the European Commission's agricultural outlook in the policy process was highlighted as it will be the reference baseline for the assessment of the CAP 2020 reform. With regard to agricultural productivity, it was emphasised that the outlook suggests that annual growth in global agricultural production over the next ten years will be lower than in the previous decade. While productivity growth is slowing down in the developed world, there are significant increases in countries like China, Africa and Brazil. However, to tackle the issue of global food security it will be necessary to increase agricultural productivity in developed countries again too, especially as some investments will only show their results in the future beyond the projection horizon. The food security issue not only eases the justification for having a CAP but also changed how the CAP is perceived by NGOs. It was again underlined that in the context of the current macroeconomic environment and with budgets under pressure in many countries, there are opportunities to make some significant and necessary changes in agricultural policies.

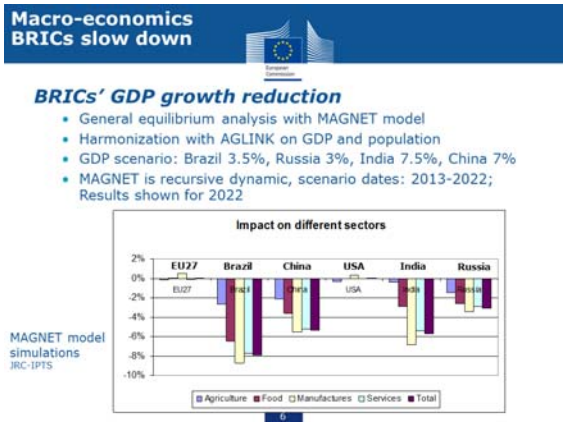
In the concluding remarks, the usefulness of the workshop was confirmed by the many valuable comments on the European Commission's baseline. Additionally, the discussions have provided a better picture of the drivers of supply and demand in the markets, as well as of the related uncertainties.

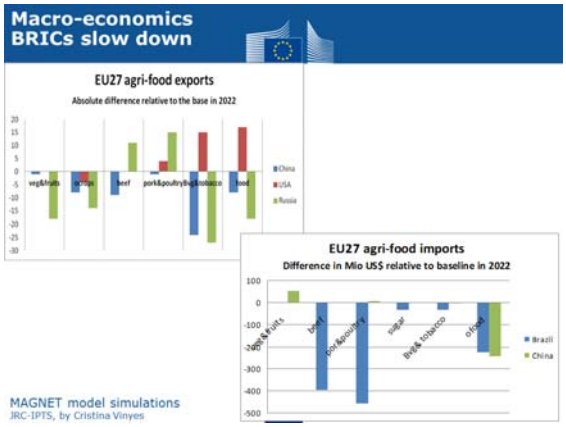
Workshop Presentations

Main conclusions of last year's outlook and introduction of this year's exercise

Robert M'barek (JRC-IPTS) & Pierluigi Londero (DG AGRI)







Flashback - Outlook 2011 Arable crops

Outlook 2011

- Biofuel feedstock demand determines growth
- EU yield growth lower than in most competitive regions
- Maize and soft wheat will continue to gain against other grains
- Oilseeds continue to expand but at lower pace
- Sugar beet production increasing
- Relatively positive picture with tight market conditions, low stock levels and prices remaining above long term averages

Expert views

- Confirmed optimistic outlook for grains
- General tendency for low stocks with higher volatility
- Sugar: major uncertainty on supply side is Brazil; impact of EU sugar quota expiry unclear

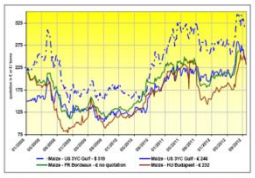
8

Flashback - Outlook 2011 Arable crops

*Where are we today **or balancing on the edge?***

- Again "surprises" due to weather abnormalities
- Prices increased since early summer

Drought in Europe, Areas of concern
DG AGRI Crop Newsletter Sept 2012



EU and USA maize prices since Jan 2008
DG AGRI Crop Newsletter Sept 2012

⇨ **Stochastic analysis of yield uncertainty by EU MS**
⇨ **Yield uncertainty due to climate change**

9

Flashback - Outlook 2011 Biofuels

Outlook 2011

- EU policy will drive production upwards

Expert views

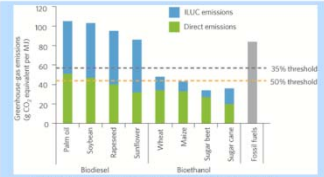
- Biofuels major source of uncertainty
- Impact of policy profound (EU, USA)
- Questionable if targets will be really met
- If rules on ILUC become stricter, market shifts

10

Flashback - Outlook 2011 Biofuels

*Where are we today **or finally the real discussion?***

- Drought in USA renews debate on biofuel
- EU to limit the target for food-derived biofuels?



Source: Nature Climate Change 1, 389–390 (2011).

⇨ **Scenario of a 80% EU mandate fulfilment**
⇨ **Scenario including ILUC**

11

Flashback - Outlook 2011 Meat

Outlook 2011

- Relatively favourable outlook for non-ruminants
- Continuing decline in the production of beef and sheep meat
- EU would have net exporter position of poultry and pig meat

Expert views

- Global meat consumption continues to grow
- However China as a major uncertainty
- Uncertainty if specific policies to restrict GHG emissions from agriculture

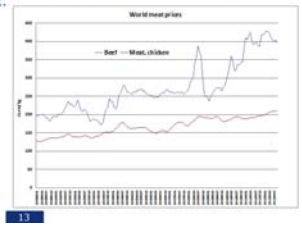
12

Flashback - Outlook 2011 Meat

Where are we today?

- **Beef** prices remain at very high level, large drop in EU beef production in 2012 (-5%)
- **Pig meat**: high pig prices help to compensate high feed costs. Stronger Euro and very low prices in USA and CA put pressure on EU export.
- **Poultry**: prices high, but producer margin just below the average due to the exceptionally high feed cost.

Prices Beef, Chicken meat from 2000 to 07/2012
World Bank



⇨ **Feed costs increase**
⇨ **Exchange rate**

13

Flashback - Outlook 2011 Milk and Dairy

Outlook 2011

- Cow's milk production expands slowly until 2015, then recovers
- World demand supports high prices over the long term and fuels exports
- Dairy sector sensitive to economic developments

Experts

- More positive on EU milk production (because of milk quota abolishment)
- EC outlook too optimistic about cheese consumption (see e.g. fat tax in Denmark)
- Usefulness of uncertainty analysis
- Uncertainty if specific policies to restrict GHG emissions from agriculture

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Flashback - Outlook 2011 Milk and Dairy

*Where are we today **or waiting for the turning point?***

DG AGRI Animal Products Newsletter Sept 2012

⇨ **Feed costs increase**
⇨ **Exchange rate**

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Animal production & GHG emissions

Possible impact of 20% GHG emission reduction from agriculture

Activity aggregate		STD	ESAA	ETSA
Dairy cow sector	Production	-4	-4	-3
	Herd size	-4	-3	-3
Beef sector	Production	-12	-12	-10
	Herd size	-28	-29	-29
	Income per head (Euro)	137	145	133
Cereals sector	Production	-12	-10	-9
	Crop area	-12	-8	-9
	Income per ha (Euro)	20	15	15
UAA	Area	-7	-7	-8
	Income per ha (Euro)	14	13	13

STD	Emission Standard Scenario
ESAA	Effort Sharing Agreement for Agriculture Scenario
ETSA	Emission Trading Scheme for Agriculture Scenario

Changes (%) in EU-27 income, production, herd size and area according to each scenario

Source: JRC report 2012. simulations with CAPRI model

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Baseline process

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Baseline Projection–what is it about?

Why?
- better understand markets and their dynamics
- identify key issues for market and policy development
- benchmark for assessing medium-term impact of market and policy issues

What?
- 10-year markets and income projections
- focus on EU
- not a forecast, but a description of what may happen under a specific set of assumptions

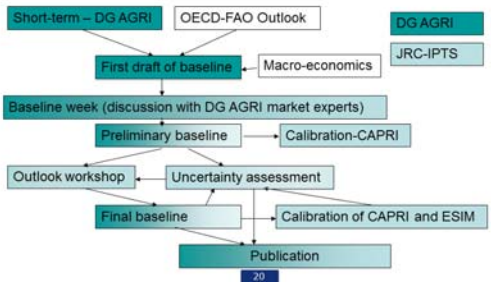
When?
- annual publication at the end of the year

18

What do we need?

19

Overview of the EU baseline process



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What is the use of the baseline?

Reference for forward looking policy assessments
- Impact assessment CAP towards 2020
- Mercosur study in 2011, Sugar quota …
- Biofuel assessment
- CAPRI modelling (e.g. CAPRI FARM)

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Uncertainties

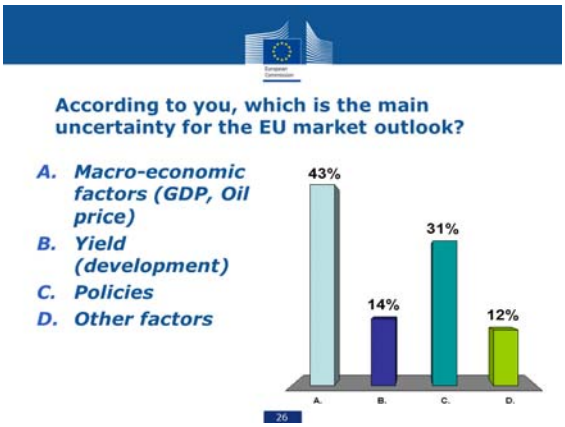
Baseline assumptions
- macroeconomic environment, weather conditions, yield trends, eventual safety /animal disease disruptions - only one possibility

Alternative "scenarios"
- Stochastic analysis (partial)
- Difference between modelled and observed values (= Error)
- Drawing 500 sets of different assumptions
- Run 500 times the model
- Analyse the range of results

22

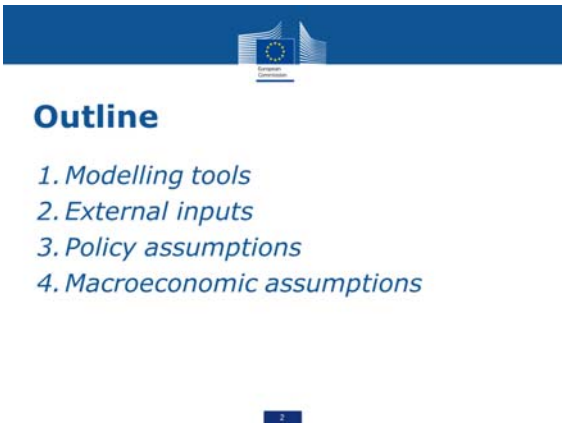
Market	Uncertainties analysed
Arable crops	- Yield uncertainty analysis (MS level depiction) - Climate change scenarios (Nuts2)
Biofuels	- 80% EU Biofuel mandate fulfilment - ILUC scenario (biofuels) - Yield and macro economic variables partial stochastic analysis (low USA yield and oil price)
Dairy	- Yield and macro economic variables partial stochastic analysis (focus exchange rate) - Input costs increase (Nuts2)
Meat	- Yield and macro economic variables partial stochastic analysis (focus feed) - Input costs increase (Nuts2)

23



EU agricultural outlook – settings

Pierluigi Londero (DG AGRI)



Modelling tools

Agro-Economic Modelling Platform (iMAP)

- **hosted by JRC-IPTS in cooperation with DG AGRI**
- **widely used, robust and scientifically acknowledged tools**
- **partial-equilibrium (PE) and general equilibrium (CGE) models**

Modelling tools used for EU baseline and uncertainty analysis

- **AGLINK-COSIMO (EC version)**
- **CAPRI (highly disaggregated in regions and products)**
- **ESIM (EU Member States)**
- **MAGNET (multi-regional, multi-sector CGE model)**

3

Modelling tools

Baseline

Model used: current market projections based on a modified version of the OECD-FAO Aglink-Cosimo model (recursive-dynamic, partial equilibrium model)

Data used: market and policy information available at the beginning of September 2012

Results: supply balance sheets for main commodities, domestic and world prices

Detailed results for:

- EU-27, EU-15 and EU-N12 aggregates
- Cereal, oilseed, sugar, rice, biofuel, meat and dairy markets

Income: Based on medium-term projections for main agricultural markets; Remaining agricultural sectors (fruit & veg, wine and olive oil) assumed to follow historical trends; continued restructuring of the sector

4

Starting point

OECD/FAO Agricultural Outlook 2012-2021

- **Agricultural commodity markets for the rest of the world**

EU Short Term Outlook

- **Recent years and orientation for near future**
- **Version of September 2012**

Macro-economic forecast

- **(DG ECFIN for the close future)**
- **Consistent source for main countries and up to 2022 (IHS Global Insight)**

Additional ad-hoc input

- **Impact of Summer 2012 drought in the US**

5

Policy assumptions

CAP in its current (post Health Check) form including

- **Phasing out\abolition of milk quotas**
- **End of sugar quotas in 2015**
- **Status quo for subsidies in the post 2013 period**
  - Direct payments as in 2010-2013
  - Stable level in EU-N12 after phasing-in of direct payments
  - Rural development payments as in 2007-2013

World trade remains in conformity with the Uruguay Round Agreement on Agriculture

No new FTAs enter into force before 2020

6

Macroeconomic assumptions

Updates for:

- **GDP growth**
- **Inflation**
- **Exchange rates**
- **Oil prices**

Single (coherent) source vs. More plausible (on which basis) assumptions

7

Macroeconomic assumptions

World economy expected to slow down to 2,6% in 2012 and 2,7% in 2013

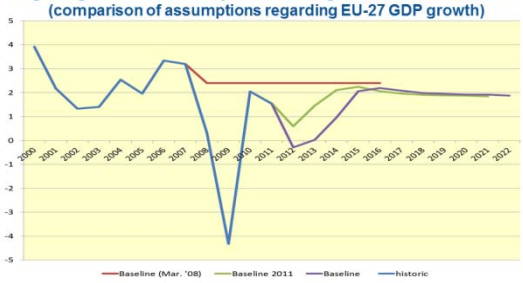
EU

- **Growht: double dip in 2012** (and 2013 for EU15)
- **Inflation: above 2% also during crisis**
- **Population: slight growth**
  (EU15 up 0.3% p.y.vs slight decline in N-EU12)
- **Euro exchange rate: capped at 1.35 ($ per EUR)**

8

Macroeconomic assumptions

High degree of uncertainty surrounding the economic outlook (comparison of assumptions regarding EU-27 GDP growth)



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Exchange rate: different assumptions (USD/EUR)

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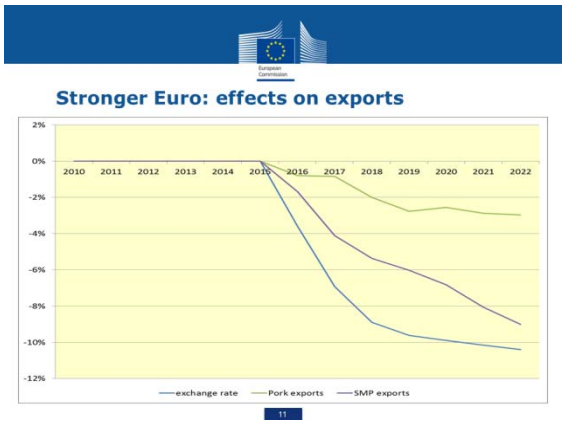
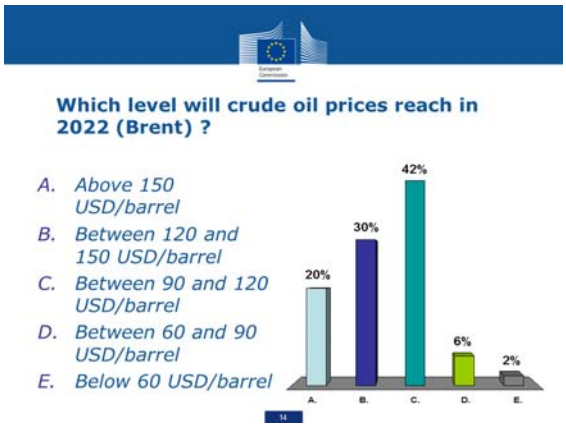
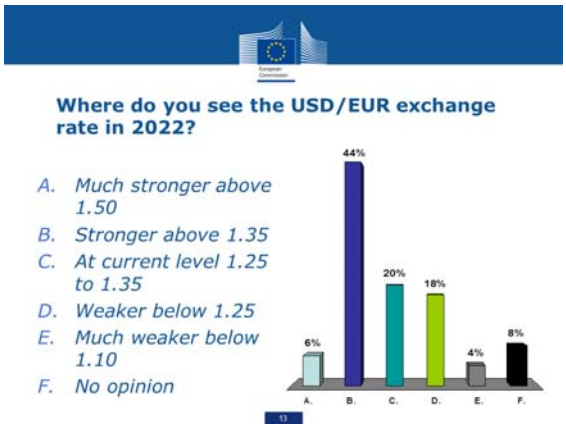


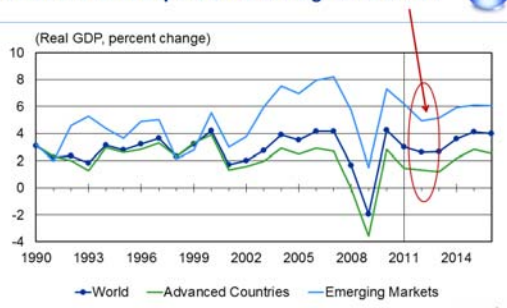




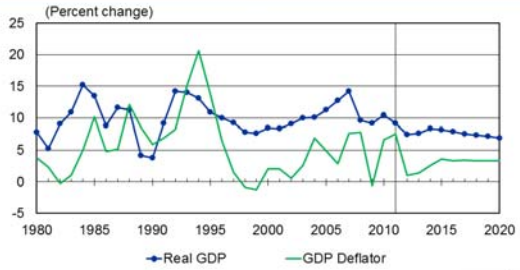
Global economic outlook and key risks

Jan Randolph (IHS Global Insight)

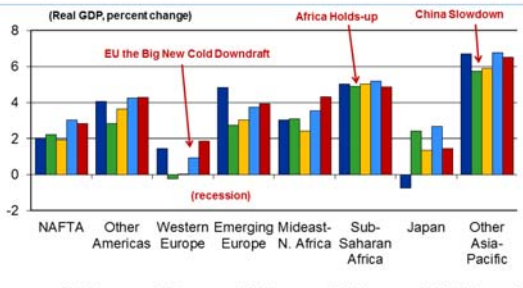
Baseline: Global Expansion Is Losing Some Steam



China Baseline: Economic Growth and Inflation



Emerging Economies – Slowing But Holding-Up



The Source for Critical Information and Insight

The IHS 'Worst Case' Scenario

= Deep Global Recession 2013-14

= 10-15% probability

Triggers?

US Baseline: Won't Go Off The Cliff

- We assume the **lame-duck Congress extends the deadlines** briefly to let November's winners tackle the problem.
- Unless one party gains full control of the government after November there will have to be **compromise.**
- We assume the automatic spending cuts are replaced by entitlement savings and tax increases to be determined after the 2012 elections…and mostly beginning in 2014, not 2013.
- **Bush tax cuts** are assumed to **stay** in place in 2013.
- The 2% payroll tax cut and emergency UI benefits are extended again for 2013 and later phased out, not suddenly removed.
- These assumptions hold the debt-to-GDP ratio below 80% over the next ten years.

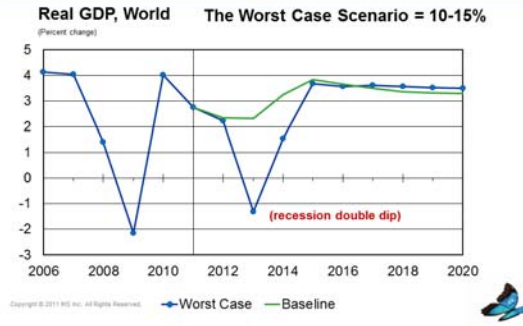
Worst Case Scenario: 4 Risk Triggers

Risk Triggers	Narrative
Eurozone Meltdown	• Greece exits Eurozone, causing financial market contagion. • Sovereign bond yields spike as private funding dries up. • Spain, Italy, Portugal, Ireland, and Cyprus exit Eurozone. • European recessions deepen, new currencies depreciate.
Middle East Conflicts &Oil Price Shock	• Syria unravels and conflict spreads into Lebanon. • Israel and Iraq feel increasingly threatened. • Nuclear talks break down, Iran veers toward confrontation. • Supply disruptions send oil prices past USD150 per barrel.
US 'Fiscal Cliff'	• Deadlines at start of 2013 pass with no action, resulting in a fiscal contraction equal to US488 billion, or 3.0% of GDP. • Tax cuts expire and sequestration leads to spending cuts. • Middle East instability prompts reversal of defense cuts.
China Hard Landing	• Real estate market bubbles burst. • Loan defaults by developers and local governments trigger a banking crisis and credit squeeze. • Investment and consumption are scaled back in 2013-16.

Baseline: China Outlook Summary

- **Risks of a "double squeeze" downturn remain.**
  - External demand remains weak as exports to the European Union decline.
  - Domestic demand is restrained due to construction downturn.
  - Diminishing inflation is another sign of demand weakness.
  - Over-capacity dampens investment demand, despite easing monetary policy.
- **In the short-term, a soft landing is more likely.**
  - So far, the slowdown is much milder than the 2009 downturn.
  - Eurozone crisis should not have the same impact as the 2009 US financial crisis.
  - Housing demand softness is still mainly due to government tightening policies.
  - Easing inflation has provided more leeway for Beijing to relax monetary policy.
- **Risks for China are weighted more over the longer term**
  - The local debt bubble highlights inadequacies of China's state controlled banking sector.
  - Major export markets of the U.S. and EU will undergo protracted demand consolidation.
  - Secular boost to China's exports due to its 2002 WTO entry will diminish over time.
  - China hasn't implemented any major economic reforms since WTO entry & SOE reform.

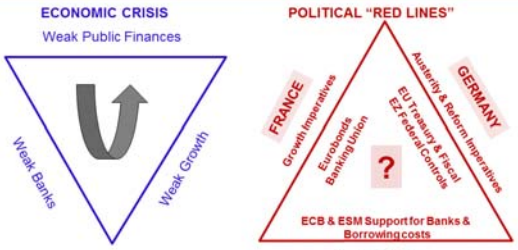
Another Global Recession in 2013-14?



Eurozone Scenarios (4)

1. Euro **Extinction**
2. **Fringe Break Away** of 1 (Greece)
3. **Multiple Fracture**: 'North-South' Split
4. Hold-Together & Expand: **"Euro Mark II"**

Eurozone (EZ) – "Triangulations*"



*** or "Vicious Triangles"**

1. Euro Extinction

% Chance 1 year: 2%
% Chance 5 years: 3%

Triggers:

- Popular & political backlashes in South **&** North EZ.
- Investor risk aversion & contagion spreads from periphery to core – simultaneous rise in yields & recessions throughout EZ.
- Italy & or Spain lose market access for sovereign debt funding

Mechanism & Comment:

- Fundamental **ideological split** between **France & Germany** on EZ management with France mired in recession, provoked by more nationalist, populist France unwilling to play 2nd fiddle.
- Nevertheless "Hard-Core" euro likely to remain in constellation around Germany = irrational for like-circumstanced & like-minded to revert to transaction & redenomination costs of own currency
- Known and unknown costs & of break-up simply too great

2. Fringe Breakaway of 1 (Greece)

% Chance 1 year: 55% (raised from 5% in NOV 2011)
% Chance 5 years: 60% (raised from 20% in NOV 2011)

Triggers:

- **Political**: Popular & political backlash to prolonged austerity – series of new governments either **unable or unwilling** to **implement**: (1) austerity & (2) Structural reform.
- IMF & EZ financing severed. Economy collapses onto a cash-basis only; further 10-15% surge in unemployment – government contemplates bringing in own currency printing presses to **re-oxygenate economy with credit** ...Otherwise **Montenegro Scenario**

Mechanism & Comment:

- Pressures inside & outside Government/Parliament/Country mount. An **inability or unwillingness to meet bailout terms** severs sovereign sector financing.
- **Failure to agree 3rd bailout** = 'hard-default' with new currency. Greece essentially weighs-up opportunity costs & benefits....to exit

3. Multiple Fracture – 'North South' Split

% Chance over 1 year = 5%
% Chance over 5 years = 10%

- Spain and Italy 'Go-Under'
- Germanic "Hard-Core" Euro Survives = The New 'Northern Euro' **Members**: Germany, The Netherlands, Austria, Luxembourg, Belgium, Finland, France & Eire.

Comments

- North-EZ banking systems experience **significant hits to bank capital of 5-15% of total bank capital** from South-EZ hard debt restructurings. North-EZ Sovereign states bring-out 'bad banks' & other direct measures to shield banking systems. ECB acts to avert credit crunch.
- **North-South Euro fracture shock** = 5-8% cumulative recession.
- Smaller, more economically cohesive and more competitive North-EZ bloc – i.e. more like-minded and like-circumstanced (financially, economically & behaviourally)
- **North-EZ pursues deeper Economic & Monetary integration** with EZ-Government including eurobonds in medium-term road map – following adoption & implementation of fiscal compact rules
- **North-EZ attracts residual capital flight** from Southern EZ; Euro under upward pressure
- France kept in North-EZ as 'political cover'

3. Euro in 2017 – Post 'Worst Case N/S Split'

(Less Than 10% Probability = Tail Risk = Low Chance & Very High Costs)

"North-South EZ Split" Scenario ... continued

- Southern Euro states re-adopt new currencies: Drachma, Peseta, Lira, etc.

