

SUMMARY RECORD OF THE SEVENTEENTH MEETING OF THE OECD NETWORK ON FARM LEVEL ANALYSIS

Paris, 23 May 2016

Participants

1. The meeting was attended by 41 participants from 22 countries: Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Japan, Korea, the Netherlands, Norway, Poland, Portugal, Spain, Sweden, Turkey, the United Kingdom and the United States. Participants are contact persons from ministries and research institutions, nominated by their delegation, and experts.

Content and structure of the meeting

2. The objectives of the 17th meeting were to:
- Present and discuss OECD and other work on farm-level productivity (Session 1).
 - Discuss work on farm structure and performance in OECD and participating countries (Session 2).
 - Discuss work on farm sustainability (Session 3).
 - Discuss a study on the impact of Brexit on farm income in the United Kingdom (Session 4).
 - Discuss the implementation of the OECD project on farm flexibility (Session 5).
 - Discuss future activities (Session 6).
3. The meeting agenda is posted on the network's website.¹

Session 1: Farm productivity

4. Raushan Bokusheva updated participants on progress with the implementation of OECD work on farm-level productivity scoped in [TAD/CA/APM/WP(2015)20]. Activity 1 aims to evaluate dynamics, sources and drivers of TFP growth in two or three countries. Possible data provision has been discussed with Canada, Hungary and France. Data from Hungary should be ready very soon, but there are issues related to confidentiality and coverage with Canadian data (they do not include labour) and timing issues with France. In the meantime, Raushan has made a request to the EU Commission for European FADN data in a selected number of EU member states. The request has been accepted, but delivery takes time.

5. Activity 2 investigates innovation impact on farm productivity, using data from the Dutch FADN provided by Hans Vrolijk. The Dutch database contains valuable information on farm investment in technology. Acting as a consultant for the OECD, Johannes Sauer presented the methodology and initial results on dairy farm innovation and productivity at the joint seminar of the network and delegates to the Working Party on Agricultural Policies and Markets (APM) which took place on the following day. The analysis will be refined and extended to crop farms. A draft report is planned to be presented at the next

1. Website: <http://www.oecd.org/agriculture/farm-level-analysis-network/>

APM meeting on 28-30 November 2016. Network members will be asked to provide comments in October.

6. Activity 3, aiming to develop and analyse indicators of farm flexibility across countries volunteering to participate, will be discussed in Session 5. The implementation of Activity 4, which aimed to evaluate the linkage between farm productivity and environmental performance in Dutch crop farming in one or two countries, is on hold for lack of resources. Network members were reminded that these activities are mandated under the 2015-16 programme of work of the OECD Committee for Agriculture. Draft reports are expected at the next APM meeting on 28-30 November 2016. This means that Raushan needs to receive data by the end of June to include them in the report.

7. Lukáš Čechura, from the Czech University of Life Sciences Prague, presented the findings of Work Package 6 of the COMPETE EU research project on Total Factor Productivity (TFP) in European Agricultural Production,² which analysed TFP in agricultural production, investigated the food processing sector, and considered the relationships between agriculture and food industry. Farm-level TFP was estimated for three sectors: milk, cereals and pig meat, for the period 2004-11. The question was whether, and how, convergence occurred between member states after EU enlargement. The analysis was based on a two-step approach: individual country frontiers were estimated in the first step, then in the second step the meta-frontier was estimated using results obtained in the first step. The Törqvist-Theil index was used to calculate and decompose TFP.

8. The analysis found significant heterogeneity in production structures in all EU member states and the three sectors, and considerable differences in technology among the countries. Economies of scale are pronounced in a majority of countries in cereal, milk and pork productions, and scale efficiency has had a significant impact on the productivity change in these countries. Technological change had a positive contribution to the production possibilities, but the direction of biased technological change is country specific. Technical efficiency (TE) explains a large share of productivity growth. Still, the developments of TE are rather stochastic, as are factors determining TE developments. Thus developments in TE were very country specific. In terms of TFP, significant differences were found among EU member states. Structural change seems to occur in a way that the most successful producers strengthen their positions and producers with poor performance fall further behind. Positive trend in TFP was found in the majority of EU member states. Technical change was identified as the important factor that contributed predominantly positively to TFP developments. Finally, TFP increased in all countries, driven by TE, but significant differences remain among and within member states after ten years of accession, with lower TFP in New Member States (NMS).