Comments

- After severe slumps in GDP (% double-digits), new currency collapses(30-60% vis-a-vis euro) **financial stabilsation** emerges after hard foreign debt restructuring and widespread domestic defaults, followed by external-led growth (mixed prospects across South-EZ)
- **High positive LCU interest rates** fall from very high levels on the back of a moderating inflation surge and subsequent fall. This attracts foreign risk capital as asset prices start to rise again
- **Local currencies stabilise** and may appreciate as growth prospects improve. More normal mainstream capital inflows resume.
- South-EZ generates a combined current account deficit

4. Euro Muddles Through to "Euro Mark II"

% Chance 1 year: 50%
% Chance 5 years: 60%

Triggers:

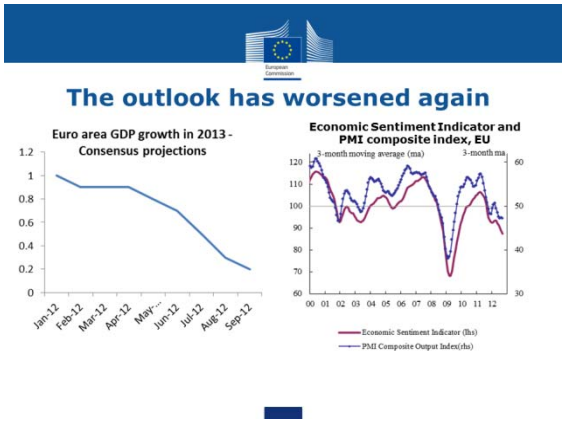
- **ECB**: More activist lender of last resort to banks; conditional to sovereigns undertaking policies 'in right direction' (**OMT**). Short-term borrowing costs fall sharply & 2nd Greek bailout success. Longer term yields fall on austerity, reform progress, external-led growth
- Banking Union progress in 2013. **ECB = "Euro IMF +"**
- **EZ governments:** Sign-up & implement new **'Fiscal Compact'** in 2012. ESM bolstered & arrives mid-2012. Weaker euro re-ignites core & peripheral euro growth. EU structural funds support growth & reforms loosen-up economy. South EZ populations broadly acquiesce under austerity & reform, outright resistance muted.

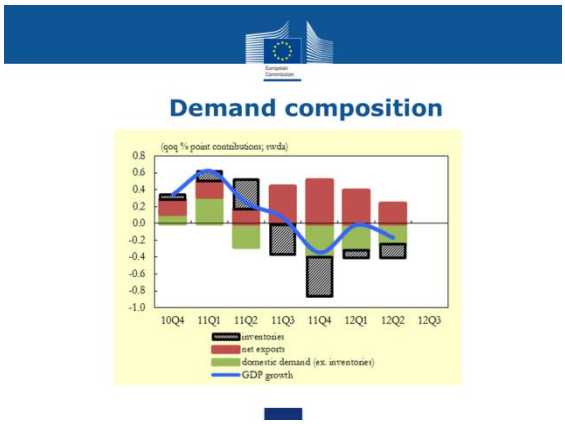
Mechanism & Comment:

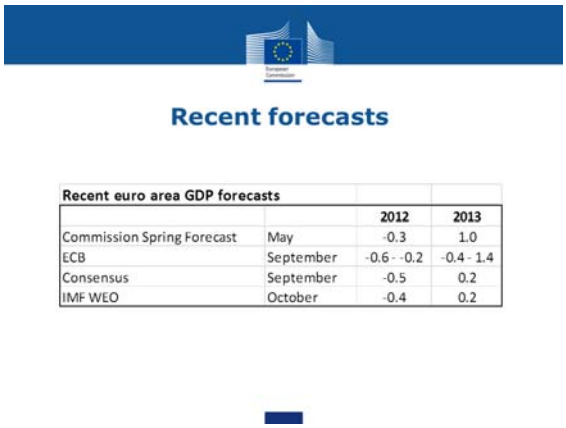
- Merkel's "step-by-step" approach gradually improves market confidence with more activist ECB and austerity the main priorities. Weaker euro generates more competitiveness & growth initially, followed by fruits from structural reforms within medium-term.
- Southern EZ more strongly bound by Northern EZ fiscal compact rules. **Single market measures accelerated**. EZ and EU fiscal funds limits borrowing costs & lifts investment.
- **Risk capital returns to EZ periphery**, followed by more moderate mainstream bank capital flows as financial stabilisation is assured.

The outlook for the EU economy

Björn Döhring (DG ECFIN)

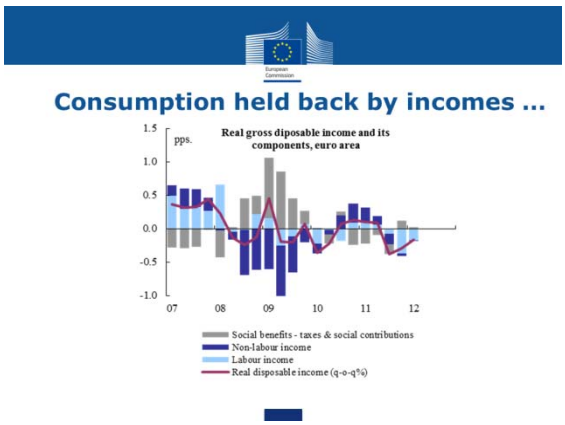




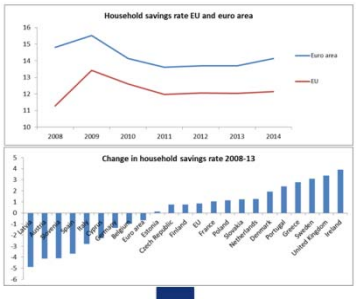


Recent euro area GDP forecasts

		2012	2013
Commission Spring Forecast	May	-0.3	1.0
ECB	September	-0.6 - -0.2	-0.4 - 1.4
Consensus	September	-0.5	0.2
IMF WEO	October	-0.4	0.2

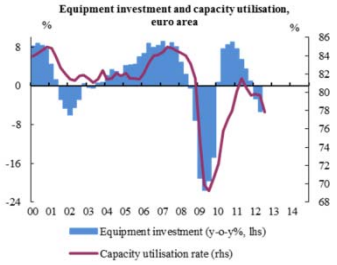


… and deleveraging (in some MS)

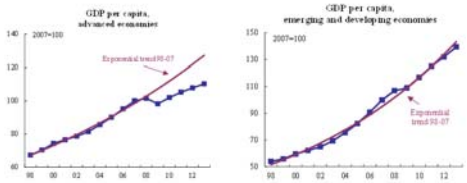


Reserve slides

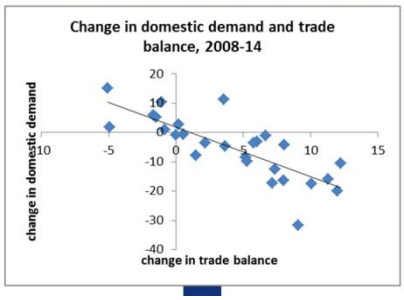
Chances for an investment rebound?



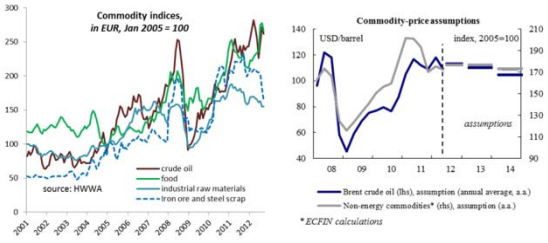
The footprint of the crisis: advanced versus emerging economies



Adjustment of external imbalances

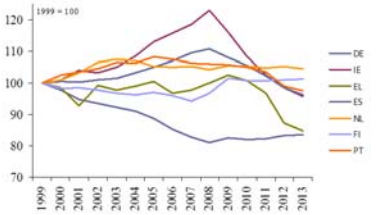


Commodity prices: high and volatile



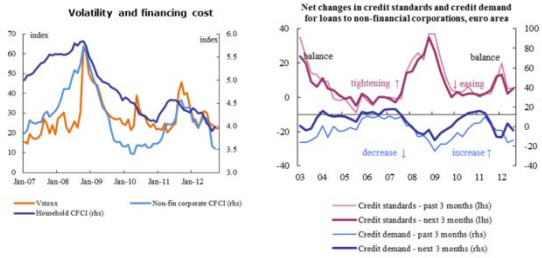
Competitiveness regained

Changes in relative unit labour costs, selected Member States

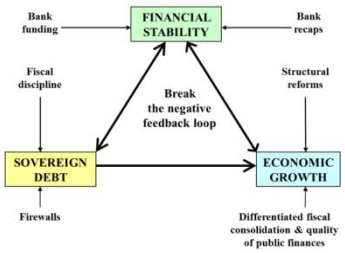


Source: Commission services' 2012 Spring Forecast

Financing conditions remain mixed



Feedback loops and crisis resolution



What matters most for commodity price developments?

John Baffes (The World Bank)

PANEL DISCUSSION
Macroeconomic assumptions and related uncertainties

JOHN BAFFES
The World Bank

Commodity Market Development in Europe–Outlook
JRC-IPTS and DG AGRI
October 16-17, 2012
European Commission, Brussels

1

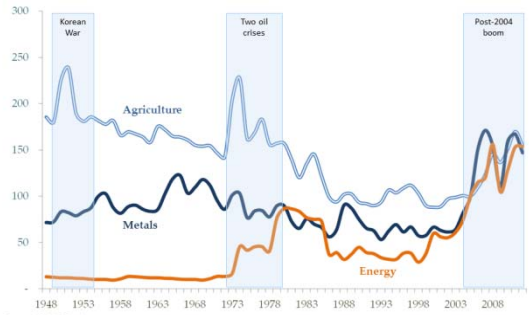
Most (not all) 'perfect storm' conditions are still in place

	2000-05	2006-11	Change
Agricultural prices (nominal index, 2005 = 100)	**87**	**158**	**81%**
Grain price volatility (stdev of log differences, monthly)	**4.5**	**8.0**	**78%**
Crude oil price (US$/barrel, nominal)	33	80	142%
Fertilizer prices (nominal index, 2005 = 100)	75	218	191%
Exchange rate (US$ against a broad index of currencies, 1997 = 100)	119	103	-14%
Interest rates (10-year US Treasury bill, nominal)	4.7%	3.7%	-21%
Funds invested in commodities (US$ billion)	80	263	229%
GDP growth (low and middle income countries, % p.a.)	6.7	7.2	7%
Industrial production growth (low and middle income countries, % p.a.)	5.6	6.5	16%
Biofuel production (millions of barrels per day equivalent)	0.5	1.5	220%
Stocks (total of maize, wheat, and rice, months of consumption)	3.0	2.5	-15%
Yields (average of wheat, maize, and rice, tons/hectare)	3.7	4.1	9%
Growth in yields (average of wheat, maize, and rice, % p.a.)	0.9	1.4	56%
Natural disasters (droughts, floods, and extreme temperatures)	220	207	-6%
OECD policies (Producer NPC, %)	1.3	1.1	-11%

Source: World Bank, US Treasury; US Department of Agriculture, Federal Reserve Bank of St. Louis, Barclays Capital, Center for Research for the Epidemiology of Disasters, and OECD.

Most prices still high by historical standards

(MUV-deflated indices, 2005 = 100)



Source: World Bank
Note: 2012 figures as of September 2012

2

What a simple model tells us

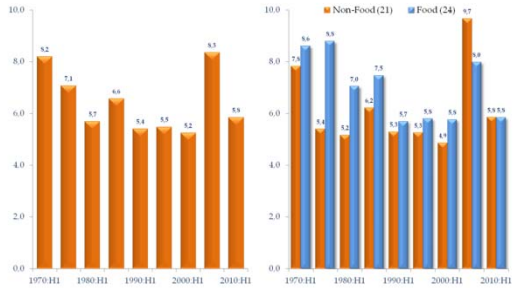
- THE MODEL: Price = f(S/U ratio, oil price, exchange rate, inflation interest rate, GDP)
- PERIOD: 1960-2012, annual data
- COMOMDITIES: wheat, maize, rice , soybeans, palm oil
- WHAT IT DOES: (i) estimates long run elasticities; (ii) considers most drivers simultaneously
- IT DOES NOT: (i) consider (explicitly) policies; (ii) say anything about short term price variability

Key results: What matters most

- It explains, on average, 80% of price variability
- The oil price accounts for more than half of price variability
- S/U ratio explains about 15%
- Exchange rates explain about 10%
- The remaining variables do not explain much
- Interesting result for rice: S/U is not significant (the rice equation performed the least)
- The model implies that during 2011-12 prices are 10% above what the fundamentals would dictate (beyond the average percent error)

Although price volatility is down to "historical" norms…

(Median of 45 monthly price series of *100*STDEV[log p(t)) - log p(t-1)]*, 5-yr average)



Source: Author's calculations
Notes: H1 and H2 refer to the first and second half of each decade; 2010:H1 is up to September 2012

9

Why oil explains the most

- Consider wheat:

	S/U	oil	ex. rate
elasticities:	-0.50***	+0.28***	-0.86**
r.h.s. changes:	-17%	+228%	-12%

- All models, except rice, have similar results
- Therefore, the most important uncertainty comes from energy prices.

… price comovement remains high by historical standards, even compared to the inflationary 1970s and …

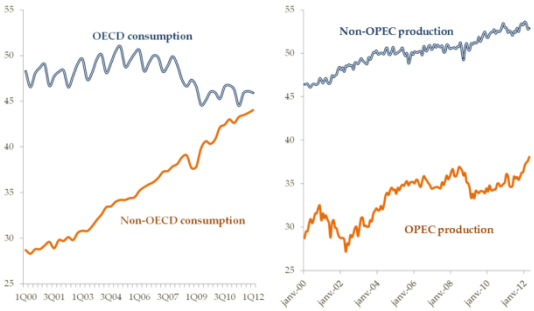
(2-year trailing moving average of *ABS[n(up)-n(down)]/[n(up)+n(down)]* based on 45 monthly price series)

Source: Author's calculation
Notes: The latest observation reflects the 2010:M10– 2012:M09 average

10

Non-OECD countries consume almost as much oil as OECD … most of which comes from high cost (non-OPEC) producers

(million of barrels per day)

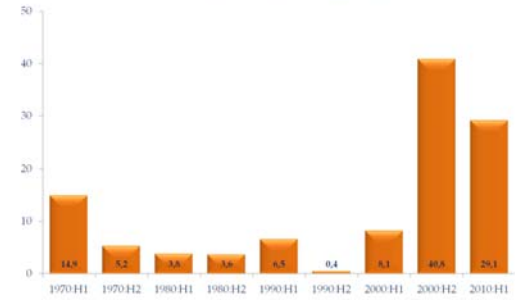


Source: International Energy Agency and BP Statistical Review

7

… similarly despite moderation during the past 2.5 years, correlation between crude oil and other prices still high

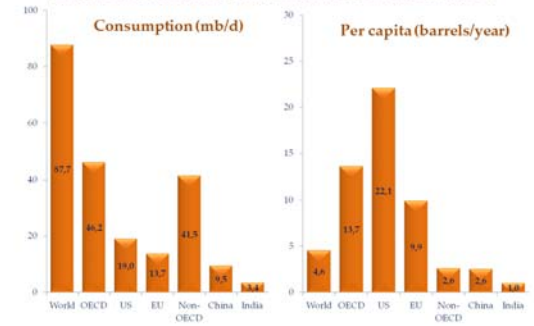
(Median based on 45 monthly price series, calculated as 5-yr average of *100*CORREL[log p(t) – log p(t-1)]*)



Source: Author's calculations
Notes: H1 and H2 refer to the first and second half of each decade; 2010:H1 includes 2010:M01-2012:M09

11

If non-OECD countries reached OECD energy use patterns, the world would consume 215 mb/d instead of 88 mb/d of crude oil



Source: BP Statistical Review

8

Speculation and the volatility of agricultural prices

Christopher L. Gilbert (University of Trento)

Speculation and the Volatility of Agricultural Prices

Christopher L. Gilbert
(University of Trento, Italy)

EC JRC-IPTS and DG-Agri Agricultural Outlook 2012 Workshop, Brussels, 16-17 October 2012

Food price volatility

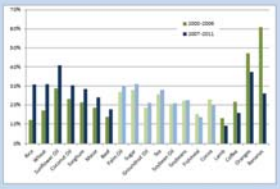
- Concern in relation to food price volatility was stimulated by the grains price spike of 2007-08. Many popular commentators jumped to the conclusion that food prices would be both permanently higher and more volatile.
- In Gilbert and Morgan (2010, 2011), we used monthly data to analyze the volatility of 19 food commodities over the 40 year period 1970-2009. We found that volatility had only increased significantly over the second half of the period (1990-2009) relative to the first two decades for two of the 19 commodities (bananas and rice) whereas it had decreased significantly for nine of the commodities. The food price rises of 1972-74 were much larger than those in 2007-08 and 2009-10.
- Taking a shorter tem perspective, we found some evidence of an increase in grains price volatility in the final years of their sample but concluded that they would need to "wait for a few more years to know whether this is indeed the case".

1. Volatility

Volatility update, 2011

This figure updates the Gilbert and Morgan numbers with data for 2010-11.

The chart is arranged in increasing order of the difference between 2000-06 and 2007-11 volatilities. Dark bars indicate cases where the change in volatility is statistically significant. There are statically significant increases for 7 of the same 19 food commodities and decreases for only 4.



The increases are concentrated on the grains. Beef (dependent on maize feed) also shows a volatility increase as does sunflower oil.

What we appear to have witnessed is an increase in the volatility of grains prices but not a general increase in that of food prices across the board.

Volatility

- The volatility of an asset price is some measure of the directionless extent of the variability of that price.
- In the finance literature, volatilities are the return standard deviations which can be approximated by the standard deviation of logarithmic price changes. I use this definition.
- In popular discussions, people often say a prices is volatile when they want to imply that the price has risen. Volatility tends to be positively correlated with price levels since both are symptomatic of tight markets. However, prices can be high but exhibit low volatility – crude oil, for example, as the consequence of the Saudi policy of stabilizing oil prices at a high level.

The determinants of volatility

Volatilities depend on the elasticities of the supply and demand curves and the variances (and covariance) of the shocks to productions and consumption. An increase in volatility must therefore result from a smaller elasticity or an increase in shock variability. Possible stories:

a) Low stocks (decline in supply elasticity) – but unclear that this is the case.
b) Global warming (increase in supply shocks) – evidence is unclear that variances have increased.
c) Use of food commodities (maize, vegetable oils) as biofuel feedstocks – this is a rightward shift to demand so the primary effect would be a rise in price not increased volatility. However, energy market shocks would be imported into food demand, increasing the demand shock variance.
d) Inflexibility of biofuels mandates – decrease in demand elasticity.
e) Financialization – futures market activities, particularly index-based investment, may generate price movements unconnected with supply and demand fundamentals - a new source of shocks.

Volatility measurement

- Volatility is not directly observed but must be inferred from other market data. There are three major classes of volatility measures:

a) Backward-looking measures (historical volatility and GARCH conditional volatilities) which estimate volatility from past returns. In this talk I discuss volatilities generated using a GARCH(1,1) filter. These are close to historical volatilities with exponentially declining weights. They tend to be fairly smooth and therefore respond to questions about volatility over a hedging horizon of weeks or months and not over a trading horizon of hours or days.

b) Current or realized measures based on price movements within the period in question. These can be calculated either from tick (transaction) data or from daily highs and lows.

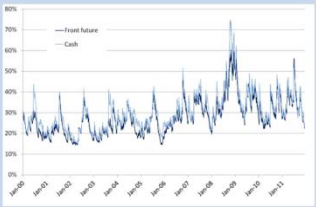
c) Forward-looking measures – implied volatilities from near-the-money options. Since traders do not know the future, these tend to be closer to historical than to realized measures.

- These measures are different. There is no reason to expect that they will have the same statistical properties or exhibit the same dependencies.

2. Positions

Corn (maize)

Conditional corn volatility fluctuated in the 20%-30% range on an annualized basis up to 2006. Since then, the range has been 30%-50% and up to 60% in 2007-08.



Averages	Cash	Front future
2000-06	25.9%	23.4%
2007-11	36.9%	34.3%

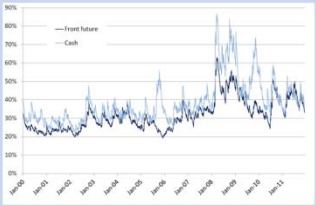
Cash and futures volatility move closely together for corn, cash slightly higher than futures.

Position data

- The CCTC's disaggregated Commitments of Traders (COT) reports give detailed weekly information on positions in US commodity futures markets starting June 2006. The reports distinguish producers and merchants, swap dealers, money managers, other reporting traders and a non-reporting group of small traders.
- The Supplemental Commitment of Traders (SCOT) reports give weekly position data for index providers in agricultural markets from January 2006. This group cuts across swap providers and money managers.
- The SCOT data are based on a small sample. Starting December 2007, the Index Investment Data (IID) reports provide more accurate data on index positions, initially quarterly and now monthly.
- Europe lags – NYSE-LIFFE and ICE have embarked on provision of comparable data but the process is recent and not yet comprehensive.

Wheat

Conditional CBOT wheat volatility is several percentage point higher than corn volatility, fluctuating in the 20%-35% range up to 2006. Since then, the range has been 35%-60% and up to 60% in 2007-08.



Averages	Cash	Front future
2000-06	32.1%	26.6%
2007-11	47.3%	39.1%

Cash volatility was substantially higher than futures volatility up to 2010 reflecting convergence problems.

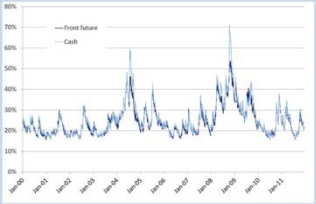
Index positions

Index-investment positions in the three major grains are of comparable size and move together – soybeans positions showing less variability than those in corn and wheat.

Positions peaked in the early summer of 2008 and again in 2010. They are currently showing relatively little movement - perhaps declining slightly. Supposing that these positions can move prices, it nevertheless seems unlikely that they will be a major factor in 2012-13.

Soybeans

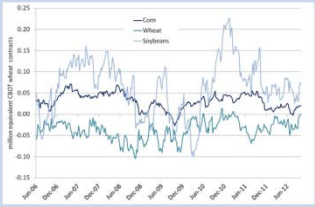
Conditional CBOT soybean volatility is substantially lower than either wheat or corn volatility, fluctuating around 20% up to 2006. After spiking higher in 2007-08 ikt has now fallen back close to earlier levels.



Averages	Cash	Front future
2000-06	23.7%	22.8%
2007-11	28.3%	27.0%

There is little difference between cash and futures volatility.

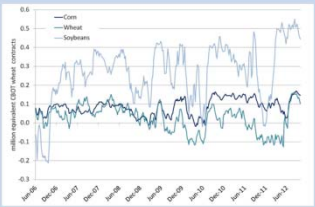
Traditional speculators



I identify traditional speculators with the "other reporting" category in the disaggregated CFTC *Commitments of Traders* data.
Soybeans appear to have attracted the most attention – first in 2006-07 and then in 2010.

Positions are currently quite low – again traditional speculators do not appear likely to be a major factor in moving grains prices in 2012-13.

Money managers



"Money managers" are hedge funds, pension funds and other large institutions investing on behalf of others.
The striking feature here is the large positions regularly taken in the soybeans market – 2006-08, 2009-10, 2010-11 and 2011-12.

These soybeans positions remain large and indicate that the smart money appears to be on a rise in vegetable oil prices.

GARCH-Granger results

		Cash	1	2	3		Cash	1	2	3
Wheat	Producers + merchants				↓	Soybeans				
	Swap dealers	↑			↑					
	Money managers									
	Other reporting	↓	↓	↓	↓					
	Non-reporting									
	CIT		↓	↓	↓			↓	↓	
Corn	Producers + merchants		↑	↑	↑	Soybean Oil				
	Swap dealers									
	Money managers									
	Other reporting	↓	↓	↓	↓					
	Non-reporting									
	CIT	↓	↓				↓	↓	↓	↓

↑ and ↓ indicate significantly positive and negative statistics at the 5% level; and in feint font at the 10% level.

3. Is financialization responsible for the rise in volatility?

GARCH-Granger results - interpretation

- The clear result is that CIT trades are volatility reducing. This is true for CBOT wheat futures, soybean futures and soybean oil futures. For corn, there is strong evidence only for cash and weak for the front future. These results reject the Masters Volatility Hypothesis. Index investment is volatility-reducing.
- The "other reporting" (traditional speculators) group is also seen as volatility-reducing for CBOT wheat and corn. (There is weak evidence that they are volatility-increasing for KCBT wheat - omitted from this table).
- For corn, an increase in the net long position of producers and merchants is seen as increasing volatility. However, since this class of commercial traders is net short throughout the sample, the interpretation is exactly the opposite – an increase in their net short position is volatility-reducing.

Financialization, speculation and volatility

- It is very important here to distinguish between possible effects of speculators and/or index investors on price levels and possible effects on price volatility.
- Work undertaken in my research group shows

a) Index investors probably did contribute to the rise in food prices in 2007-08 and the subsequent fall in late 2008. Others, in particular Sanders and Irwin, dispute this. If present, this was a price level effect.

b) The trading of both index investors and traditional speculators tends nevertheless to be volatility-reducing. The next two slides summarize some work I have recently completed.

4. Biofuels

Granger causality

- Granger-causality (GC) testing is the standard approach in the literature which looks at the impacts of different classes of financial actor on asset prices. I have used it in various papers, including with Simone Pfuderer. Sanders and Irwin have used GC is a series of recent papers.
- Granger causality is based on two proposition that if a variable *x* causes another variable *y*, the cause will be helpful in forecasting the effect regardless of what information set is used The standard test asks

$$E\left(y_{t+1}\middle|\Omega_t\right)=E\left(y_{t+1}\middle|\Omega_t-\{x_t,x_{t-1},\ldots\}\right)$$

where Ω_t is the complete information set available in period *t*. If we reject this equality, then *x* Granger-causes *y*.
- In the GARCH context I modify this test to ask

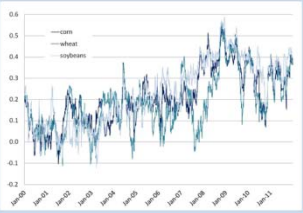
$$Var\left(y_{t+1}\middle|\Omega_t\right)=Var\left(y_{t+1}\middle|\Omega_t-\{x_t,x_{t-1},\ldots\}\right)$$

- This defines what I call the GARCH-Granger test.

Biofuels and price volatility

- Most of the work on the effects of biofuels on food prices has focused on price level effects – the use of corn for ethanol and vegetable oils for biodiesel shifts the food demand curve to the right, raising prices until supply responds.
- Higher prices will eventually bring forth additional production so this impact will be larger in the short than the long run.
- The attractiveness of converting food crops into biofuels depends on energy prices. Shocks to energy prices are therefore likely to transmit to food prices. This volatility impact will not diminish with the passage of time. In what follows, I report work with Harriet Mugera looking at the correlation of grain and crude oil prices.
- Biofuel mandates specify quantities. Mandated biofuel production will not be sensitive to prices. Inflexible mandates therefore reduce demand elasticities and hence increase volatility.

DCC MGARCH conditional correlations



Average correlation with crude oil

	Corn	Wheat	Soybeans
2000-06	0.125	0.130	0.114
2007-11	0.378	0.313	0.278

We use the DCC Multivariate GARCH model to extract conditional correlations of grains price returns with crude oil returns (here Brent crude). Correlations with crude oil returns have increased for all three grains and do not show any sign of declining.

Conclusions

1. The volatility of the prices of grains and oilseeds has increased over the most recent decade. The financialization of commodity futures markets, specifically the growth of index-based investment, has been singled out as the most likely culprit.
2. Index positions have been relatively stable through 2012, tending to show a slight decline. They do not appear to be a major factor in current developments.
3. Econometric tests show that trading by index traders, producers and merchants and the "other reporting" group of large speculators tends to be volatility-reducing. No major group is recorded as being volatility-increasing.
4. There is no volatility-reduction case for enhanced financial market regulation. Speculation is not "excessive" so there is no argument for regulation for a reduction. Any limitation on index trader positions is likely to increase and not reduce food price volatility.
5. Financialization, and index trading in particular, turns out to be a scapegoat which distracts attention from the real causes of increased volatility. The most likely candidate appears to be diversion of food crops into biofuels uses.

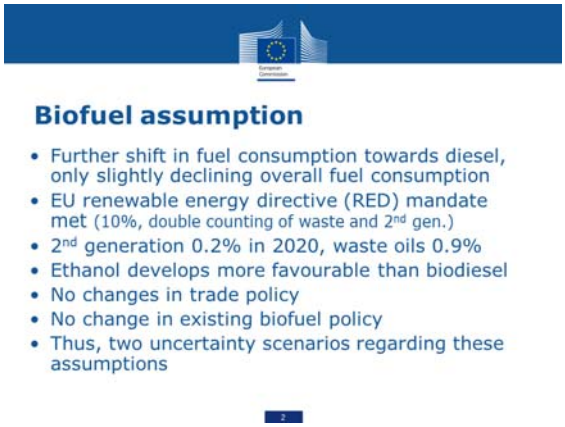
Possible explanations

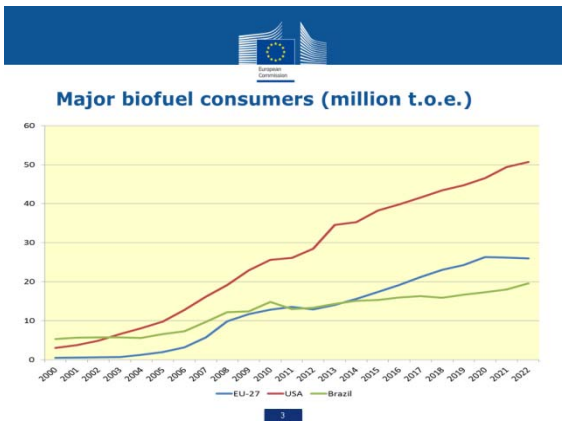
1. Financialization: This does not appear right because we see the same increased correlations for oats and rough rice, markets which are too small to attract index investment or money managers.
2. Common demand side shocks: supply shocks tend to be commodity-specific while demand shocks are more general. The post-2008 financial crisis may have led to a dominance of demand side shocks. This may be part of the explanation, but the rise in the inter-commodity correlation starts in 2006-07 predating the financial crisis.
3. Biofuels: the increase in correlations coincides with the rise in oil prices and the installation of ethanol refining capacity in the US. However, the biofuels story cannot explain why we get a similar rise in correlations of metals and crude oil prices.

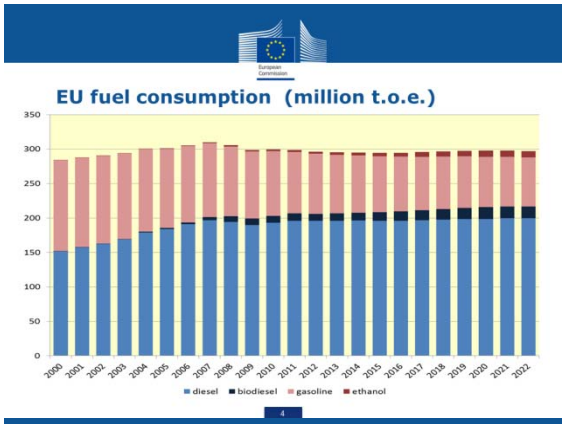
5. Conclusions

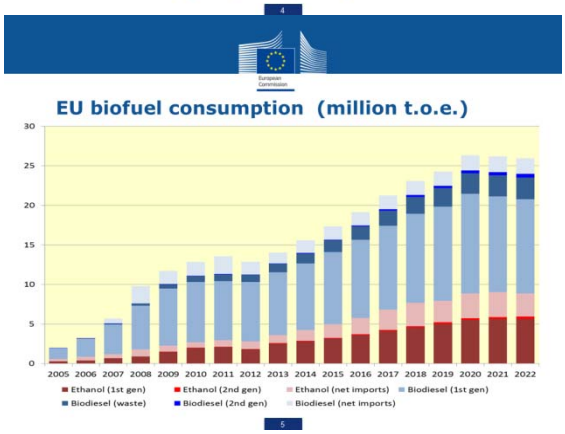
EU agricultural outlook 2012-2012: Biofuels

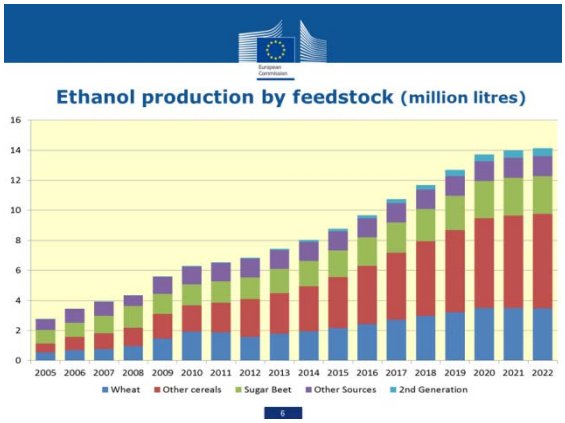
Stephan Hubertus Gay (DG AGRI)

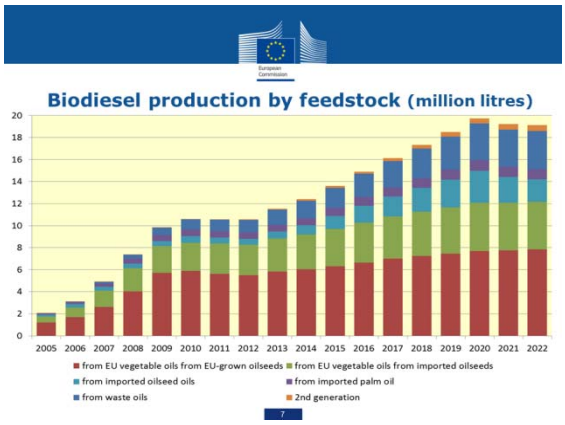


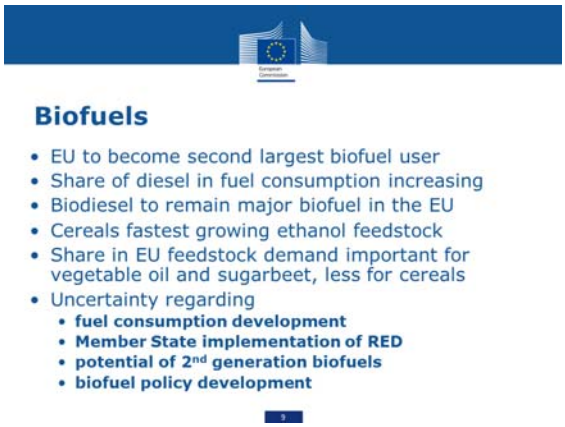


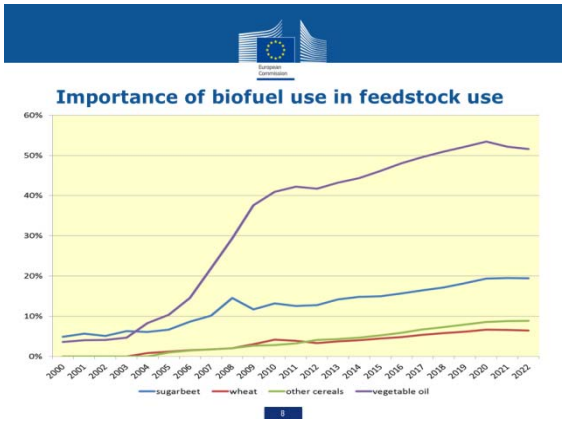






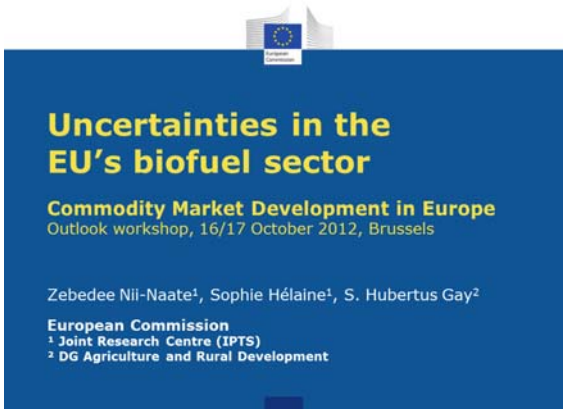


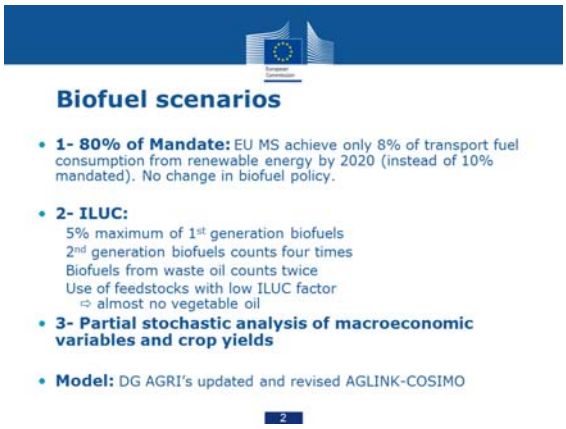




Uncertainties in the EU's biofuel sector

Zebedee Nii-Naate, Sophie Hélaine (JRC-IPTS), Stephan Hubertus Gay (DG AGRI)





Biofuel use in EU-27 — Biofuel scenarios

% share in energy equivalent	2020 Baseline	80% Mandate	ILUC
Biofuel (in fuel)*	10%	8%	9.2%
1st generation (in fuel)	7.8%	6.1%	5%
2nd generation (in fuel)	0.2%	0.2%	0.6%
Waste oil (in fuel)	0.9%	0.8%	0.9%
Biodiesel (in diesel)	8.1%	6.9%	2.7%
Ethanol (in gasoline)	11.1%	7.4%	16.4%

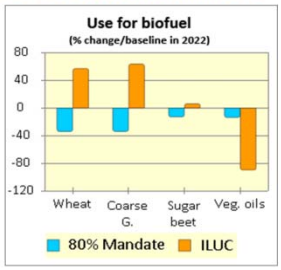
* Renewable Energy Directive accounting

- **80% of mandate**: biodiesel and ethanol shares in energy equivalent declines
- **ILUC**: Sharp decrease in biodiesel, the mandate is not fulfilled and ethanol blend wall is reached

3

Biofuel scenarios

EU-27 biofuel feedstocks

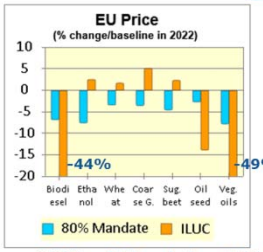


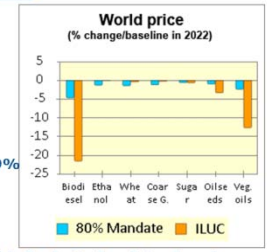
80% of Mandate:
- Less arable crops used for biofuel production

ILUC:
- Extreme decrease in vegetable oils used for biodiesel, partially offset by increased cereals for ethanol

4

Price — Biofuel scenarios

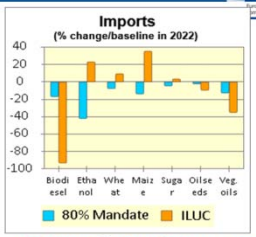


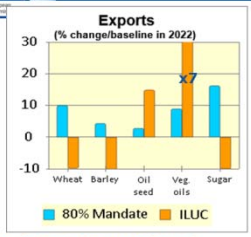


- **80% of Mandate:** EU biofuels & feedstock prices decrease leading to a small decrease in world prices
- **ILUC:** Biodiesel and vegetable oils price fall significantly

5

EU-27 trade — Biofuel scenarios





- **80% of Mandate:** Large decrease in ethanol imports and increase in exports of arable crop
- **ILUC:** Biodiesel imports collapse ⇨ net exports vegetable oils improves. Cereals are needed for ethanol production ⇨ more imports and less exports

6

Partial stochastic analysis of macroeconomic variables and crop yields

Partial stochastic analysis

Objective:
Assess the implications of regional weather uncertainties around the world and EU macroeconomic uncertainties

How?
- Taken into account past forecast errors of macroeconomic variables (exogenous) and weather shocks to arable crop yields (endogenous)
- Created 500 sets of correlated macroeconomic assumptions and correlated arable crop yields
- Simulated global model 500 times. Analysed the dataset of solved simulations and interesting subsets

8

USA low maize yields +high & low oil prices — Partial Stochastic Analysis

Yield coefficient of variation (CV)

Average 2013-2022 annual coefficient of variation between 10th & 90th percentiles

	Wheat*	Maize**	Oilseeds
EU-15	7%	8%	4%
EU-N12	15%	26%	9%
Ukraine	33%	22%	25%
Russia	21%		8%
Argentina	14%	14%	9%
Brazil	29%	13%	2%
USA	10%	14%	5%
Australia	69%	20%	12%

* Common wheat for the EU
** Coarse grains for Ukraine and Australia

Oil price uncertainty by 2022:

90th perc. = 193 USD/bl
Baseline = 110 USD/bl
10th perc. = 50 USD/bl

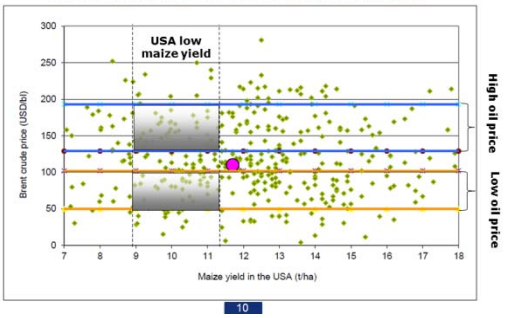
USD/EUR exchange rate uncertainty by 2022:

90th perc.= 2.20 USD/EUR
Baseline = 1.35 USD/EUR
10th perc.= 1.00 USD/EUR

9

USA low maize yields +high & low oil prices — Partial Stochastic Analysis

Brent crude price and USA maize yields in 2022



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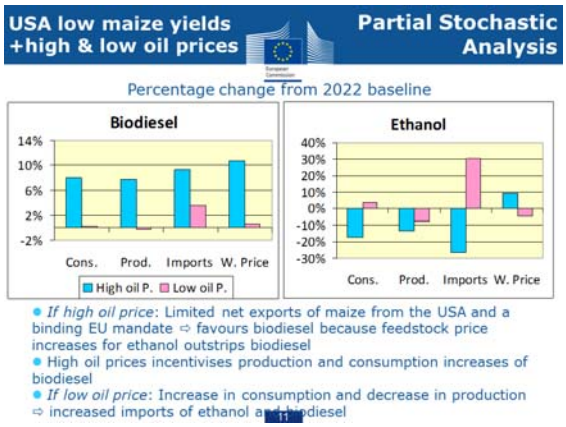
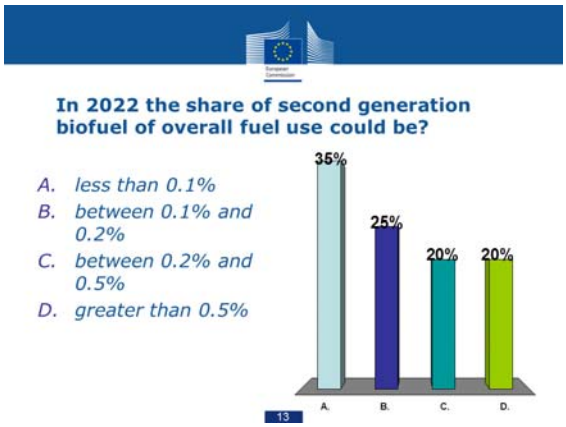
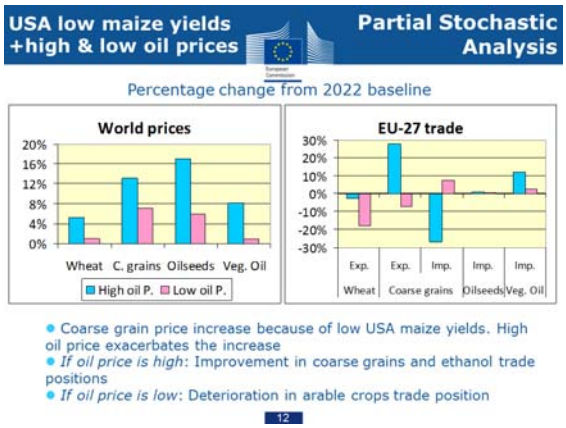
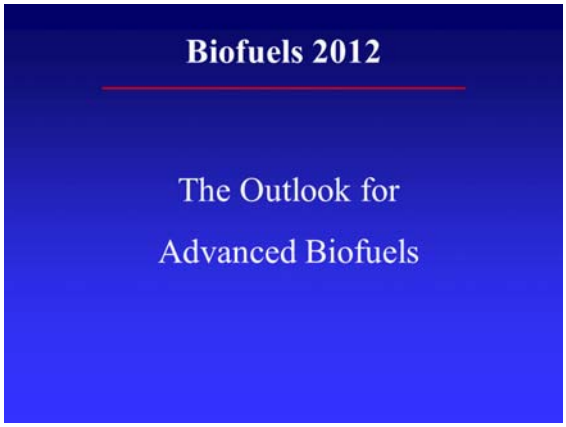


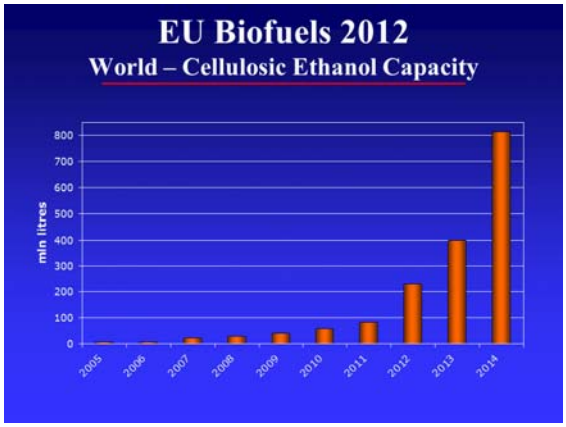


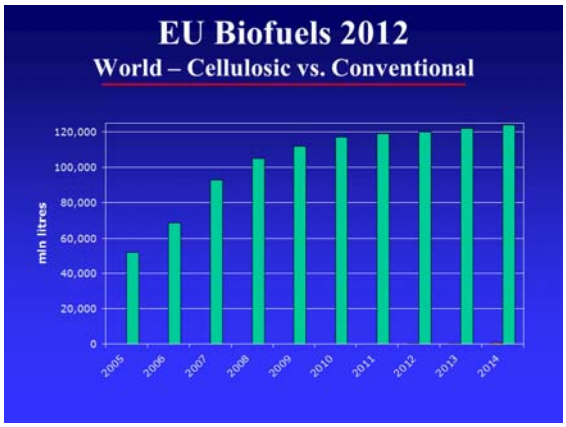


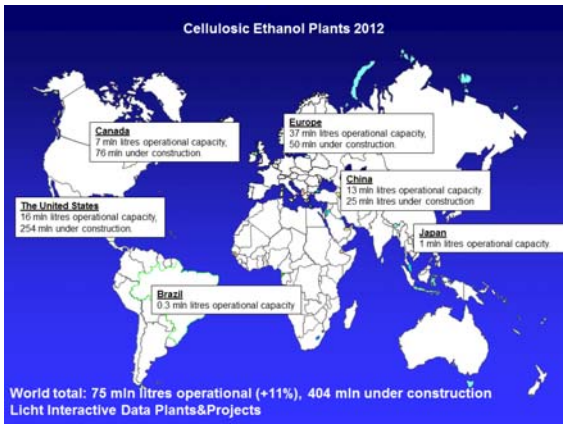
The outlook for advanced biofuels

Christoph Berg (F.O. Licht)









Lighthouse projects: Chemtex 2012

- Crescentino, Italy
- 50-76 mln litres
- EUR140 mln (90 mln CE)
- $0.29-0.34 per litre OC
- Feedstock: wheat straw
- Roll-out in Brazil, US (6 plants)

Lighthouse projects: POET 2013

- Emmetsburg, USA
- 76 mln litres
- $250 mln
- Feedstock: corn stover
- Roll-out in USA (potential 29 plants)

Lighthouse projects: Enerkem 2013

- Edmonton, Canada
- 38 mln litres
- C$70 mln
- Feedstock: MSW
- Roll-out in Canada (3 plants)

Lighthouse projects: Abengoa 2014

- Hugoton, USA
- 90 mln litres
- $476 mln
- Feedstock: corn stover
- Roll-out in USA, EU (potential 11 plants)

EU Biofuels 2012
Conclusions

- Advanced biofuels gain traction
- 2013 will be milestone year
- EU incentives are too weak
- 2020 targets will not be reached
- Strong growth in the USA, Brazil

Renewable fuel standard waiver: options during the drought 2012

Wyatt Thompson (FAPRI)

Renewable Fuel Standard Waiver Options during the Drought of 2012

Wyatt Thompson
Food and Agricultural Policy Research Institute
at the University of Missouri
www.fapri.missouri.edu

"Commodity Market Development in Europe -Outlook"
organized by JRC-IPTS and DG AGRI
16-17 October 2012

Food and Agricultural Policy Research Institute
FAPRI

Price of corn ethanol certificates for mandate compliance

Source: OPIS Oil Price Information Service (www.opisnet.com/news/biofuels.asp).
Note: corn ethanol certificate prices are conventional RIN prices.

FAPRI

Mandates and waivers

- Biofuel mandates
  - Minimum use requirement
  - Corn starch (conventional) ethanol
  - Tradable and storable certificates ("RINs")
- Waiver options
  - Reduce overall mandate → conventional ethanol less useful for mandate
- Key questions
  - How do mandates affect ethanol use?
  - How does change in use relate to corn market?

FAPRI

Waiver assumptions

- Overall mandate waiver
  - No corn starch ethanol need for mandate
  - Use falls to level chosen given market conditions
  - Certificates stored for later use
- Other possibilities
  - Reduce role of corn starch ethanol, not eliminate
  - Disallow storing certificates
  - Target other parts of mandate

FAPRI

U.S. ethanol market and mandates

Baseline projections without a waiver

	2011/12	2012/13	2013/14
Ethanol market		(billion gallons)	
Production	13.8	12.5	14.9
Imports	0.2	0.7	0.7
Domestic use	12.9	12.7	14.7
Exports	1.1	0.6	0.8
Change in stocks	0.0	-0.2	+0.2
Overall mandate compliance		(billion certificates)	
Corn (conventional) ethanol	12.7	12.0	13.9
Other biofuels	1.9	2.2	2.7
Change in stocks	-0.2	-1.9	-0.4
Total used for compliance	14.8	16.1	17.0

Source: FAPRI-MU #11-12, October 2012.
Notes: mandates converted to marketing years; mandate-related quantities are in billions of RIN-gallons; and overall mandate in 2013/14 reflects assumptions about cellulosic production versus mandate.

FAPRI

Impacts of a waiver

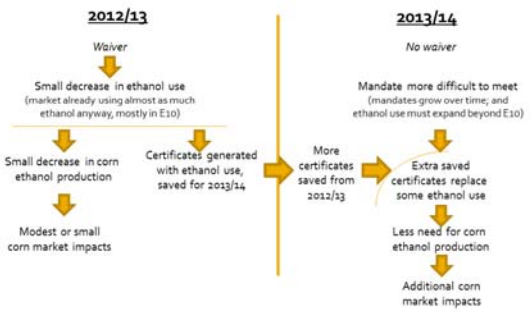
2012/13 marketing year results

	Baseline	Waiver	Difference
Certificates used for overall mandate compliance (billions)	16.1	2.5	-85%
Ethanol use (billion gallons)	12.7	12.5	-1.3%
Corn ethanol price (dollars per gallon)	2.70	2.67	-0.9%
Ethanol production (billion gallons)	12.5	12.3	-1.3%
of which, from corn	12.2	12.0	-1.3%
Corn used for ethanol and coproducts (billion bushels)	4.49	4.43	-1.3%
Corn price, farm (dollars per bushel)	7.87	7.83	-0.5%
Corn exports (billion bushels)	1.25	1.26	+0.8%

Source: FAPRI-MU #11-12, October 2012.
Notes: mandates converted to marketing years; mandate-related quantities are in billions of RIN-gallons; and overall mandate in 2013/14 reflects assumptions about cellulosic production versus mandate.

FAPRI

Delayed impacts
Potential for larger impacts after waiver ends



Summary

- Waiver impacts
  - Small if markets would use almost as much biofuel without mandate
  - Delayed impacts can be important
  - Also : trade can play a role
- Uncertainties
  - Waiver implementation
  - Calendar and marketing year
  - Ethanol demand

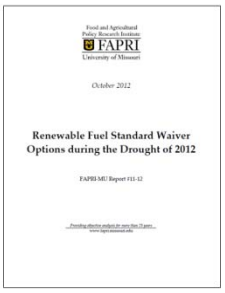
Source: FAPRI-MU #11-12, October 2012.