9. Specific results for the dairy sector, at regional level (NUTS 2) indicate highest milk yields in the North West of Europe, and lowest in the South East. TFP growth has been higher in the highest performing countries. TFP performance between milk production and the processing industry is correlated. In terms of TFP, NMS are lagging behind old member states (OMS), and there is no indication it will change over time. Economies of scale are pronounced in a majority of countries. TE has a generally lower impact in NMS than OMS, and only a few regions in the NMS are catching up (with larger farm sizes). In fact farm sizes in NMS are suboptimal for the fast adoption of technical change (dynamic diseconomies to scale) as some innovations are indivisible (e.g. equipment, and animal housing). Innovation would require a restructuring of dairy farms.

2. See all outputs of the COMPETE project on International comparison of product supply chains in the agri-food sector: determinants of their competitiveness and performance on EU and international markets at: <http://www.compete-project.eu/publications/working-papers.html>, and the TFP report at: http://www.compete-project.eu/fileadmin/compete/files/working_paper/COMPETE_Working_Paper_9_TPF_in_Agriculture.pdf

10. In the discussion, participants noted that convergence is considered limited because of farm structures, and asked if there is a group of farms in NMS which reached the same level as farms in OMS. The study found that the best 5% farms in NMS show similar TFP growth rates as in OMS. It was suggested to compare farm performance by size. It was also noted that heterogeneity is very different by country. The link between TFP and labour costs was discussed. Can we say that countries with high labour costs achieved high TFP to remain competitive? Or are they highly productive despite higher costs? It was noted that the definition of specialised dairy farms could affect the results, in particular the estimated heterogeneity. There was a question about the author's conclusion that after abolition of the milk quota in 2015, a move of milk production from the NMS and southern member states to the north-west member states can be expected. This conclusion is based on changes in the filling rate of quotas during their recent expansion. There were also questions on whether the policy could explain why production moved to best performing farms, and on the relationship between farm productivity and food quality and innovation. A suggestion was made to estimate an input distance function, because farm strategy under production constraints is to reduce inputs. Further investigation of determinants, heterogeneity, and relationship between farm and food industry is foreseen in the future.

Session 2: Productivity and structural change

11. Raushan informed participants that the report of the joint project on cross-country comparison of farm-size distribution had been revised, mainly with the addition of a box on regional results in Germany. The revised report, which was presented for declassification at the APM the following day [TAD/CA/AP/WP92015)21/REV1], was declassified with minor changes. The report will be released as an *OECD Food, Agriculture and Fisheries Paper*, as previous outputs of the network.³

12. Ekaterina Zavyalova from the Thünen Institute in Germany presented main developments in farm and agricultural enterprise structures in Germany. Dramatic changes occurred in agricultural holdings in the last decades and many family farms feature complex structure: farms increase in size and increasingly hire external workforce or use agricultural contractors; and new enterprise and employment models are developed. Official statistics cannot keep pace with the development, and this limits their explanatory value when analysing structural change and income issues. This calls for a new approach in data collection.

13. One example of imperfect coverage concerns alternative gainful activities, partly because of taxation issues: only small-scale activities are included in farm structure surveys and large-scale activities are mostly considered commercial and thus not covered by agricultural statistical surveys. Another issue concerns livestock density constraints, which result in the division of livestock operations to stay within the limits, and reduce the ability of official statistics to reflect the holding structure. The difference between the real structure and statistics is most pronounced in regions with high livestock density. According to a pilot study of farms in Lower Saxony, a considerable proportion of holdings comprises several holdings, especially in regions with intensive livestock production; the owners involved are often family members; the fragmentation of holdings is an adjustment strategy due to taxation regulations; and renewable energy production has a strong influence on structural development in agriculture.