Crop and crop product price impacts
2012/13 and 2013/14 marketing year results

	2012/13		2013/14	
Corn (dollars per bushel)	-0.04	-0.5%	-0.17	-3.2%
Wheat (dollars per bushel)	-0.01	-0.2%	-0.08	-1.1%
Soybeans (dollars per bushel)	0.00	0.0%	-0.07	-0.6%
Soybean meal (dollars per ton)	0.42	0.1%	0.84	0.3%
Soybean oil (cents per pound)	-0.03	-0.1%	-0.44	-0.8%
Ethanol, conventional (dollars per gallon)	-0.02	-0.9%	-0.16	-7.1%
Biodiesel (dollars per gallon)	0.00	0.0%	-0.03	-0.5%
Distillers grains (dollars per ton)	0.20	0.1%	0.61	0.4%

Source: FAPRI-MU #11-12, October 2012.
Notes: mandates converted to marketing years.

For more information



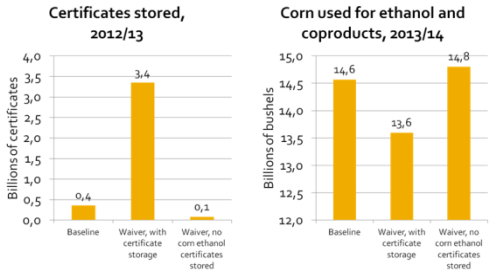
www.fapri.missouri.edu
Biofuel reports
- temporary waiver
- cellulosic waiver

Baseline
- august update

Farm bill
- Senate
- House Agric. Comm.

Articles
- Eurochoices
- AEPP
- Energy Policy

Implementation matters
Second year effect depends on certificate storage



Source: FAPRI-MU #11-12, October 2012.
Notes: certificates stored are estimated total RIN storage in RIN-gallons; and mandates converted to marketing years.

Two-way trade in biofuels

Seth Meyer (FAO)

Two-way trade in biofuels: how environmental legislation fuels resource use and GHG emissions

Seth Meyer
Josef Schmidhuber
Jesús Barreiro-Hurlé

Economic and Social Department (ES), FAO
October 16, 2012

US mandate classification of biofuels

Mandate	GHG Reduction minimum	Feedstocks, fuels and processes
Renewable Fuels (T)	20%	*(all of below and)* ***Ethanol from maize starch***
Advanced Fuels (A)	50%	*(all of below and)* ***Sugar, Starch other than maize***, bio-based diesel from co-processing with petroleum, butanol, biogas
Bio-based Diesel (B)	50%	Distillate replacements produced from: Vegetable oil, animal fats, waste grease, animal waste and byproducts, excluding co-processing with petroleum
Cellulosic Biofuel (S)	60%	Derived from cellulose, hemi-cellulose or lignin from Renewable Biomass (from existing lands in production): Dedicated crops, crop residues, planted trees and residues, algae, yard waste and food waste

Other feedstocks possible in each class unless explicitly excluded (such as maize starch in advanced) which meet the GHG reduction minimum

Source: Authors' summary of EISA 2007

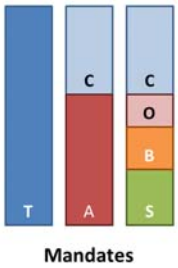
Trade Theory and Reasons for Cross Trade

1. Two way trade in differentiated products (N/A)
   - Consumer preferences for differentiated products drive trade, not relative cost advantages or factor endowments
2. Two way trade in homogeneous/identical products
   - Transportation and transaction costs ("border trade")
   - Lack of market transparency
   - Statistical artifact (lack of HS disaggregation (M. Finger)
   - Seasonality (production, trade, policies)

=> None of the above appear to apply

=> Physically homogeneous goods, product differentiation by policies?!

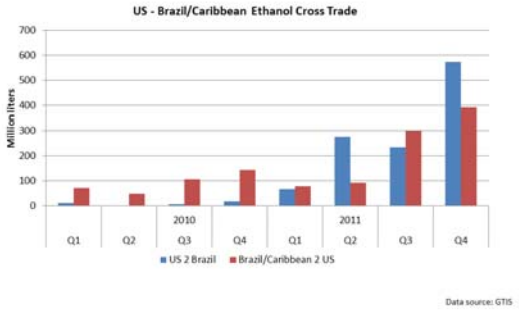
Biofuel mandates



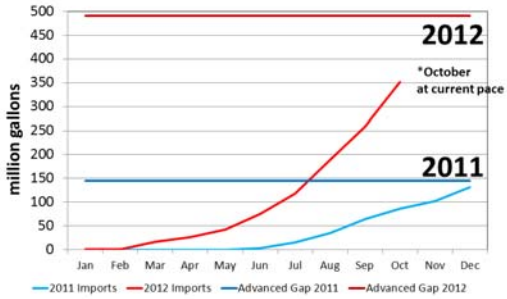
Mandate quantities
T = renewable mandate
A = advanced mandate
B = bio-based diesel mandate
S = cellulosic mandate

Implied gaps
C = conventional ethanol gap
O = other advanced gap

Seasonality?
US Brazil Ethanol Cross Trade w/ Caribbean

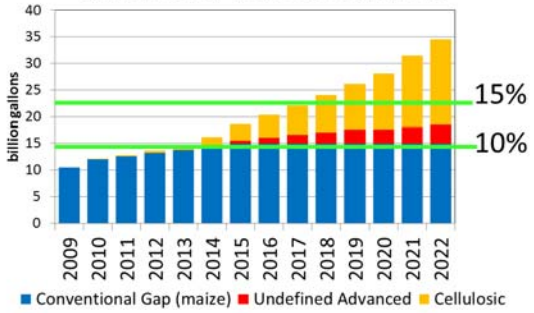


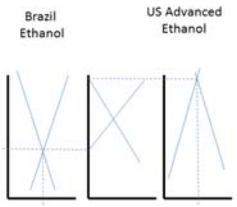
US Ethanol Imports VS. Implied Advanced Gap



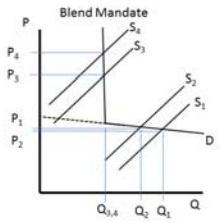
Source: US-EIA Monthly/Weekly Fuel Ethanol Imports

Ethanol mandate market and blend-wall constraints





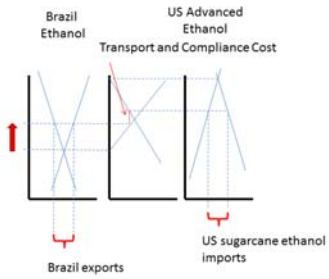
Brazil ethanol market response to export demand



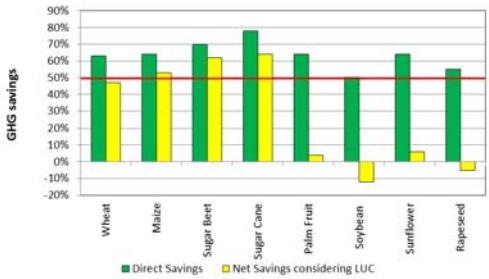
-All gasoline includes 20% ethanol blends (mandatory)
-No effective blend wall or use of ethanol
-No GHG savings requirement

Price and quantity effects of similar supply shifts are very different when mandates are or are not binding

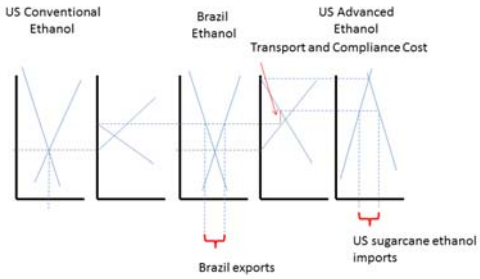
Larger price effects will increase the likelihood of re-import of ethanol



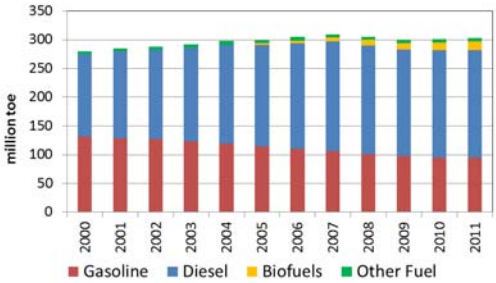
EU Scoring
Biofuel emission savings in 2020



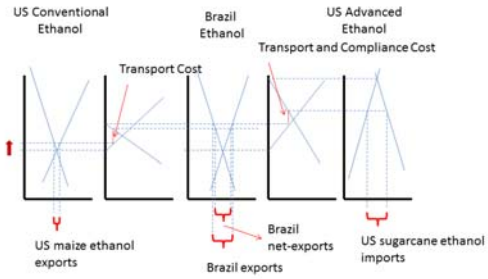
[1] GHG savings with a 90.3 grCO2eq/MJ reference for fossil fuel
[2] Source: Assessing the Land Use Change Consequences of European Biofuel Policies: Final Report



EU-27 Road Transport Fuel Use



Source: Eurostat



A Book and Claim system between the US and Brazil

- Ethanol producers in Brazil would register all biofuels to obtain an ''international'' RIN.
- They can offer these International RINs for sale e.g. on the Book & Claim on-line trading platform.
- Gasoline in Brazil would contain a minimum of 20% ''RIN volume" but may physically contain more or less than 20% ethanol.
  - RINs sold to US blenders would NOT be available to meet the 20% "RIN volume" threshold in Brazil
- Policies which would have induced the trade in physical biofuels, now would induce the trade in RIN credits.

Likely effects of a Book and Claim system between the US and Brazil

- Save on transport costs and GHG emissions from shipping
- Lower ethanol prices in both markets, potentially increasing consumption of ethanol in both Brazil and the US, resulting in additional GHG savings
- No change in *systematic* US compliance costs for RFS2, additional compliance costs for Brazil to implement virtual 20% in domestic fuel consumption. Lower consumer costs!
- Requires a credible certification scheme which has *systematic* compliance costs (monitoring, certification and verification)
- Same would hold for a Book and Claim with EU

Conclusions

1. Policies are a necessary but not sufficient condition for cross trade
2. Policies in place now in the US, EU and Brazil suggest that there could/will be an explosion of cross trade!
   - US: Growing US "advanced" ethanol needs will increase cross trade potential
   - EU: EU ethanol needs may come from the US or EU, various scenarios are possible. Cross trade or triangular trade. EU policies and biodiesel blend wall like a pump for "triangular flows"
   - Brazil: "Indiscriminant" ethanol blend polices (no GHG scores) spurs cross trade with the US; potentially triangular flows: Brazil-EU-US
3. Cross trade could be eliminated and GHG emissions reduced or entirely eliminated e.g. through the implementation of a trilateral, coordinated "book and claim" system.

Cross trade factors

Increases Cross Trade

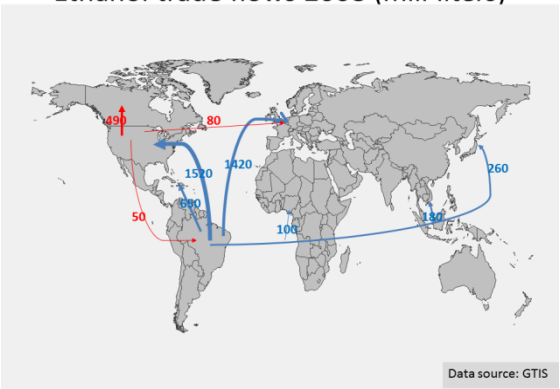
- Policies
  - Binding mandates US
  - Binding mandate BR
  - EU scores ILUC
  - EU uses mass balance system
  - Lower EU biofuel import tariff
  - Differential GHG scoring: US v EU v Brazil
- Technologies
  - Effective US ethanol blendwall
  - Effective EU biodiesel blendwall
- Markets
  - Low oil prices
  - Low transport costs
  - High US maize yields
  - Low BR sugar yields
  - High vegoil prices/low yields

Decreases Cross Trade

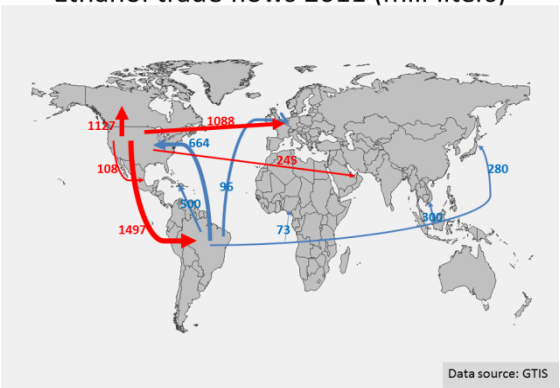
- Policies
  - Non-binding mandates US
  - Non-binding mandate BR
  - EU doesn't include ILUC
  - EU uses Book and Claim system
  - Current EU biofuel import tariff
  - Consistent GHG scoring: same GHG scores across countries
  - US approves Sorghum for advanced ethanol
- Technologies
  - Ineffective US ethanol blendwall
  - Ineffective EU biodiesel blendwall
- Markets
  - High oil prices
  - High transport costs
  - Low US maize yields
  - High BR sugar yields
  - Low vegoil prices/high yields

Part 1: Nature and extent of crosstrade

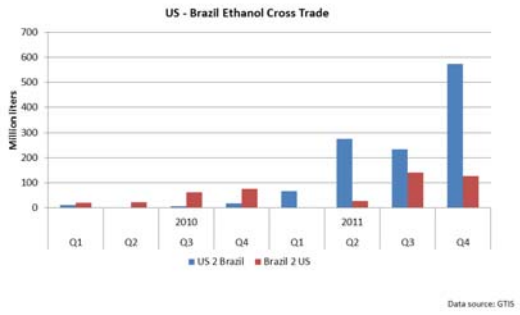
Ethanol trade flows 2008 (mill liters)



Ethanol trade flows 2011 (mill liters)



Seasonality?
US Brazil Ethanol Cross Trade w/o Caribbean



Brazil Biofuel Policy and Use

- All gasoline includes 20% ethanol blends (mandatory)
  - Flex fuel vehicles (can use up to 85% ethanol) dominate current sales
  - Neat fuel vehicles (run on pure alcohol) exist in fleet but new sales are negligible
  - No blend wall or use of ethanol
  - No GHG savings requirement
- Tax treatment/gasoline pricing
- Support to transform bagasse into renewable electricity

RIN and Ethanol Prices Aug 6, 2012: OPIS reporting

- Ethanol Prices (spot assessment)
  - New York = $2.6300 /gallon
  - Brazil FOB Santos anhydrous = $2.83875
- Conventional RINs (2012 vintage)
  - $0.0470 /gallon
- Advanced RINs (2012 vintage)
  - $0.4900 /gallon
- Biodiesel RINs (2012 vintage)
  - $1.0950 /gallon[1]

[1] the biodiesel mandate is in physical gallons but each physical gallon of biodiesel generates 1.5 RINs

The EU fuel market

1. Market factors
- Diesel dominates, therefore biodiesel dominates ¾ of biofuel use
- Blendwall for biodiesel (7%, by 2015)→ Shift in the dynamics from biodiesel to ethanol

→ need for "clean" ethanol imports (from Brazil), Brazil to cover own needs with "dirty" ethanol from the US: cross trade

2. Policies
- RED 2003: 5.75% of transport fuel use by 2010 (voluntary)
- RED 2009: 10% of transport fuel use by 2020 (mandatory)
  - GHG savings direct
  - GHG savings with ILUC

→ need for "clean" ethanol imports (from Brazil), 3.5 bn liters w/o ILUC, more with ILUC

→ EU requires physical addition of sustainable biofuel to the energy mix (Mass Balance System): physical trade required/cross trade?

→ Brazil to cover own needs with "dirty" ethanol from the US: cross trade

The EU fuel market

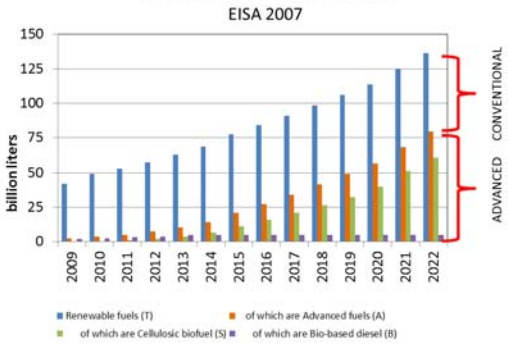
1. Market factors
- Diesel dominates, therefore biodiesel dominates ¾ of biofuel use
- Blend wall for biodiesel (7%, by 2015)→ Shift in the dynamics from biodiesel to ethanol

→ need for "clean" ethanol imports (from Brazil), Brazil to cover own needs with "dirty" ethanol from the US: cross trade

2. Policies

US Biofuel Mandates

EISA 2007



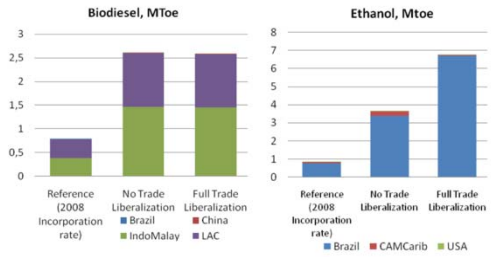
Wrapping it up: Extent and effects of Cross Trade

US policies and cross trade

(Energy Independence and Security Act of 2007)

Part 3: What's the solution?

EU Imports of Biofuels, Mtoe, 2020



Source: Mirage-Biof Simulations

Brazil's policies and cross trade

US biofuel policy

Energy Independence and Security Act of 2007

- Establishes 4 classes of biofuels, segmented based on feedstocks, process, fuel type and GHG reduction score
- Mandates minimum quantities, not inclusion rates[1], of each of the 4 classes in a nested hierarchy
- "advanced'' fuel classes grow at faster rates

[1] each year a blending rate is established based on (mandated quantities / expected motorfuel demand)

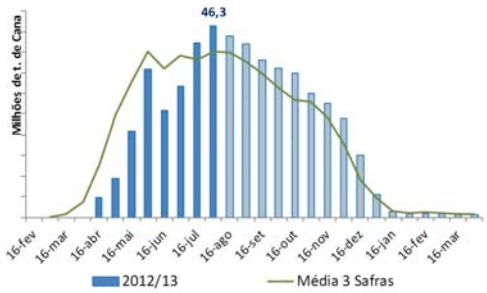
Part 2: Policies that drive cross trade

US

EU

Brazil

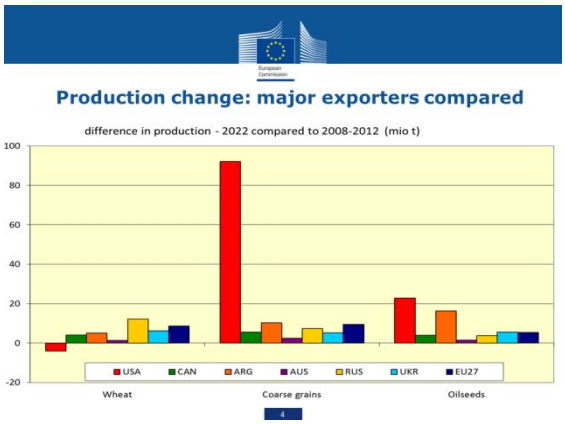
Seasonality: Cane harvest in Brazil

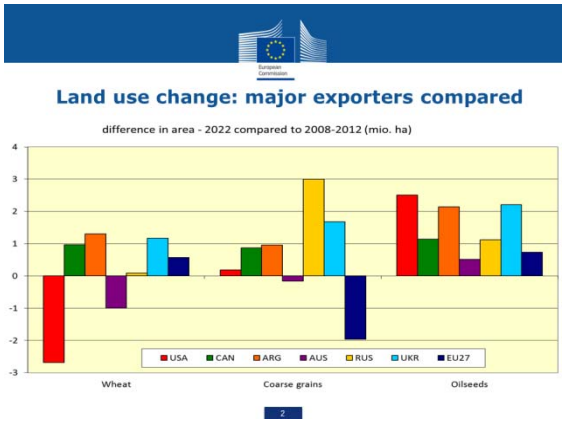


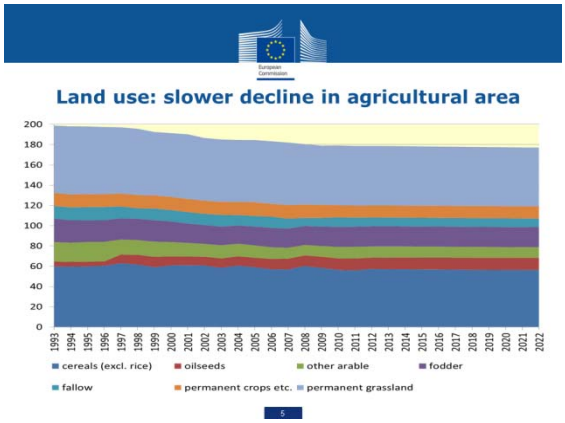
EU policies and cross trade

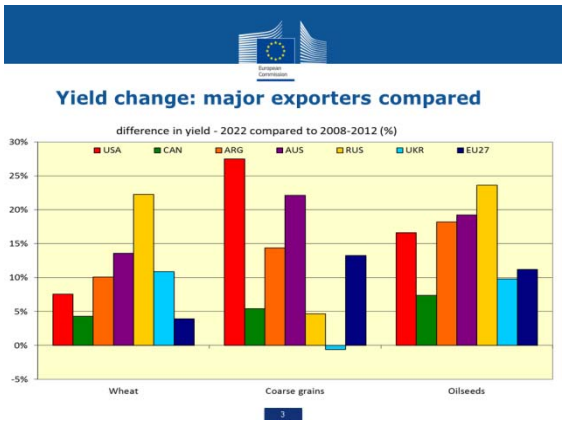
EU agricultural outlook 2012-2022: cereals, oilseeds, sugar

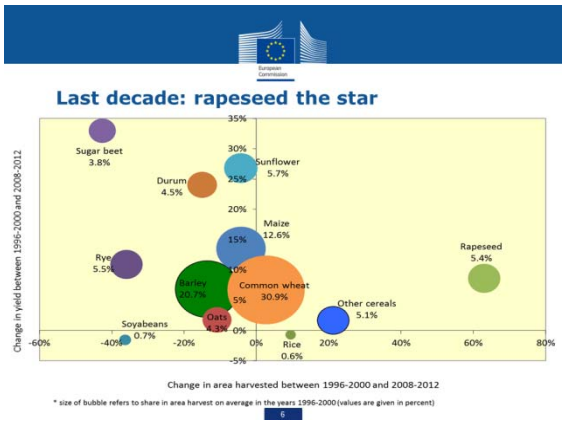
Stephan Hubertus Gay (DG AGRI)



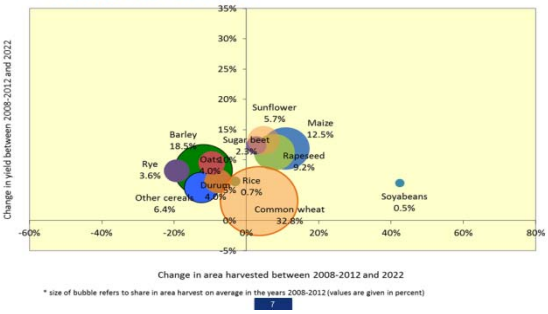






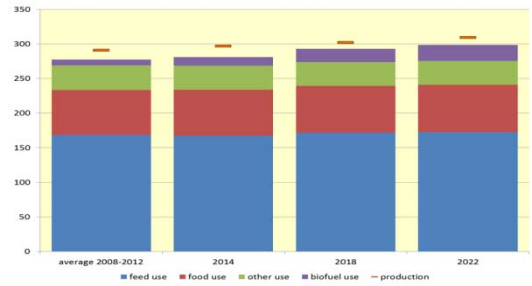


Coming decade: ???



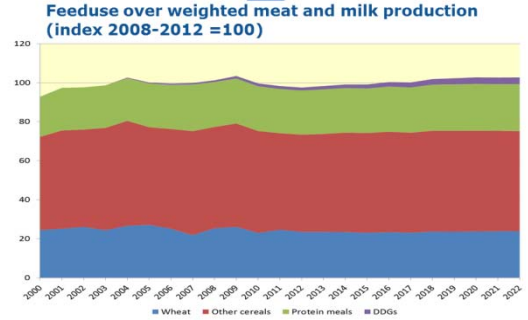
7

Cereal balance overview (million tonnes)



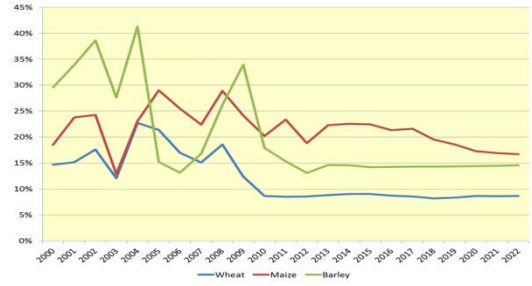
8

Feeduse over weighted meat and milk production (index 2008-2012 =100)



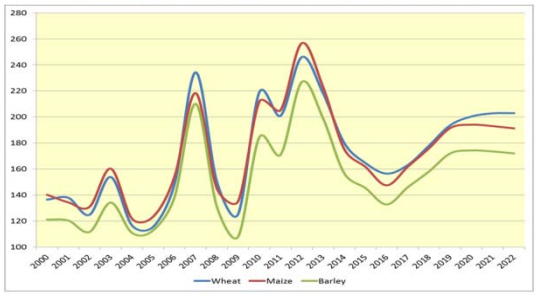
9

Stock to domestic use: to remain tight



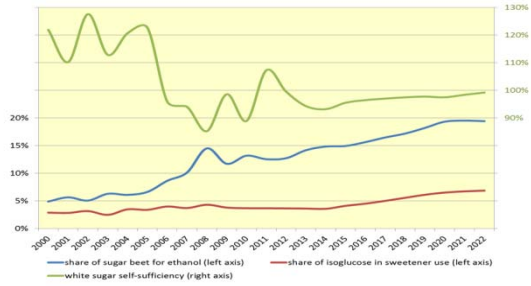
10

EU cereal prices: a period of lower prices?



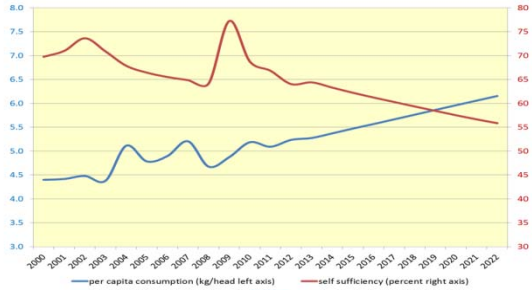
11

Sugar market: development of indicators



12

Rice: more consumption and import dependency



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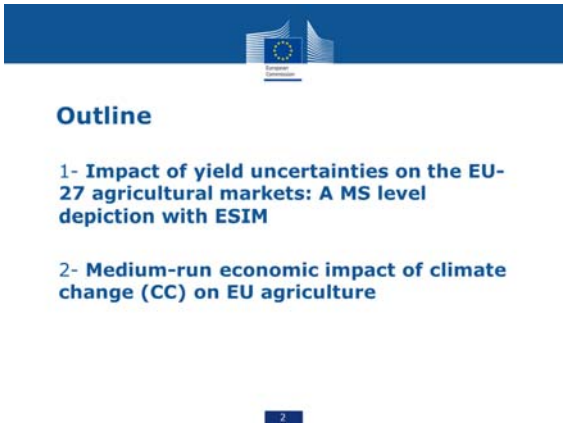
Cereals, oilseeds, rice and sugar

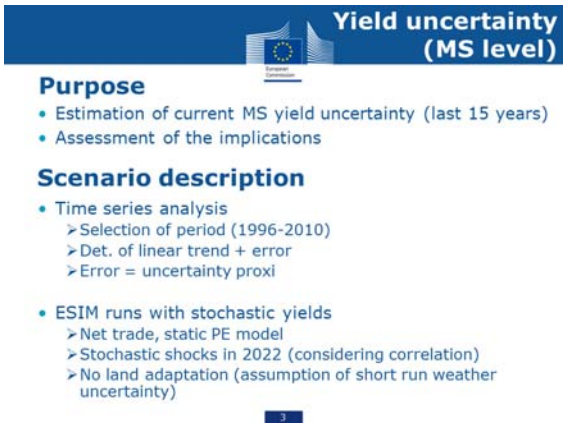
- EU less dynamic than competitors
- Slower yield growth, continued concentration of crops
- Continued strong domestic demand (feed, food and biofuels)
- No fundamental relief of market tightness
- Competitive position in sugar but no reversion to major net-exporter
- Rice: continued imports to satisfy growing domestic demand

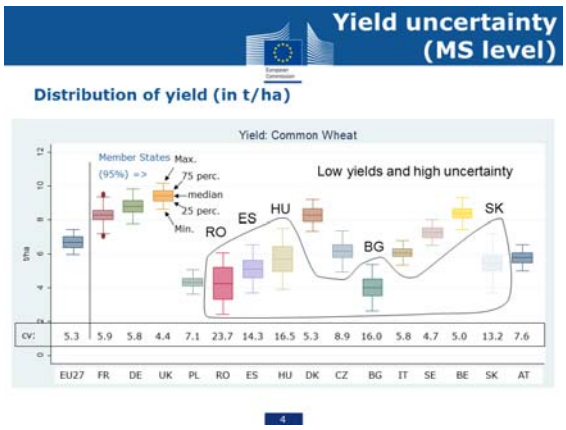
14

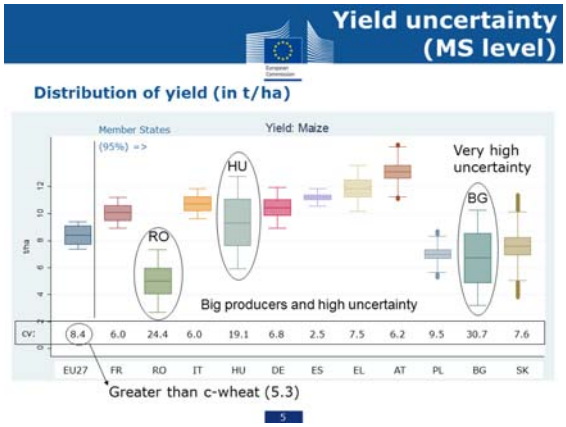
Uncertainties in the EU crop sector

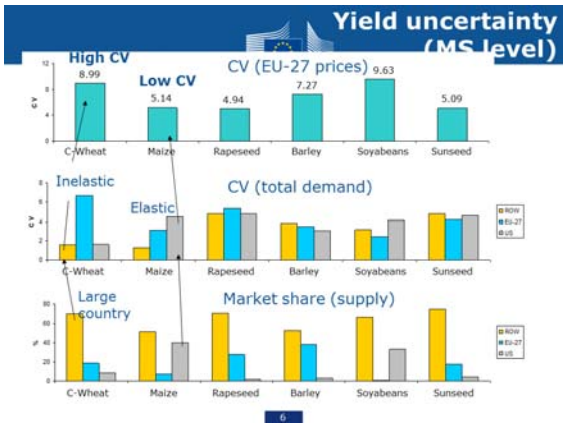
Marco Artavia and Pavel Ciaian (JRC-IPTS)

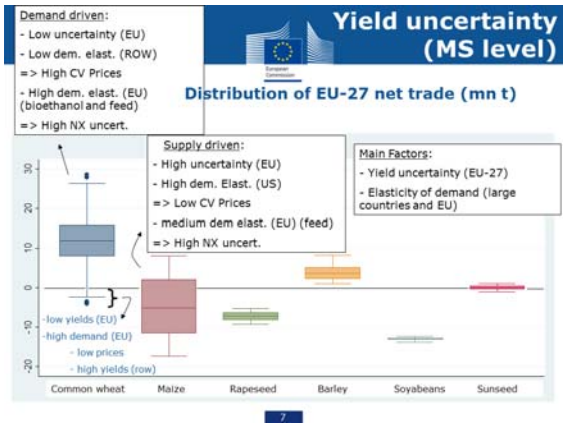


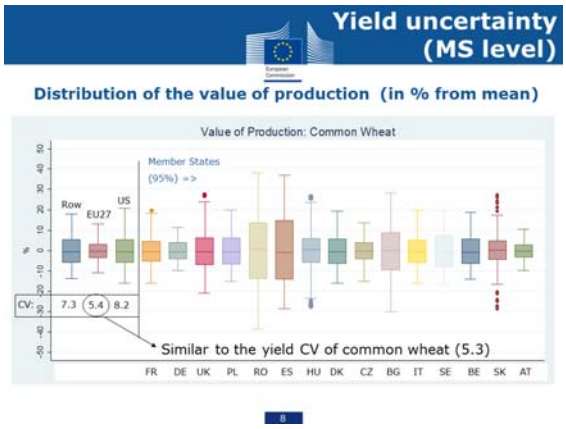


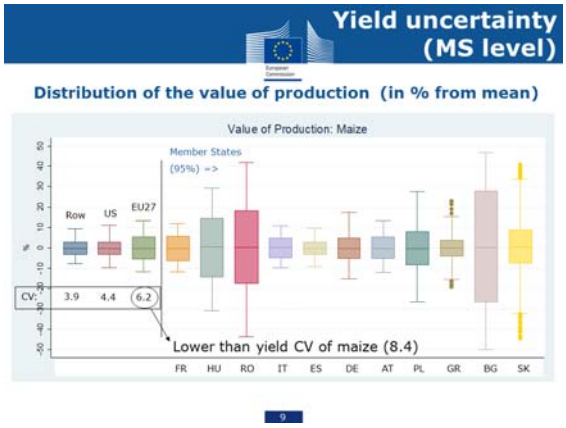




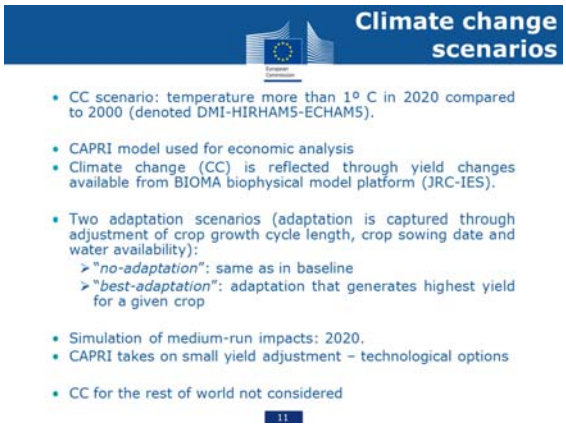


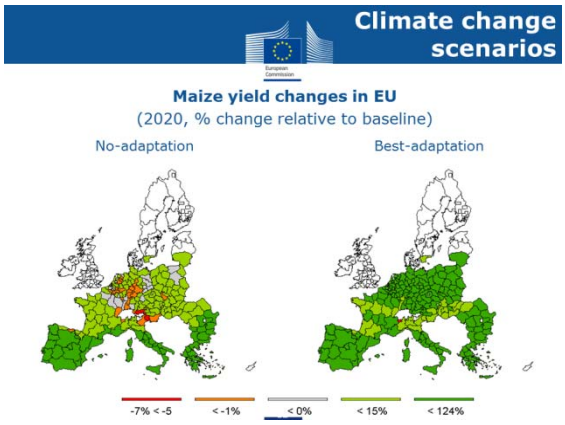

Yield uncertainty (MS level)
Distribution of EU-27 net trade (mn t)
Demand driven:
- Low uncertainty (EU)
- Low dem. elast. (ROW)
=> High CV Prices
- High dem. elast. (EU) (bioethanol and feed)
=> High NX uncert.
Supply driven:
- High uncertainty (EU)
- High dem. Elast. (US)
=> Low CV Prices
- medium dem elast. (EU) (feed)
=> High NX uncert.
Main Factors:
- Yield uncertainty (EU-27)
- Elasticity of demand (large countries and EU)
-low yields (EU)
-high demand (EU)
- low prices
- high yields (row)
Common wheat
Maize
Rapeseed
Barley
Soyabeans
Sunseed
7

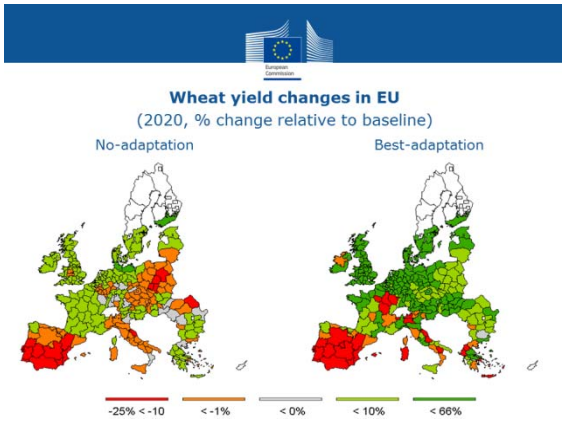

Yield uncertainty (MS level)
Distribution of the value of production (in % from mean)
Value of Production: Common Wheat
Member States (95%) =>
Row
EU27
US
CV: 7.3 5.4 8.2
Similar to the yield CV of common wheat (5.3)
FR DE UK PL RO ES HU DK CZ BG IT SE BE SK AT
8

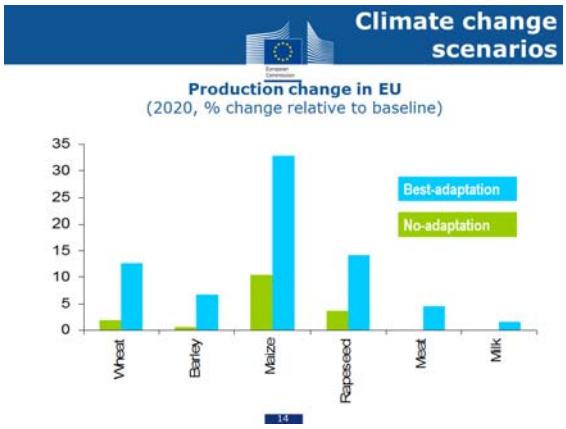

Yield uncertainty (MS level)
Distribution of the value of production (in % from mean)
Value of Production: Maize
Member States (95%) =>
Row
US
EU27
CV: 3.9 4.4 6.2
Lower than yield CV of maize (8.4)
FR HU RO IT ES DE AT PL GR BG SK
9

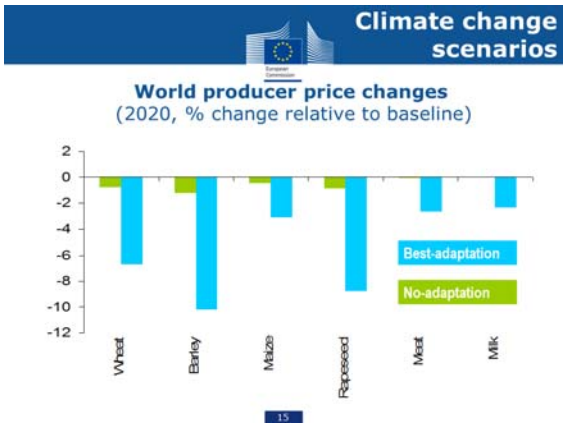

Medium-run economic impact of climate change (CC) on EU agriculture
10

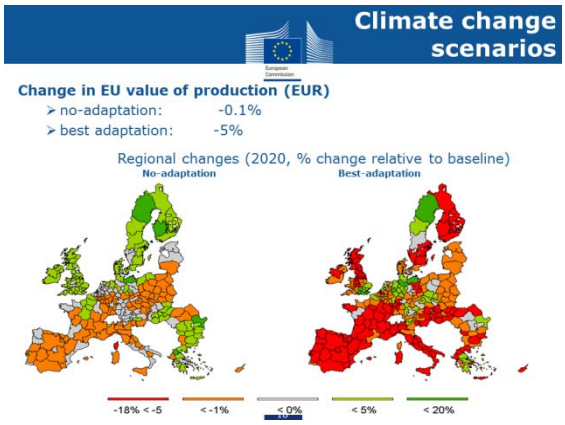

Climate change scenarios
CC scenario: temperature more than 1° C in 2020 compared to 2000 (denoted DMI-HIRHAM5-ECHAM5).
CAPRI model used for economic analysis
Climate change (CC) is reflected through yield changes available from BIOMA biophysical model platform (JRC-IES).
Two adaptation scenarios (adaptation is captured through adjustment of crop growth cycle length, crop sowing date and water availability):
"no-adaptation": same as in baseline
"best-adaptation": adaptation that generates highest yield for a given crop
Simulation of medium-run impacts: 2020.
CAPRI takes on small yield adjustment – technological options
CC for the rest of world not considered
11

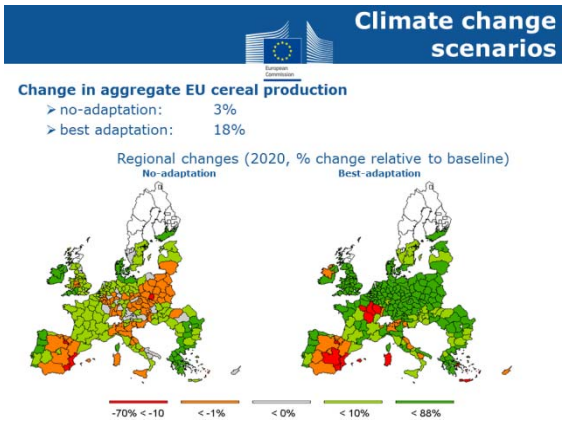

Climate change scenarios
Maize yield changes in EU
(2020, % change relative to baseline)
No-adaptation
Best-adaptation
-7% < -5
< -1%
< 0%
< 15%
< 124%

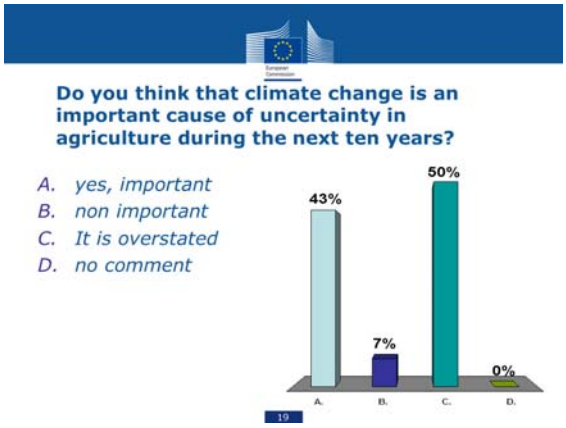

Wheat yield changes in EU
(2020, % change relative to baseline)
No-adaptation
Best-adaptation
-25% < -10
< -1%
< 0%
< 10%
< 66%

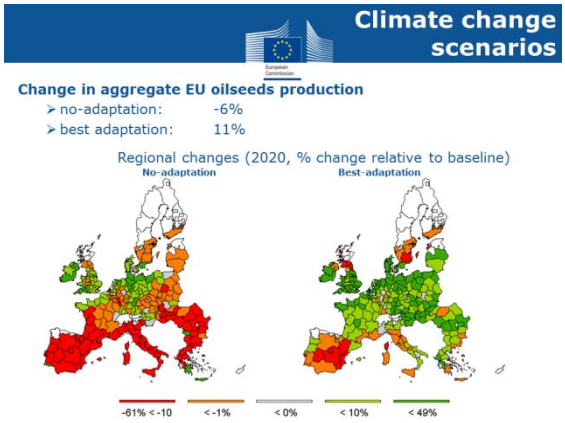

Climate change scenarios
Production change in EU
(2020, % change relative to baseline)
35
30
25
20
15
10
5
0
Best-adaptation
No-adaptation
Wheat
Barley
Maize
Rapeseed
Meat
Milk
14


Climate change scenarios
World producer price changes
(2020, % change relative to baseline)
2
0
-2
-4
-6
-8
-10
-12
Best-adaptation
No-adaptation
Wheat
Barley
Maize
Rapeseed
Meat
Milk
15


Climate change scenarios
Change in EU value of production (EUR)
no-adaptation: -0.1%
best adaptation: -5%
Regional changes (2020, % change relative to baseline)
No-adaptation
Best-adaptation
-18% < -5
< -1%
< 0%
< 5%
< 20%


Climate change scenarios
Change in aggregate EU cereal production
no-adaptation: 3%
best adaptation: 18%
Regional changes (2020, % change relative to baseline)
No-adaptation
Best-adaptation
-70% < -10
< -1%
< 0%
< 10%
< 88%


Do you think that climate change is an important cause of uncertainty in agriculture during the next ten years?
A. yes, important
B. non important
C. It is overstated
D. no comment
43%
7%
50%
0%
A.
B.
C.
D.
19


Climate change scenarios
Change in aggregate EU oilseeds production
no-adaptation: -6%
best adaptation: 11%
Regional changes (2020, % change relative to baseline)
No-adaptation
Best-adaptation
-61% < -10
< -1%
< 0%
< 10%
< 49%

Sugar markets and ethanol use of sugar

Thordis Möller (Nordzucker AG)

Nordzucker

Workshop on Commodity Market Development in Europe

Sugar Market

Thordis Möller, Nordzucker AG
thordis.moeller@nordzucker.de

Brussels, 16-17 October 2012

Nordzucker

Feedback on the projections of the European Commission

- Grains:
  - Corn for bioethanol production
- Sugar:
  - Beet productivity, increases only by 10%
  - Beet for bioethanol production still too high

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- **Feedback on Commodity Outlook**
- **EU and World Sugar Markets 2012/13**
- **Energy use of Sugar**

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1. Feedback on Commodity Outlook
2. **EU and World Sugar Markets 2012/13**
3. Energy use of Sugar

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1. **Feedback on Commodity Outlook**
2. EU and World Sugar Markets 2012/13
3. Energy use of Sugar

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European sugar market 2012/13 (rse*)

- **High beet and sugar yields led to biggest production in 6 years in 2011/12 with 18.4 mio. tons.**
- **Despite starting with similar good conditions, 2012/13 will not reach record level of 2011/12**
- **Area with 14.2 mio. hectares unchained, but average sugar yield around 12 t/ha (13/-9%).**
- **Production reduced by 1.7 mio tons to 17.7 mio. tons (-4%)**
  - France 4.2/-10%
  - Germany 4.1/-7%
  - Poland 2.0/-2.5%

- **Quota limit of 13.3 mio. (wse) exceeded**

* does not inlcude sugar for ethanol production

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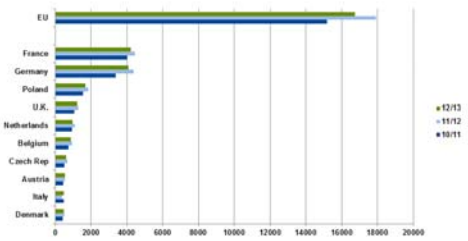
Top Ten Sugar Producers EU 2010/11-2012/13 (1000 tons, rse*)



Source: F.O.Licht

* does not inlcude sugar for ethanol production

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1 Feedback on Commodity Outlook
2 EU and World Sugar Markets 2012/13
3 **Energy use of Sugar**

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World sugar market 2012/13

- **Production increase in main producing countries Brazil, China and Australia offset declines in Europe and Thailand**
- **F.O.Licht: 177 mio. tons (2011/12: 177)**
- **ISO: Global consumption increases by 1.9% to 172 mio. tons (168), 5-6 mio. tons below production**
  - End of period of low stocks
  - No huge price decreases expected

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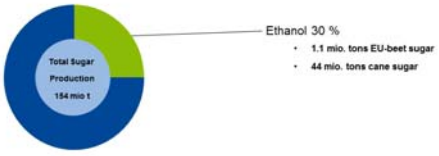
Energy use of Sugar

Global sugar use for ethanol production in 2009



Source: adapted from FNR 2011

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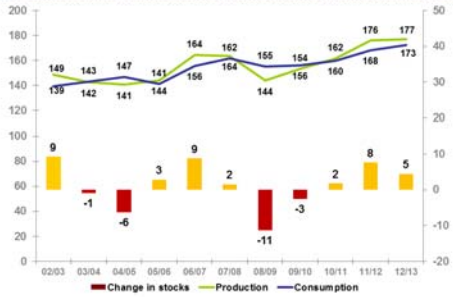
Development on world sugar market 2002/03 – 2012/13 (rse, mio tons)



Source: USDA, FO.LICHT, own assumption

| 9

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Energy use of Sugar

EU Beet-Ethanol - Capacity and Production 2009

	Beet Ethanol Production Capacity		Sugar Needs ('000 t White Value)
	Capacity 1000 cbm	Sugar supply 1000 t White Value	2009
Czech Republic	100	147	103
France	905	1 327	1239
Germany	265	389	330
UK	70	103	92
Europe total	1340	1965	1764
Only pure fuel ethanol	885	1298	1119

Source: own assumption

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Development of Sugar Market - Uncertainties

- **Weather**
- **Acreage development (higher prices of competing crops)**
- **General Ag commodity price development**
- **Institutional money**
- **Economic slowdown/recession**

- **Isoglucose after abolishment of quota**
- **Production and ad hoc policies in India**
- **Cane plantings in Brazil**
- **Blending mandates in Brazil and EU**
- **Investments in defecit regions**
- **Doha?**

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Development of Sugar for Energy - EU Directives

The EU Renewable Energy Directive (2009/28/EC)

- Each EU Member State shall ensure that the share of energy from renewable sources in transport in 2020 is at least **10%**
- Irrespective of whether the raw materials are cultivated inside or outside of EU territory, energy from biofuels and other bioliquids shall be taken into account for the 10% target

➢ **EU Commission: cap at max. 5% ?**

Fuel Quality Directive (2009/30/EC)

- GHG emission saving compared to fossil fuels is at least **35%** (and 50% from 2017)
- BF shall not be made from raw materials obtained from land with a high biodiversity value, with high carbon stock or from Peatland
- When BF are produced with EU agricultural raw materials, these should be obtained in accordance with EU cross-compliance.

➢ **EU Commission: ILUC factors?**

→ The future use of sugar for energy will foremost depend on EU policies (blending mandate, ILUC etc.)