14. Other participants agreed this is an important issue, as farm activities change in all countries. In the Netherlands, the ministry asked for more information about non-farm activities. Off-farm activities also affect farmers' decisions. This issue is not high on the policy agenda, despite its importance in analysing changes in farm structures and farmers' behaviour. Income diversification affects farm risk management strategy and influences technology adoption.

3. OECD Food, Agriculture and Fisheries Papers are available at: http://www.oecd-ilibrary.org/agriculture-and-food/oecd-food-agriculture-and-fisheries-working-papers_18156797

15. Cemre Özcanli, from the Turkish Ministry of Food, Agriculture and Livestock first presented an overview of Turkish agricultural production, which has recorded fast growth in the last ten years. She then presented the characteristics of the Turkish FADN and main FADN farm characteristics. A full FADN became available for the first time in 2015, following the gradual extension of regional pilot surveys since 2007. Farmers are paid to participate, and are intended to stay in the survey. The most beneficial factor for them is the feedback reports they receive at the end of the accountancy year. In 2015, data was collected from 5 547 holdings according to a sampling plan. Grazing livestock farms are the largest category with about a third of all farm holdings; 21% are mixed crops-livestock farms; and 19% are specialised in field crops. Most of the holdings (35%) are between EUR 12–30 000 of economic size (standard output). Grazing livestock dominate in this category. Most farms with less than EUR 4 000 of output are in the mixed farm category. The largest farms with over EUR 60 000 of output had on average 6 units of paid labour. The highest average net value-added per annual work unit (AWU) was found in farms with output between EUR 30 and 60 000, slightly over that of farms above EUR 60 000. The lowest net value-added per AWU was found in farms with output between EUR 4 and 12 000, slightly under that of farms below EUR 4 000. Field crop farms had the highest value added per AWU, and horticulture farms the lowest in 2015. Gross farm income was highest in field crop farms and grazing livestock farms. In 2015, most farm categories had a positive margin (output higher than input) except horticulture.

16. Turkey produces a diversity of cereals, among which durum wheat has the highest area (21% of cereal area) among FADN farms, followed by wheat (17%) and maize (14%). But maize accounts for 40% of cereal production in FADN farms because of higher yields. Similarly, rice has the second highest yield among cereals.

Session 3. Farm sustainability

17. Wioletta Wrzaszcz, from the Institute of Agricultural and Food Economics – National Research Institute of Poland, presented the main challenges for the sustainable development of agricultural holdings, and the determinants of sustainability performance at the farm level. Farmers are expected to produce agricultural products and public goods, while minimising the pressure on the natural environment. Farm development depends on both external and internal factors. External factors include micro- and macro-conditions (the former include the state of infrastructure in rural areas, the latter include development level and pace, and creation and implementation of innovation); market conditions (prices); social conditions, such as public awareness in the field of environmental goods and food nutrients, and increased demand for local and regional products and direct sales; and institutional conditions (regulations, policy incentives, advisory system, and social security system). Internal factors are the soil, environment and climate conditions, which directly influence a farm's organisation and production capabilities; and the conditions concerning characteristics of an agricultural holding in terms of production organisation, and farmers' preferences and knowledge. Farm sustainability is facilitated by a family farm structure; practices related to the improvement of soil conditions, such as: testing soil reaction and composition, preparing fertilisers plans and balances of soil organic matter; a moderate increase in agricultural area, production and management intensity, concentration and specialisation of production, depending on local conditions and the state of farm's development in addition to traditional agricultural production, and the introduction of organic production and integrated system; and mixed agricultural production – combining crop and livestock production on the farm.