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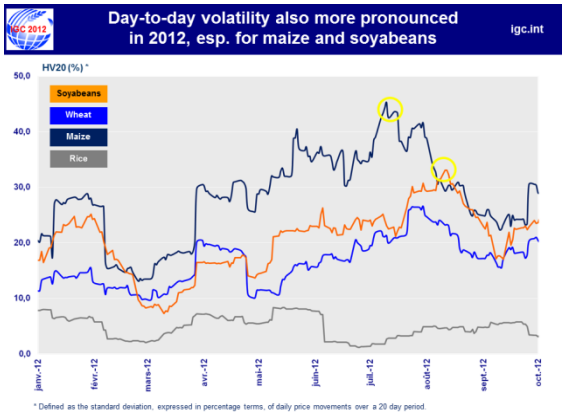
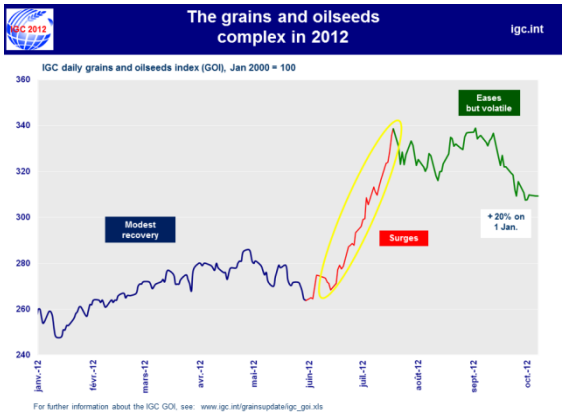
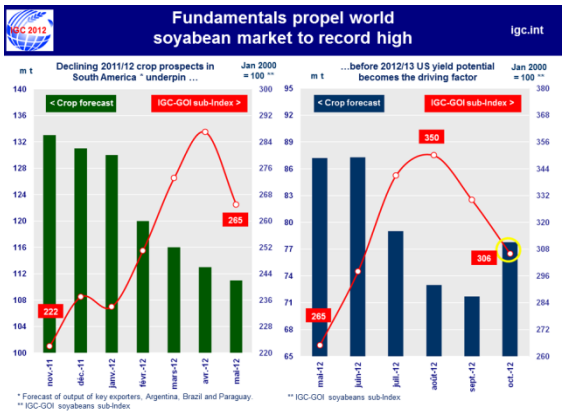
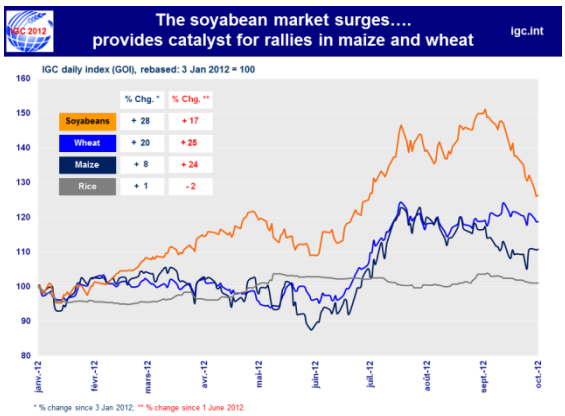
The US drought and implications for world grains and oilseeds markets

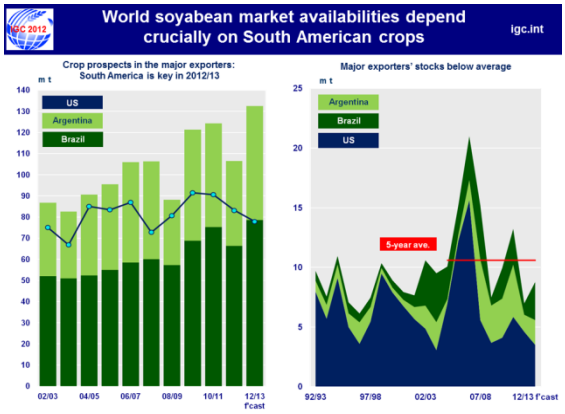
Darren Cooper (IGC)

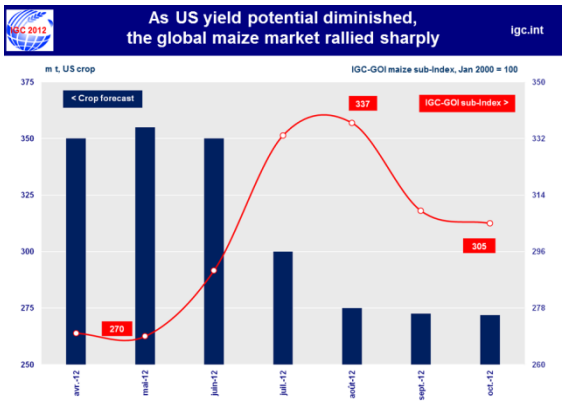


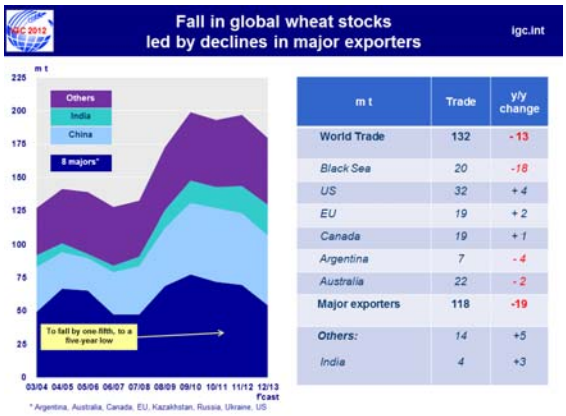




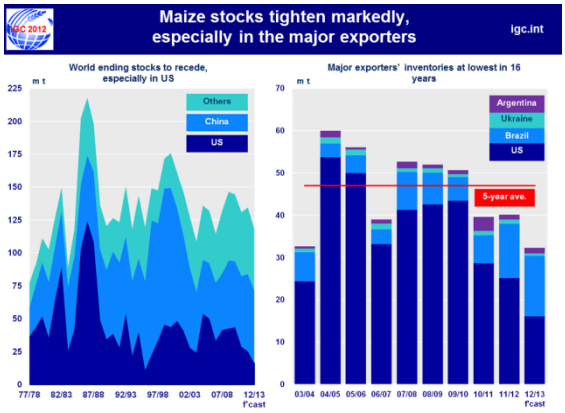




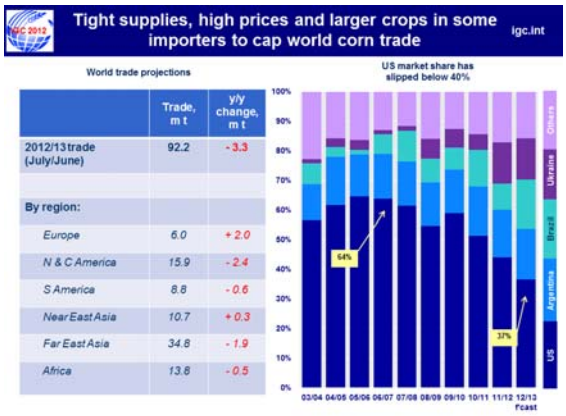




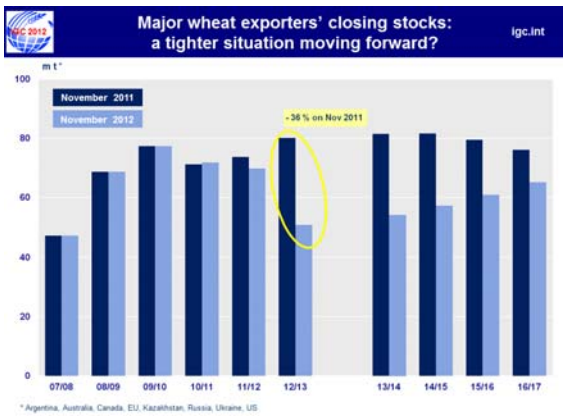
m t	Trade	y/y change
World Trade	132	- 13
Black Sea	*20*	*-18*
US	*32*	*+ 4*
EU	*19*	*+ 2*
Canada	*19*	*+ 1*
Argentina	*7*	*- 4*
Australia	*22*	*- 2*
Major exporters	118	-19
Others:	*14*	*+5*
India	*4*	*+3*

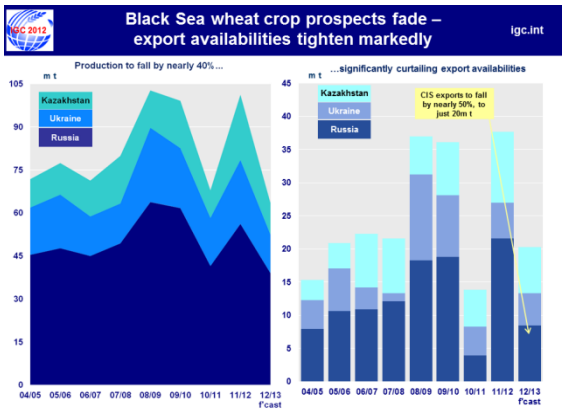


A note on longer-term projections



	Trade, m t	y/y change, m t
2012/13 trade (July/June)	92.2	- 3.3
By region:		
Europe	*6.0*	*+ 2.0*
N & C America	*15.9*	*- 2.4*
S America	*8.8*	*- 0.6*
Near East Asia	*10.7*	*+ 0.3*
Far East Asia	*34.8*	*- 1.9*
Africa	*13.8*	*- 0.5*





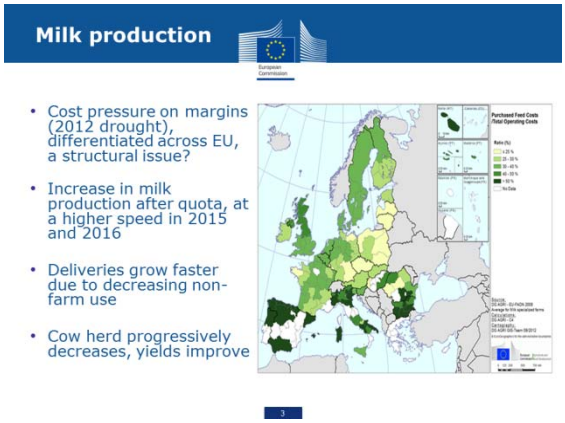
Medium-term EU acreage projections for selected crops igc.int

m hectares	2012/13 EC-BS	2017/18 EC-BS	% Change Ave. *	2012/13 IGC	2017/18 IGC	% Change Ave. *
All Wheat	25.8	26.2	+ 0.3	25.3	26.5	+ 1.0
Maize	9.7	9.5	- 0.3	9.3	8.9	- 0.9
Barley	12.5	12.0	- 0.8	12.1	12.4	+ 0.5
Soyabeans	0.4	0.4	+ 2.9	0.4	0.4	+ 0.4
Rapeseed	6.1	6.7	+ 2.1	6.3	6.7	+ 1.2
Sub-total	54.5	54.9	+ 0.1	53.4	54.9	+ 0.5

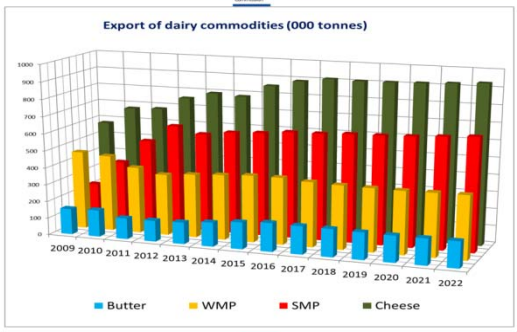
* Annual average growth rate; EC-BS - EC baseline projections; IGC - International Grains Council.

EU agricultural outlook 2012-2012: dairy

Beatriz Velazquez (DG AGRI)



Dairy commodities



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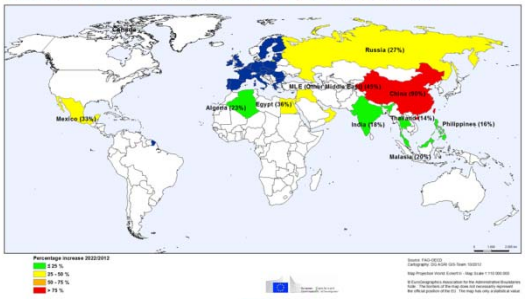
Dairy commodities

6

SMP imports

% increase 2022/2012 in the first 10 importing countries



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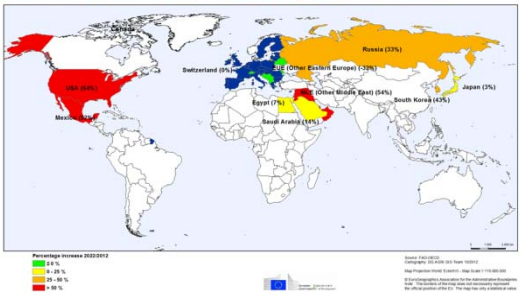
Cheese imports

% increase 2022/2012 in the first 10 importing countries



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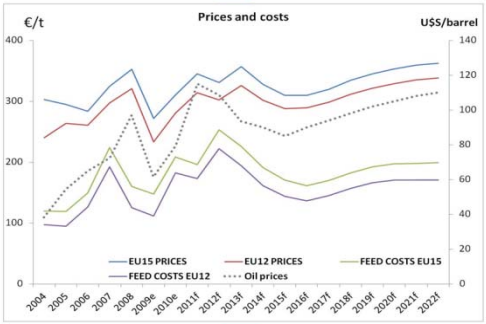


9

Uncertainties

Macroeconomic conditions

- Prospects for continuing economic growth and demand in emerging countries
- Exchange rates
- Access to capital for investment

Costs

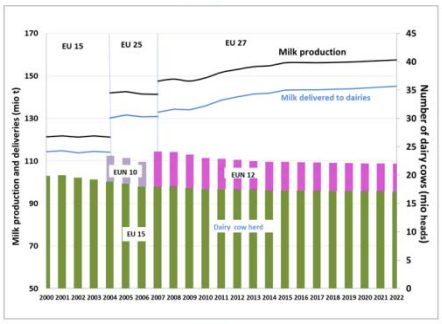
- Trends in oil prices
- Evolution of feed crop prices

10

In your opinion, will demand for cheese and fresh dairy products continue growing?

1. Yes, at higher rates of growth
2. Yes, but at slower rates of growth
3. No
4. I do not know

12



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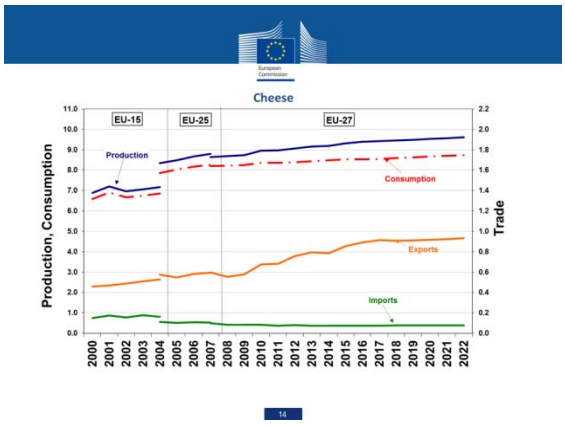
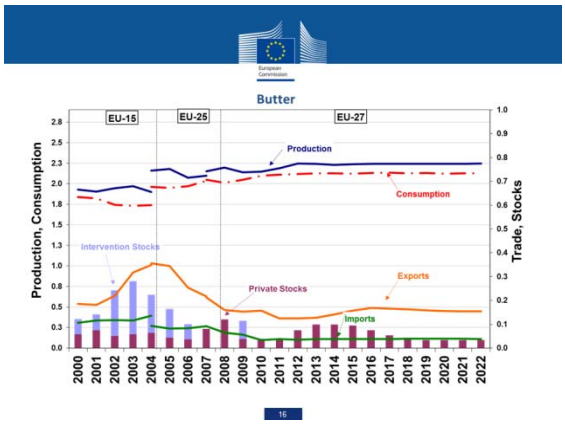
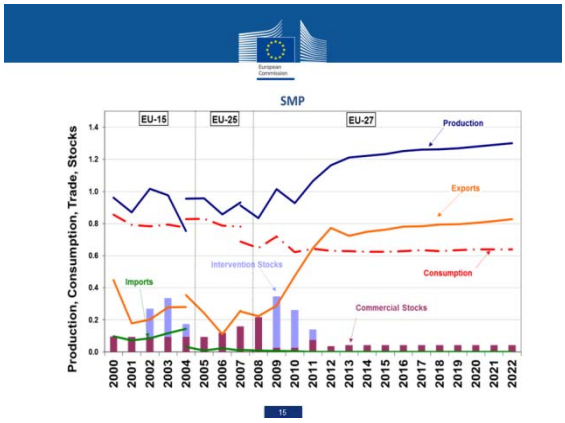
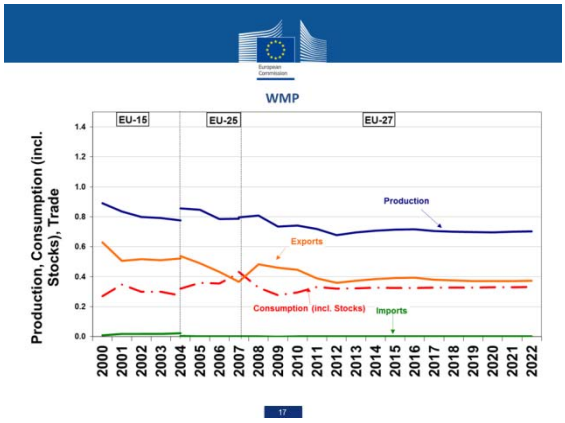


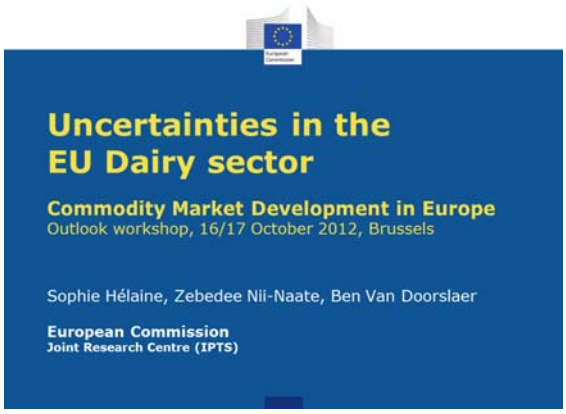


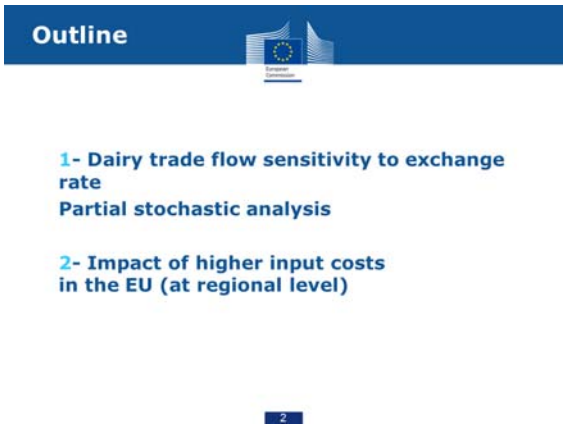




Uncertainties in the EU dairy sector

Sophie Hélaine, Zebedee Nii-Naate, Ben Van Doorslaer (JRC-IPTS)





Partial stochastic analysis

Objective:
Assess the implications of global-regional weather uncertainties and EU macroeconomic uncertainties

How?

- Accounted for past forecast errors of the macroeconomic variables (exogenous) weather shocks to arable crop yields (endogenous)
- Created 500 sets of coherent macroeconomic assumptions and correlated arable crop yields
- Simulated global model 500 times. Analysed the dataset of solved simulations and interesting subsets

3

Partial Stochastic Analysis

Yield coefficient of variation (CV)
Average 2013-2022 annual coefficient of var. between 90th & 10th percentiles

	Wheat*	Maize**	Oilseeds
EU-15	7%	8%	4%
EU-N12	15%	26%	9%
Ukraine	33%	22%	25%
Russia	21%		8%
Argentina	14%	14%	9%
Brazil	29%	13%	2%
USA	10%	14%	5%
Australia	69%	20%	12%

* Common wheat for the EU
** Coarse grains for Ukraine and Australia

Oil price uncertainty by 2022:

90th perc. = 193 USD/bl
Baseline = 110 USD/bl
10th perc. = 50 USD/bl

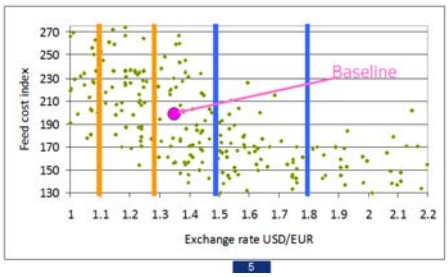
Ex. rate uncertainty USD/EUR by 2022:

90th perc.= 2.20 USD/EUR
Baseline = 1.35 USD/EUR
10th perc.= 1.00 USD/EUR

4

Partial Stochastic Analysis

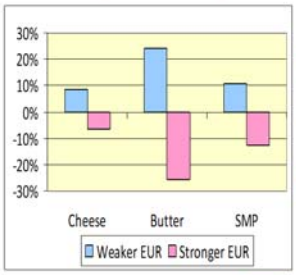
Dairy trade flow sensitivity to exchange rate? Analysis of 2 subsets
2022 EU feed cost index and exchange rate in the stochastic simulations:



5

Partial Stochastic Analysis

EU-27 exports in comparison to the baseline

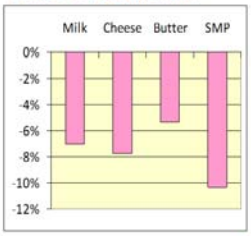


- **Weaker EUR = 1.2 USD/EUR in 2022**
  ⇨ More exports
  ⇨ Especially butter
- **Stronger EUR = 1.6 USD/EUR in 2022**
  ⇨ Less exports

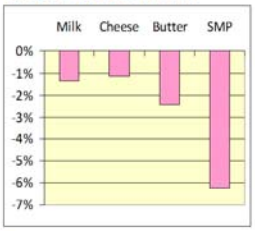
6

Stronger Euro — Partial Stochastic Analysis

All EU prices for dairy products are inferior
% change of EU prices in comp. to 2022 baseline:



Lower EU-27 SMP production
% change of EU prod. in comp. to 2022 baseline:



7

Higher input costs

Objective : Impact of higher input prices (2020)

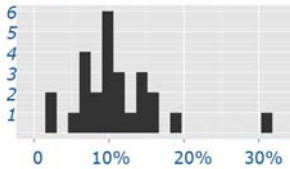
What?

1) **Increase of operating costs in EU (fertiliser, energy, plant protection, ...), exogenous to CAPRI**

How?

- **econometric estimation of the observed coefficient of variance**
- **by Member State**

Number of MS / CoV (plant protection costs)



8

Higher input costs

What?

2) **Increasing the feed costs (endogenous variable)**

How?

Increase of the demand of feed on the world market

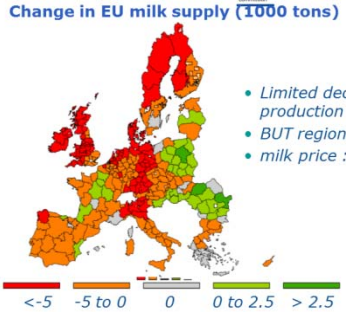
- **by changing human consumption of certain meats in China (25% - 35%)**
- **while keeping the Chinese trade balance of meats close to baseline level**

Feed	*EU price change (%)*
Grain maize	*3,0*
Wheat	*2,9*
Barley	*3,4*
Rape seed cake	*5,1*
Soya cake	*4,1*

9

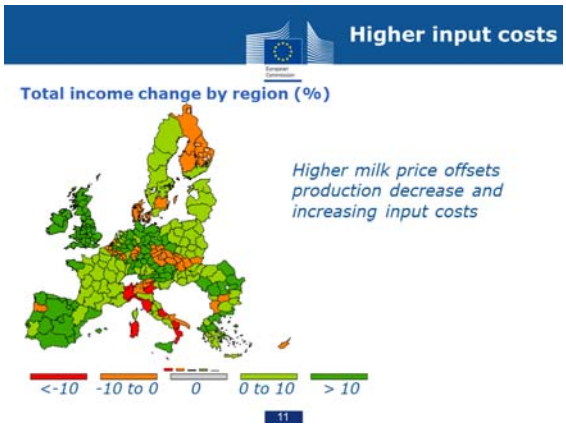
Higher input costs

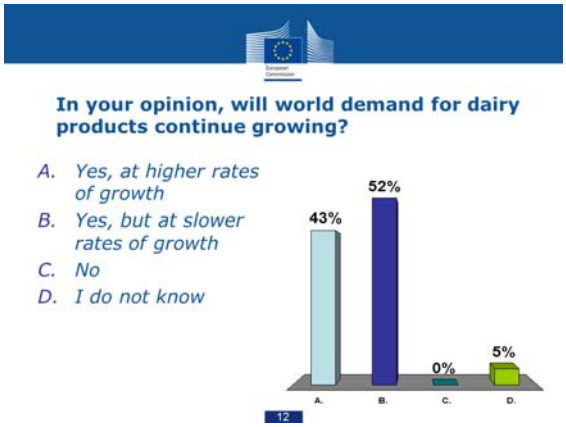
Change in EU milk supply (1000 tons)

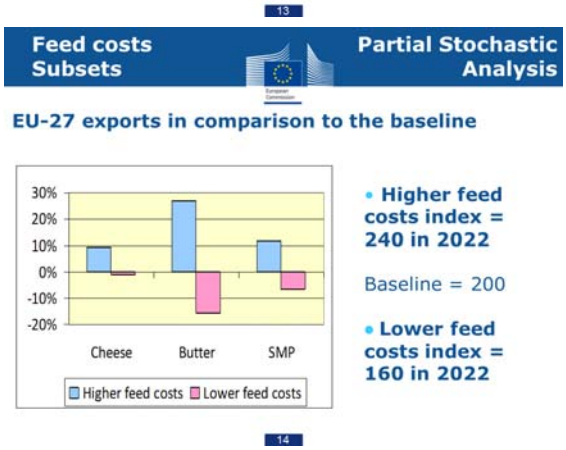


- *Limited decrease of total EU milk production : - 0.6 %*
- *BUT regional differences*
- *milk price : 1 – 6 %*

10

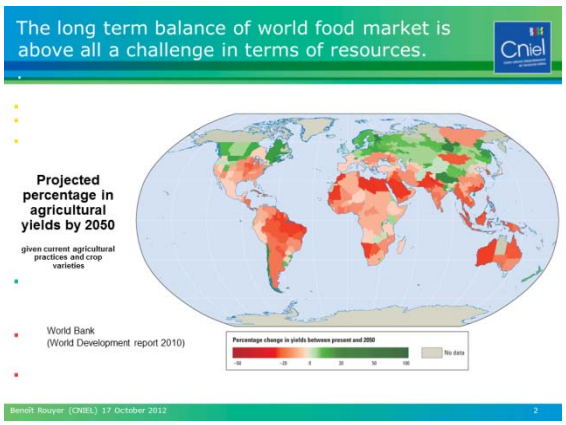






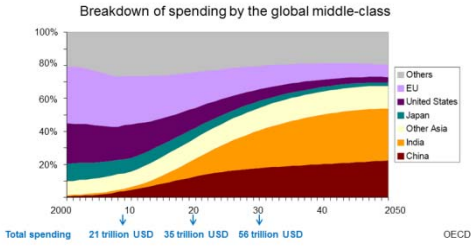
Drivers of supply and demand for milk and dairy products

Benoît Rouyer (CNIEL)



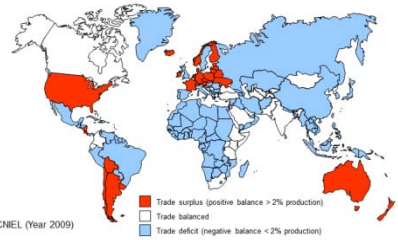
Demand from emerging countries supports milk production everywhere, including Europe.

World demand is increasingly coming from emerging economies, notably India and China.



Most emerging countries, especially in Asia and Africa, present a trade deficit for dairy products.

Classification of countries according to their trade balance for dairy products



CNIEL (Year 2009)

Rather than feeling sorry for the European dairy sector, investors are genuinely tempted by it.

Foreign investors take an interest in the European milk sector

Even though some European dairy operators may be not confident in their future, a few Chinese investors have no worries about it…

In 2011

took control

Hyproca + LYEMPF (Netherlands)

Capacity of 30 000 t of milk powder
Turnover (2011) : 88 million €

In 2012

set up a partnership with

to produce milk powder in France

SODIAAL (France)

90 million € invested by Synutra in 2 driers
280 million litres of milk + 30 000 t dry whey

CNIEL / international press

…and Fonterra is on the same wavelength !

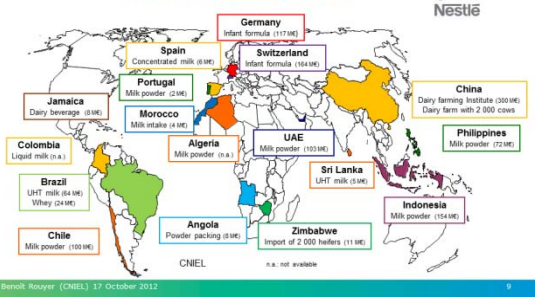
In September 2011
Strategic alliance between Fonterra et First Milk (biggest British dairy co-op in terms of volume [1.73 Billion l per year] ; turnover (2010-11): 670 M€)
Processing of WPC 80 in a cheese factory located in Aspatria (Cumbria)

In May 2012
Strategic alliance between Fonterra and A-Ware (main cheese trader in the Netherlands; turnover (2010): ~800 M€)
Building a new cheese factory and a new dairy ingredient factory

CNIEL / International press

The locating of losing and winning areas, what is the feeling of a global leader like Nestlé?

Investments announced or finalized by Nestlé in the dairy sector in 2011 and 2012 (9 months)



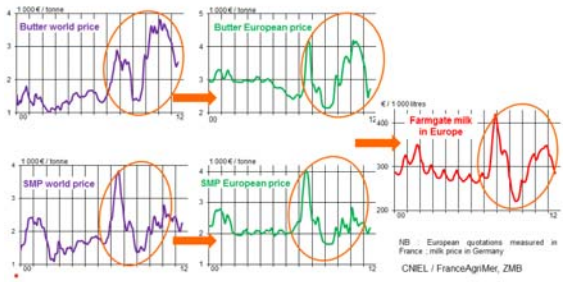
The outlook seems positive for the European dairy sector.

However, the situation is not perfect.

Three important challenges must be quickly taken up:

- The adaptation of dairy operators to price volatility
- The transmission of higher feed costs for dairy cows downstream to consumers
- The future of less-favoured dairy areas with no (or few) agricultural alternatives

Volatility is increasing on the world market and making its way onto the European domestic market.



Dairy price volatility will remain.

International trade* of dairy products

49 million tonnes
in liquid milk equivalent
7% of world milk production

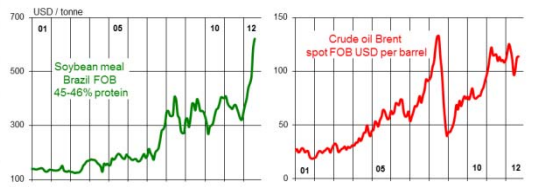
*: excluding intra-EU trade

Main suppliers of the world dairy market (%)

New Zealand	30
European Union	25
United States	10
Australia	6
Belarus	5
Argentina	4

Top 3: 65 %

At the same time, input prices tend to soar.



CNIEL / USDA, CLAL

The necessary transmission of these rising costs downstream to the consumer is a difficult challenge.

Share of food and dairy products in total household spending in France

CNIEL / Insee

What is the future of dairy farms in less favoured areas with no (or few) agricultural alternatives ?

Variations of milk costs in France according to the types of dairy farm in 2010 (€ / 1 000 litres)

Dairy farms on plains	443
Dairy farms in mountains	583

Institut de l'élevage

Conclusion

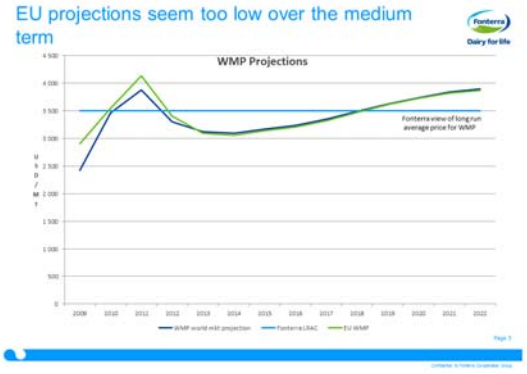
If we manage to deal with these important challenges, the outlook for the European dairy sector will appear rather favourable.

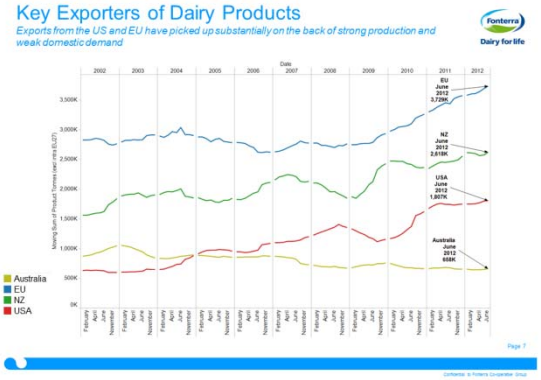
The long term is definitely bright, but dairy farms remain in a financially precarious situation in most parts of Europe and very sensitive to any economic shocks.

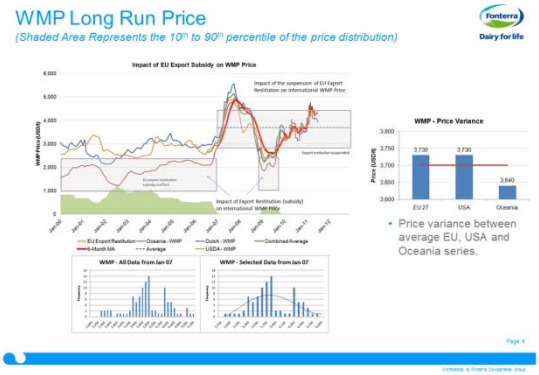
The schedule of changes (post quota milk increase in Northern Europe; standardisation of the level of SFP per hectare) will be decisive to determine if the European dairy sector will make it through the period 2015-2020 unharmed.

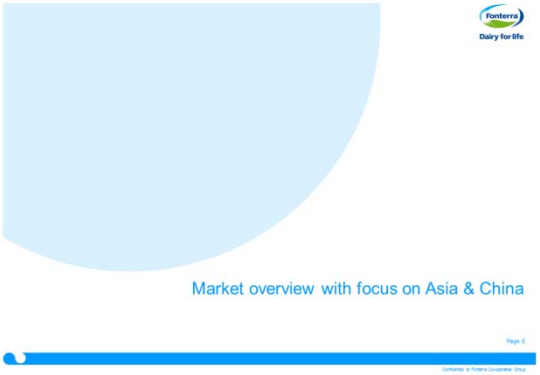
Market overview and longer term trends in global trade

Bruce Turner (Fonterra)



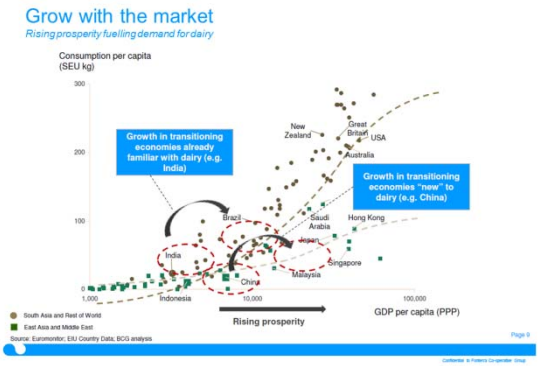


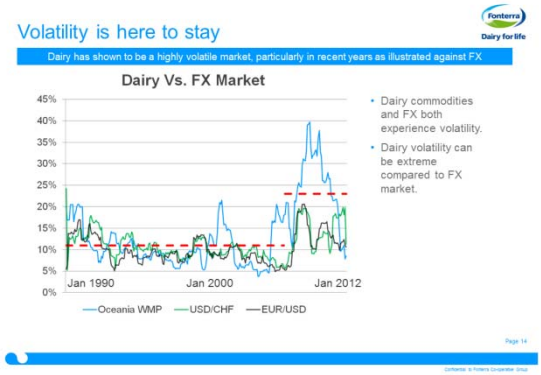


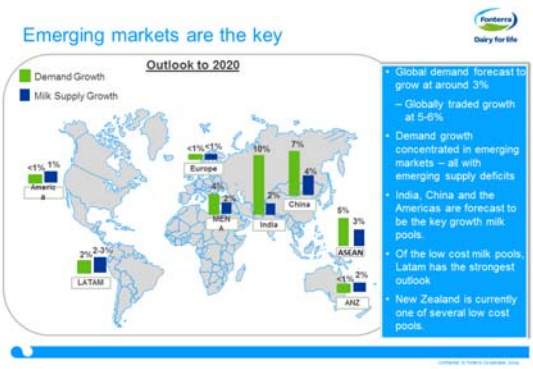


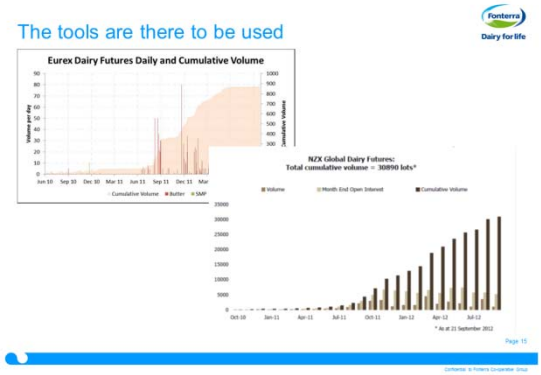

Key Importers of Dairy 2012
The trend continues of powders into developing markets and proteins and cheese into developed
Global Imports of Dairy Products
(12 month rolling total 11 million tonnes)
Large volumes of milk fat and powders

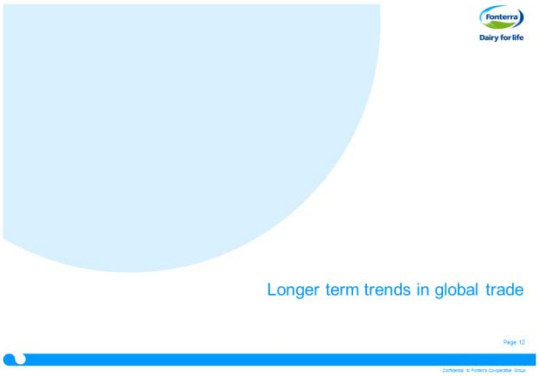

The global context is shifting
1980-2000
"Demographic dividend" in the OECD
Cheaper capital
Cheaper resources
Cheaper labour
Low correlation and volatility
Low unemployment
Richer than their parents
Governments "getting out of the way"
Shocks
Urbanisation (or the Industrial revolution) in emerging market
Aging in OECD and China
Increasing linkages from technology and globalization
2000-2030
More expensive capital
More expensive resources
Price transparency
Deleveraging
Correlated and volatile world
Lead to driver for a procurement portfolio
Security of supply
Managing volatile prices
Market based prices


Grow with the market
Rising prosperity fuelling demand for dairy
Consumption per capita (SEU kg)
Growth in transitioning economies already familiar with dairy (e.g. India)
Growth in transitioning economies "new" to dairy (e.g. China)
New Zealand
Great Britain
USA
Australia
Brazil
Saudi Arabia
Hong Kong
Japan
Singapore
Malaysia
India
China
Indonesia
Rising prosperity
GDP per capita (PPP)
South Asia and Rest of World
East Asia and Middle East
Source: Euromonitor; EU Country Data; BCG analysis


Volatility is here to stay
Dairy has shown to be a highly volatile market, particularly in recent years as illustrated against FX
Dairy Vs. FX Market
Jan 1990
Jan 2000
Jan 2012
Oceania WMP
USD/CHF
EUR/USD
Dairy commodities and FX both experience volatility.
Dairy volatility can be extreme compared to FX market.

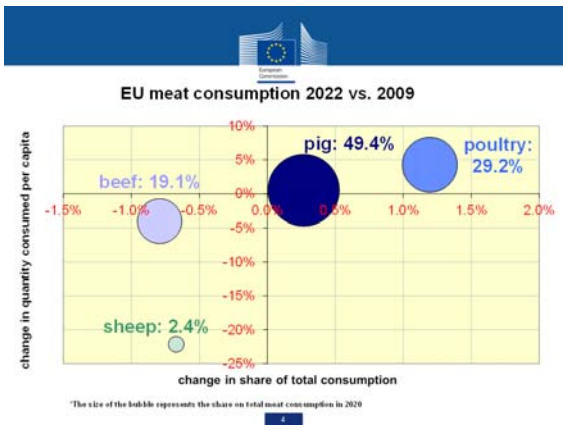

Emerging markets are the key
Outlook to 2020
Demand Growth
Milk Supply Growth
Europe
MEN A
India
China
ASEAN
ANZ
LATAM
Global demand forecast to grow at around 3%
– Globally traded growth at 5-6%
Demand growth concentrated in emerging markets – all with emerging supply deficits
India, China and the Americas are forecast to be the key growth milk pools.
Of the low cost milk pools, Latam has the strongest outlook
New Zealand is currently one of several low cost pools.

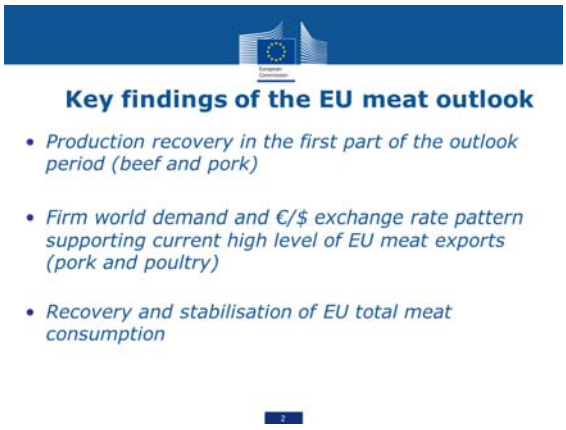

The tools are there to be used
Eurex Dairy Futures Daily and Cumulative Volume
NZX Global Dairy Futures:
Total cumulative volume = 30890 lots*

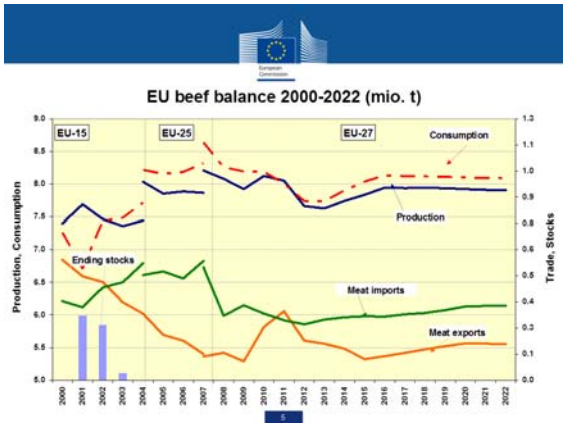

Longer term trends in global trade

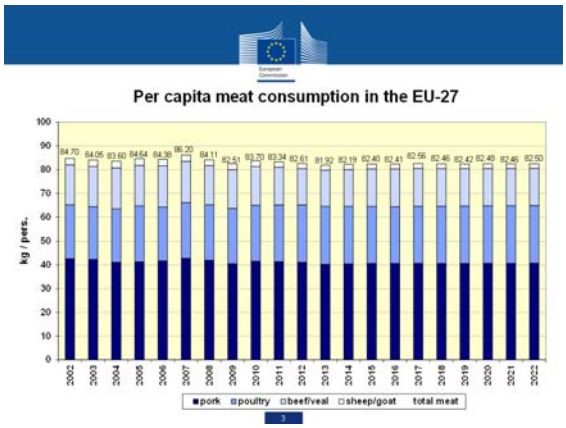
EU agricultural outlook 2012-2012: meats

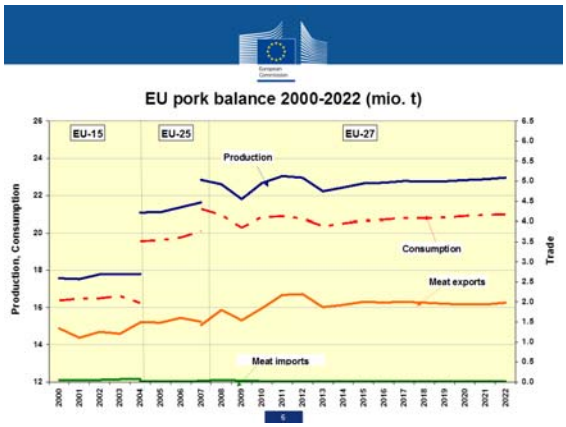
Alberto D' Avino (DG AGRI)

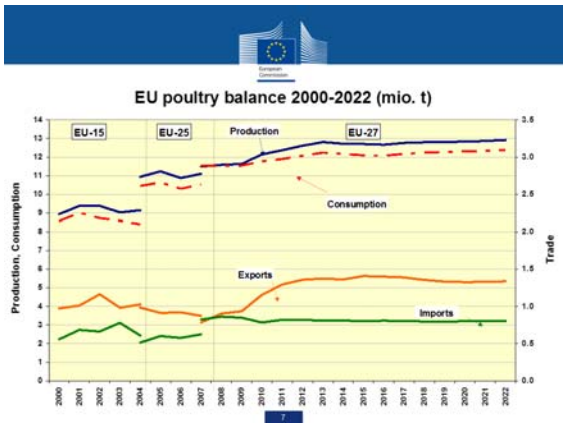


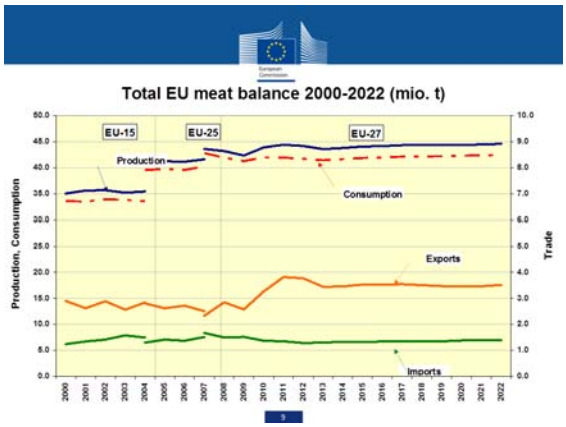


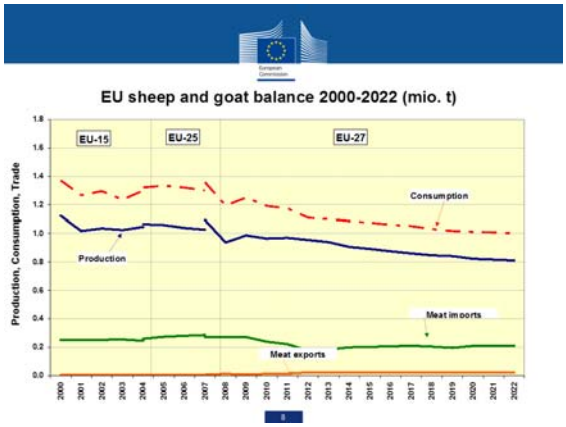


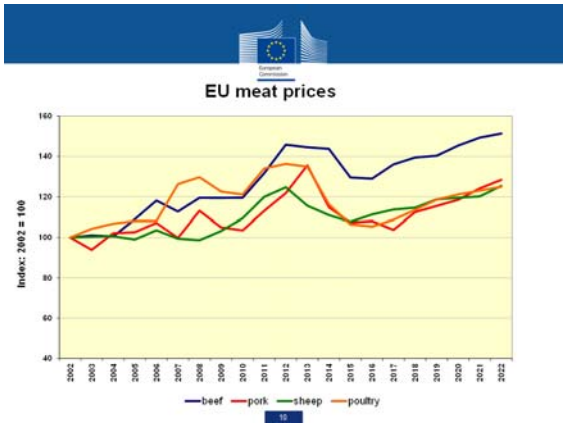






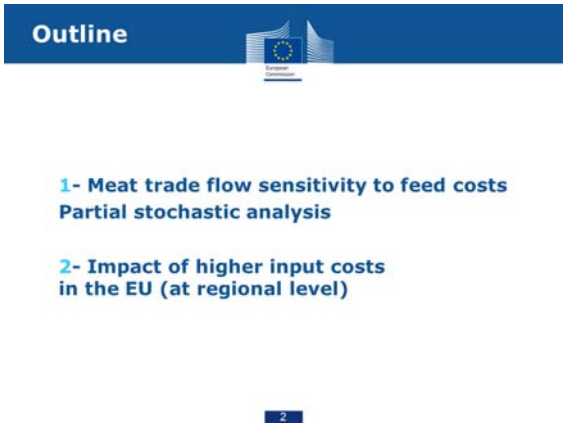






Uncertainties in the EU meat sector

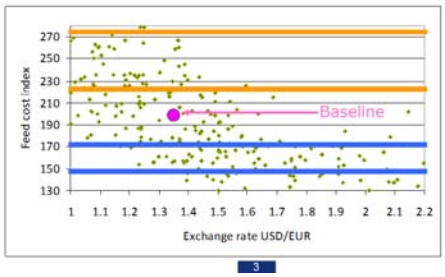
Ben Van Doorslaer, Sophie Hélaine, Zebedee Nii-Naate (JRC-IPTS)



Partial Stochastic Analysis

Meat trade flow sensitivity to feed costs? Analysis of 2 subsets

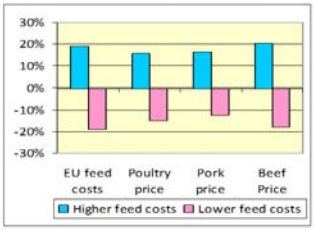
2022 EU feed cost index and exchange rate in the stochastic simulations:



3

Partial Stochastic Analysis

% change of EU prices in comparison to 2022 baseline



If feed costs are higher than in the baseline:

- EU prices are higher too

and

- Pig & Poultry cons. goes down and poultry prod. goes up.

but

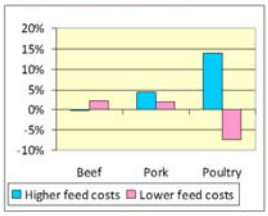
- Beef cons. is slightly above the baseline and prod. decreases

4

Partial Stochastic Analysis

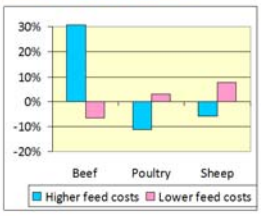
Poultry: the EU gains competitiveness

% change of EU Exports in comp. to 2022 baseline:



Sharp increase of beef imports if higher feed c.

% change of EU imports in comp. to 2022 baseline:



5

Higher input costs

Feed	EU price change (%)
Grain maize	3,0
Wheat	2,9
Barley	3,4
Rape seed cake	5,1
Soya cake	4,1

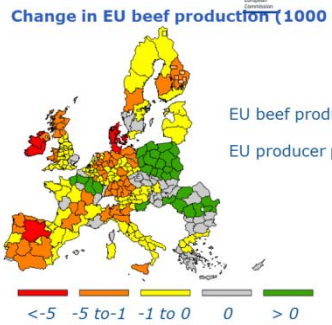
% change in feed composition

	Feed cereals	Protein rich feed	Gras
Male adult cattle	1.9	- 6.0	3.5
Pig fattening	1.7	- 1.2	
Poultry fattening	1.5	- 2.0	

6

Higher input costs

Change in EU beef production (1000 tons)



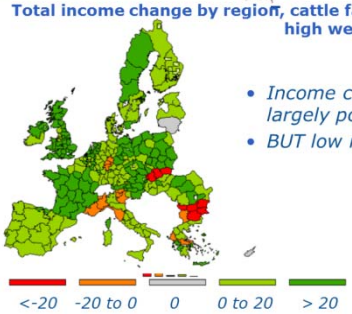
EU beef production decreases: - 2,1%

EU producer price : + 7,2 %

7

Higher input costs

Total income change by region, cattle fattening, high weight (%)

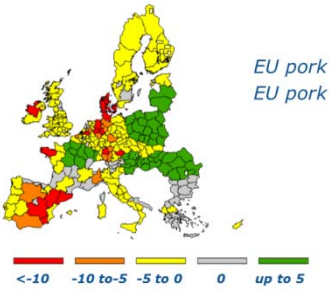


- *Income changes : largely positive*
- *BUT low margins*

8

Higher input costs

Change in EU pork production (1000 tons)

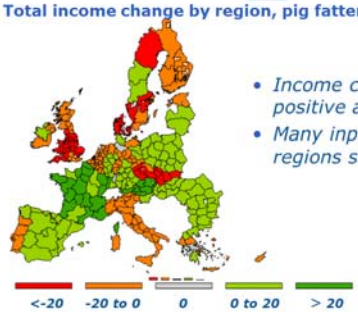


EU pork production : -1.8 %
EU pork price: + 6.1%

9

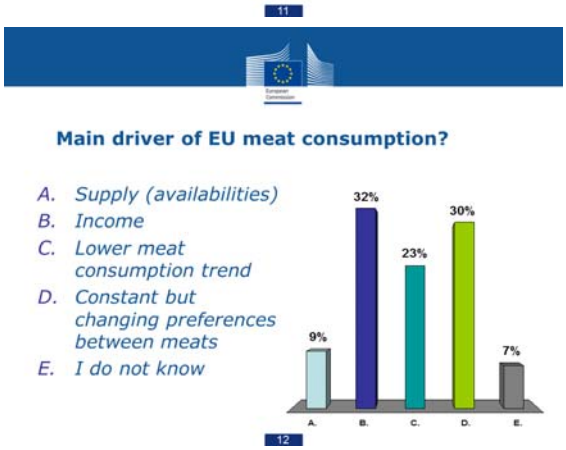
Higher input costs

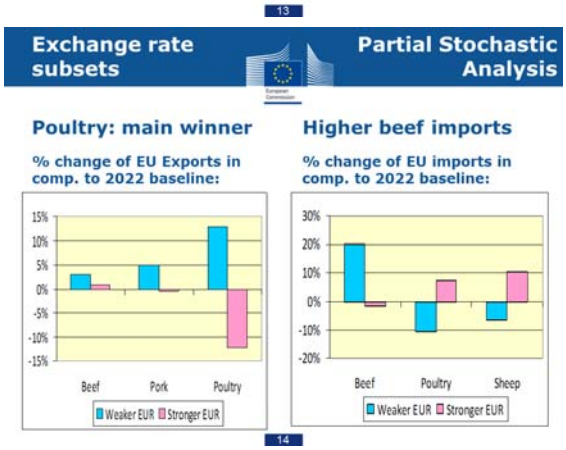
Total income change by region, pig fattening (%)



- *Income changes : positive and negative*
- *Many input intensive regions suffer*

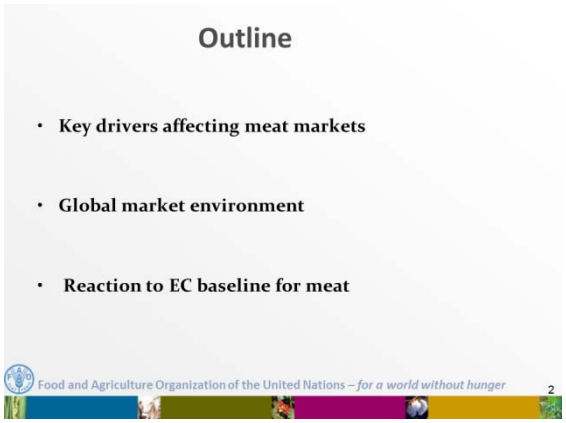
10





Global meat market environment and key drivers for meat markets

Merritt Cluff (FAO)

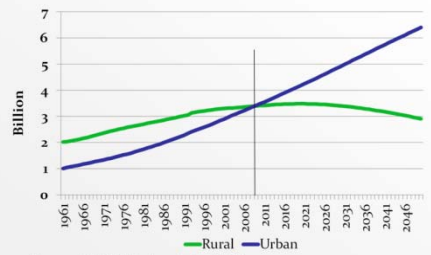


OIE Listed Animal Diseases – critical to meat markets

Multiple species diseases	Cattle diseases	Sheep and goat diseases	Equine diseases	Swine diseases	Avian diseases
Anthrax	Bovine anaplasmosis	Caprine arthritis/encephalitis	African horse sickness	African swine fever	Avian chlamydiosis
Aujeszky's disease	Bovine babesiosis	Contagious agalactia	Contagious equine metritis	Classical swine fever	Avian infectious bronchitis
Bluetongue	Bovine genital campylobacteriosis	Contagious caprine pleuropneumonia	Dourine	Nipah virus encephalitis	Avian infectious laryngotracheitis
Brucellosis (Brucella abortus)	Bovine spongiform encephalopathy	Enzootic abortion of ewes (ovine chlamydiosis)	Equine encephalomyelitis (Western)	Porcine cysticercosis	Avian mycoplasmosis (M. gallisepticum)
Brucellosis (Brucella melitensis)	Bovine tuberculosis	Maedi-visna	Equine infectious anaemia	Porcine reproductive and respiratory syndrome	Avian mycoplasmosis (M. synoviae)
Brucellosis (Brucella suis)	Bovine viral diarrhoea	Nairobi sheep disease	Equine influenza	Swine vesicular disease	Duck virus hepatitis
Crimean Congo haemorrhagic fever	Contagious bovine pleuropneumonia	Ovine epididymitis (Brucella ovis)	Equine piroplasmosis	Transmissible gastroenteritis	Fowl typhoid
Echinococcosis/hydatidosis	Enzootic bovine leukosis	Peste des petits ruminants	Equine rhinopneumonitis		HPAI
Epizootic haemorrhagic disease	Haemorrhagic septicaemia	Salmonellosis (S. abortusovis)	Equine viral arteritis		Infectious bursal disease (Gumboro disease)
Equine encephalomyelitis (Eastern)	Infectious bovine rhinotracheitis/infectious pustular vul vovaginitis	Scrapie	Glanders		Newcastle disease
Foot and mouth disease	Lumpy skin disease	Sheep pox and goat pox	Venezuelan equine encephalomyelitis		Pullorum disease
Heartwater	Theileriosis				Turkey rhinotracheitis
Japanese encephalitis	Trichomonosis				
New world screwworm (Cochliomyia hominivorax)	Trypanosomosis (tsetse-transmitted)				
Old world screwworm (Chrysomya bezziana)					
Paratuberculosis					
Q fever					
Rift Valley fever					

3

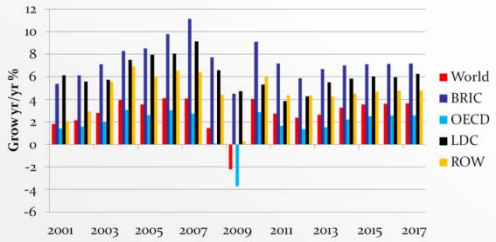
At the global level, virtually all population growth is in urban areas



Source: UN-Statistics/population 2010

Food and Agriculture Organization of the United Nations – *for a world without hunger*

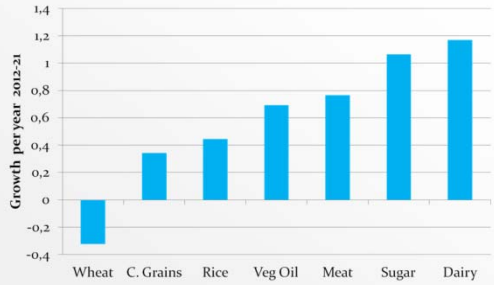
IMF - World GDP growth projections are getting slower?



WEO – Oct 2012

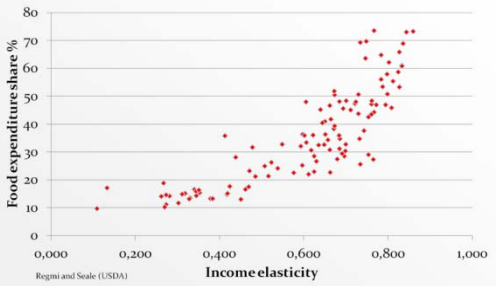
Food and Agriculture Organization of the United Nations – *for a world without hunger*

Shift in global consumption from staple foods to value-added products continues



8

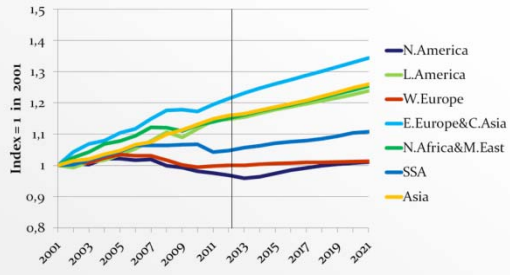
Income elasticity for meat versus food expenditure share - 114 countries



Regmi and Seale (USDA)

5

Per capita aggregate consumption growth flat to falling in developed countries, rising elsewhere



Index based on constant 2004-06 dollars

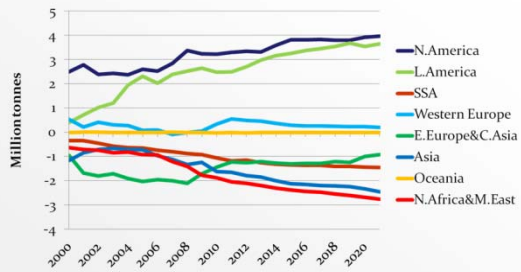
World Population growth is slowing, but sizable addition still in Asia and Africa

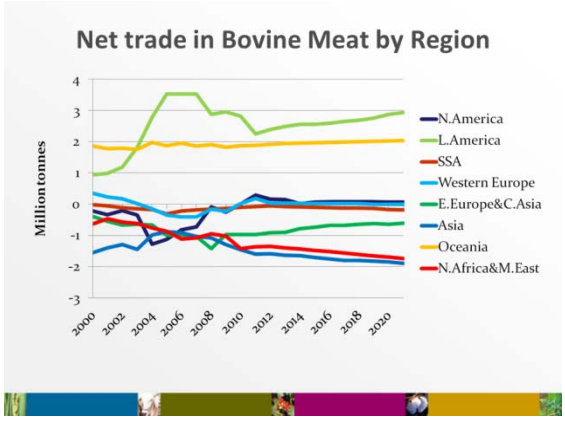
	Annual growth rate in %		Millions
	2002-2011	2012-2021	2021-2012
World	1.17	1.02	679
Africa	2.38	2.29	233
Latin America & Caribbean	1.19	0.96	55
North America	0.92	0.85	28
Europe	0.19	0.11	7
Asia and Pacific	1.14	0.91	345
China	0.52	0.30	43
India	1.46	1.20	160
Oceania Developed	1.56	1.16	3

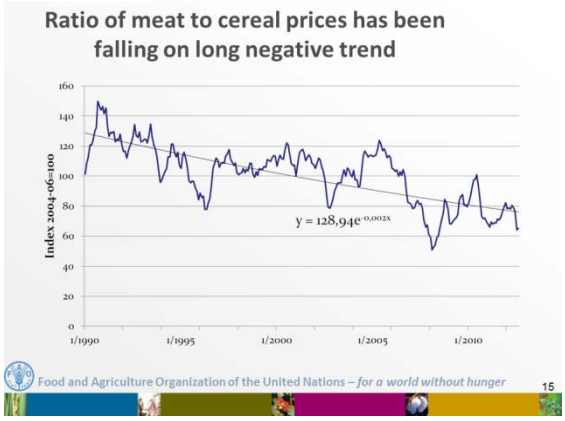
Source: UN-Statistics/population 2010

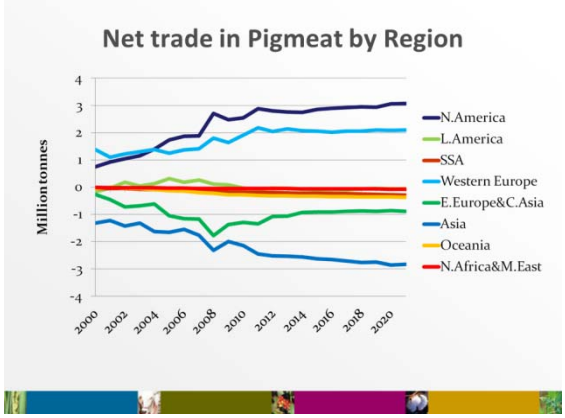
Food and Agriculture Organization of the United Nations – *for a world without hunger*

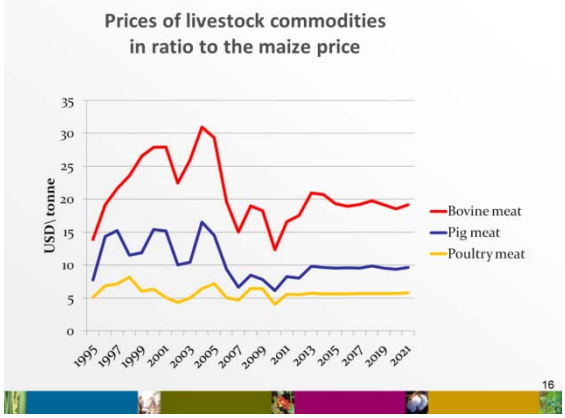
Net trade in Poultry Meat by Region

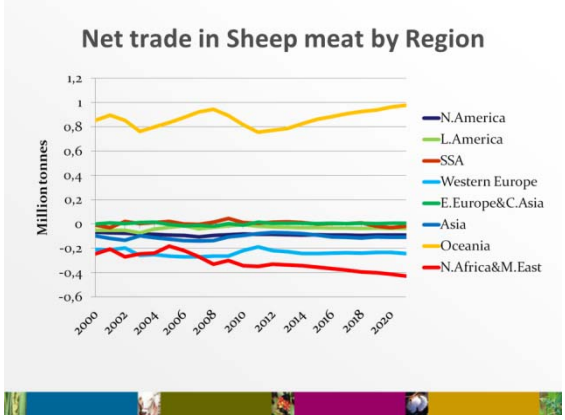



Net trade in Bovine Meat by Region
Million tonnes
N.America
L.America
SSA
Western Europe
E.Europe&C.Asia
Asia
Oceania
N.Africa&M.East

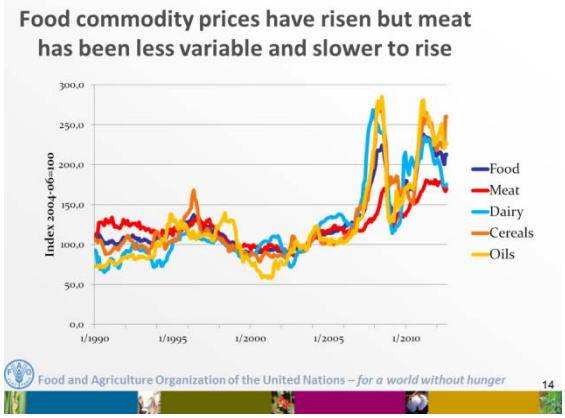

Ratio of meat to cereal prices has been falling on long negative trend
Index 2004-06=100
y = 128,94e-0,002x
Food and Agriculture Organization of the United Nations – for a world without hunger
15

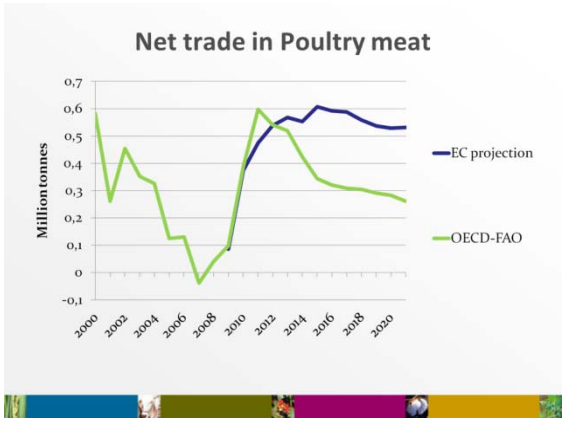

Net trade in Pigmeat by Region
Million tonnes
N.America
L.America
SSA
Western Europe
E.Europe&C.Asia
Asia
Oceania
N.Africa&M.East

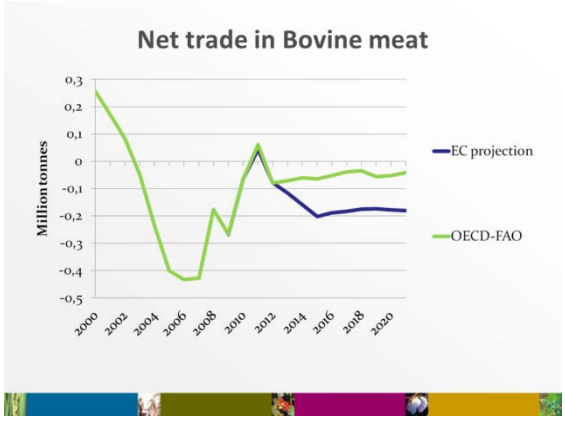

Prices of livestock commodities in ratio to the maize price
USD\ tonne
Bovine meat
Pig meat
Poultry meat
16

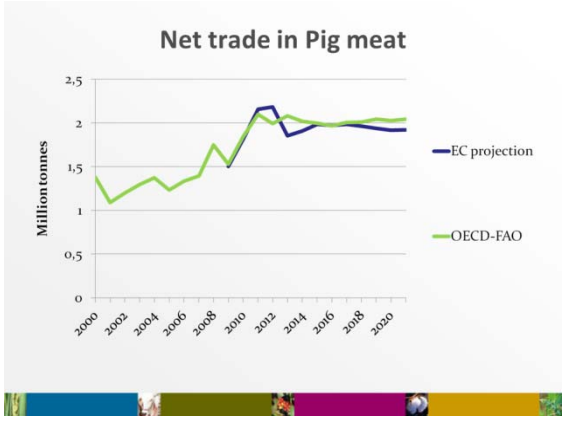

Net trade in Sheep meat by Region
Million tonnes
N.America
L.America
SSA
Western Europe
E.Europe&C.Asia
Asia
Oceania
N.Africa&M.East


EC Baseline
• Little is happening in EC meat markets.. Growth is in E12 countries
– Meat production is flat (up slightly), with fall in sheep and beef offset by rises in pork and poultry
– Per capita meat consumption is from 2009-11 to 2022 is falling 2% in E15, but rising 5% in E12
• What about trade?
– EU meat trade rose over the previous decade, and is projected quite flat over the medium term. Will it rise under excess supply, or return to lower levels under higher feed prices, and greater competition?
Food and Agriculture Organization of the United Nations – for a world without hunger
17


Food commodity prices have risen but meat has been less variable and slower to rise
Index 2004-06=100
Food
Meat
Dairy
Cereals
Oils
Food and Agriculture Organization of the United Nations – for a world without hunger
14


Net trade in Poultry meat
Million tonnes
EC projection
OECD-FAO





Beef production developments in Mercosur

Rafael Tardáguila (TARDÁGUILA Agromercados)

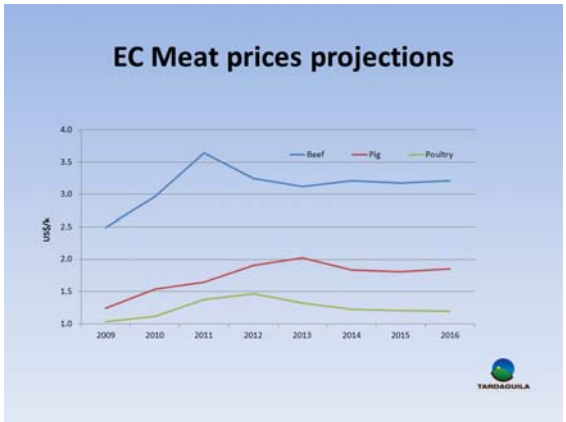
TARDAGUILA
AGROMERCADOS

1) Discussion of EC projections

2) "Beef production developments in Mercosur by production system and the implications for the EU and world beef markets"

Workshop on Commodity Market Development in Europe - Outlook

Ing. Agr. Rafael Tardáguila
TARDÁGUILA Agromercados
www.tardaguila.com.uy
Brussels October 17, 2012



"Beef production developments in Mercosur by production system and the implications for the EU and world beef markets"

Price tendencies

- Old fashioned sentences
  - F&MD circuit and non F&MD circuit
  - Cheap beef from Mercosur
- But Mercosur prices will be lower than other major exporters
  - USA cattle herd at lowest level in 55 years
  - USA cattle price more dependent on feed prices
  - Real devaluation

Topics

- Mercosur beef production
- Cattle Price tendencies
- Cattle production systems in Mercosur
- Mercosur fresh beef exports
  - Effects over international beef trade
  - Effects over EU beef imports
- Mercosur beef production in the long run

An old fashioned sentence: Mercosur cheap cattle prices

Mercosur

Cattle production systems in Mercosur			
Mainly forage intensive			
Grainfed cattle increased in the last 10 years			
Actual estimated numbers		Million	%
Brazil	Feedlots	4,0	10%
	Total slaughter	40,0	
Argentina	Feedlots	3,2	29%
	Total slaughter	11,0	
Uruguay	Feedlots	0,3	15%
	Total slaughter	2,0	
Paraguay	Feedlots	0,2	11%
	Total slaughter	1,4	
Total	Feedlots	7,7	14%
	Total slaughter	54,5	

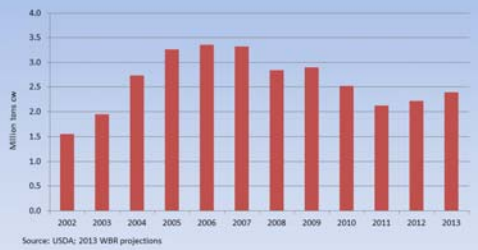
Mercosur beef production

- Beef production will increase in 2013 and 2014
  - Retention cycle phase is over in Brazil, Argentina and Uruguay
  - Slaughter will increase in the four countries (not so sure in Uruguay)

Mercosur fresh beef exports will grow

- Bigger slaughter and production
- Slowing down of increase in domestic consumption
  - Brazil GDP expected to increase 1-2% 2012-13
  - Brazilian currency devaluation of 25-30% since March
  - Not in Argentina – First increase in production will go to domestic market
- Higher competitors prices (USA)
- Higher prices for other meats (pork, poultry)

Mercosur beef exports in 2013 around 190 th tons up from 2012



Source: USDA; 2013 WBR projections

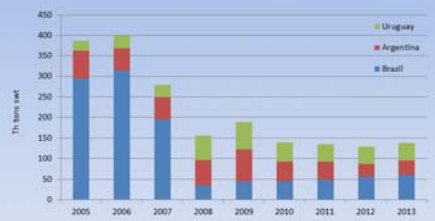
How much of that increment may be exported to EU?

- Not much
  - Brazilian establishments approved in the Trace List are falling. They were 2,229 at the end of 2010, but now are 1,858 establishments. In 2007 they were above 10,000.
  - Paraguay will be out of EU for some time more
  - Argentina will have a low export surplus in 2013
  - Uruguay is increasing exports to the EU (Hilton and 481 quota)

Effects over world beef markets

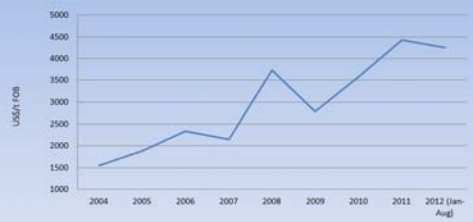
- Mercosur export volumes will still be near 1 million tons cwe below high peaks of 2006/07
- In a historic view, beef international prices will be high
- Prices in main importers (Russia, Middle East) may go down another US$/t 100-200
- Participation of Mercosur beef in international trade will increase

EU fresh beef imports from Mercosur should increase marginally in 2013



Source: Secex, Senasa, Uruguayan Customs, 2013 WBR projections

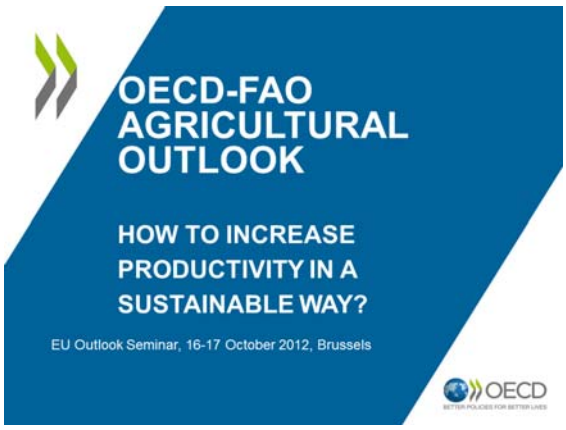
FOB average value of Brazilian exports to Russia

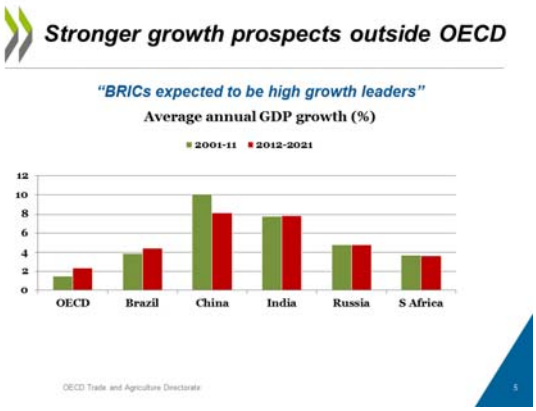


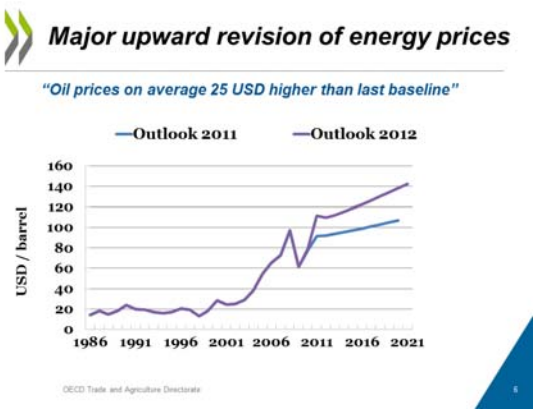
Source: Secex

How to increase productivity in a sustainable way?

Ignacio Pérez Domínguez (OECD)







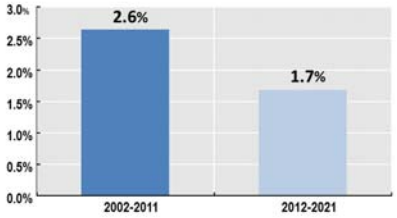
Need 60% more food and feed by 2050

- 3 billion more urban dwellers
- higher incomes/changing diets
- 2.3 billion more mouths to feed
- 1 billion tonnes more cereals
- 200 million tonnes more meat
- plus feedstock for biofuel

OECD Trade and Agriculture Directorate 7

Production growth expected to slow

Annual growth in global agricultural production



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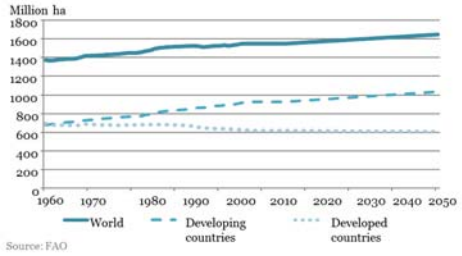
Arable land to increase only 5% by 2050

Estimated/projected global arable land 1960 - 2050



Source: FAO

9

Productivity growth expected to continue

Historical and projected average annual TFP growth rates

Period	TFP	Efficiency gain	Tech change
1961-1980	0.60	-0.55	1.16
1981-2000	1.29	0.13	1.18
2001-2040	1.38	0.34	1.04

Source: Ludena, Hertel, Preckel, Foster, Nin, 2007

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Constraints to productivity growth?

- Rising input costs (energy, water, feed, credit)
- 25% of all agricultural land highly degraded
- 40% of pop'n in regions of severe water stress by 2050
- Limits to irrigation and multiple cropping
- Growing environmental pressures
  - GHG emissions
  - Biodiversity
  - Groundwater pollution
- Impacts of climate change

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What needs to be done?

- Encourage better agronomic practices
- Create the right enabling environment
- Strengthen the agriculture innovation system
- Reduction of crop losses and food waste

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For more information

- Visit our website:
  www.agri-outlook.org
  www.oecd.org/agriculture
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Abstract

This report contains a summary and the presentations of the expert workshop 'Commodity Market Development in Europe – Outlook', held in October 2012 in Brussels. The workshop was held in order to present and discuss the preliminary results of the DG AGRI outlook on EU agricultural market developments. The workshop gathered high-level policy makers, modelling and market experts and provided a forum to present and discuss recent and projected developments on the EU agricultural and commodity markets, to outline the reasons behind observed and prospected developments, and to draw conclusions on the short/medium term perspectives of European agricultural markets in the context of world market developments. Special focus was given on the discussion of the influence of different settings/assumptions (regarding e.g. drivers of demand and supply, macroeconomic uncertainties, etc.) on the projected market developments.

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