18. The agricultural innovation system has an important role to play in developing technologies and production practices improving farm sustainability performance, and facilitating their adoption through advisory systems. It is important to expand farmers' professional skills, covering the interdisciplinary scope: production, environmental and economic issues. Participation in courses on traditional and modern production technology based on natural ecosystem processes is a way to increase environmental awareness and possibility of agricultural holding sustainability. The Polish Institute of Agricultural and Food

Economics – National Research Institute has been conducting empirical research on farm sustainability since 2005, using farm level data from the Farm Accountancy Data Network, the Central Statistical Office of Poland, and a Survey of farmers that conduct FADN including additional questions on environmental issues.

19. Alessandra Kirsch, PhD student in Dijon, presented the results of her research comparing the distribution of CAP payments and farm environmental performance. It aims to assess the extent to which the distribution of direct aids of the CAP rewards the supply for environmental public goods by farming. French FADN data are used to analyse the distribution of direct aids received by three farm types: OTEX 15 (cereals and oilseeds), OTEX 45 (milk farms) and OTEX 46 (cattle farms), which represent 44% of French farms and 50% of the direct payments in the FADN sample. Eleven indicators of farm pressure on the environment available in the FADN are used to rank farms according to their overall environmental impact. They include the share of grassland, the share of protein crops, or the share of irrigated land in total agricultural area, an index of crop diversity, and information on input costs. The ranking is made in several steps: 1) ranking by indicator: points are attributed to each farm according to its rank in its type of farm decile; 2) for each farm, the points attributed for each indicator are summed; 3) farms are finally ranked in quartiles calculated according to the sum of points, by type of farm. Farms ranked as more environmentally friendly have, on average, larger agricultural area and smaller arable land area, but with higher diversity of crops, and incomes equivalent to those in other farms. For cattle breeding, the best ranked group has fewer cows, and uses more grass and less silage. The income of more environmentally friendly farms is on average less variable over time. During the period 2000-13, these farms received lower payments than less environmentally friendly farm categories, but the distribution of payments is changing as the CAP reforms are implemented. Direct payments per hectare are always higher in the farm group with the lowest marks. The difference is not very important for crop farms, but it is large in dairy farming and cattle farming, where the most environmentally friendly farming group receives much lower first pillar payments. They receive higher second pillar payments, but not enough to compensate the difference in first pillar payments. Initial results on UK and German dairy farms point to larger changes in payment distribution over time, mainly due to the regional approach to allocating direct payment from Pillar I among farms.

20. The limits to this approach are linked to the use of the FADN, which only includes farm account data and excludes smaller farms. But when compared to the results of a more precise survey for a sub-set of dairy farms, this simple statistical approach provides a similar picture. Its advantage is to be reproducible every year for each member state; it can simulate CAP direct aids redistribution; and can be used as an assessment tool to help decision making for the next CAP reforms

21. Questions focused on the aggregation of indicators, and possible use of weights when summing up single ranks. The author's response is that the indicators are indicators of pressure on the environment not of the state of the environment. As they group multiple impacts, it would not be appropriate to use weights to calculate the aggregate.

22. Hans Vrolijk, from LEI-WUR in the Netherlands, updated participants on progress with the EU FLINT Project, which aims to develop additional indicators of farm performance in the FADN context. After several rounds of discussion, the list was reduced to 33 indicators of sustainability, economics-innovation performance, and social contributions. The same frame and procedures as for FADN were used with additional questions. Data have been collected on a pilot basis on a sub-sample of farms. This should lead to further reduction in the number of indicators. Some countries already collect additional information (the Netherlands, Belgium, Ireland, Italy). FADN collection generates additional information that is not retained in the European FADN, such as quantity/characteristics of inputs. Worries about how data would be used by government (e.g. for tax purpose) vary by country. The next step is to use the data in specific case study to test them. Final assessment of feasibility and value of indicators will follow, as well as scenarios and recommendations for future infrastructure. Consultations with countries, including non-

participants to FLINT are planned. Please contact Hans if you are interested in participating in the consultations.

23. There were a few questions on data collection and future incorporation of FLINT indicators in the FADN. The data collected during the pilot project is fully harmonised, but some countries find some questions quite sensitive. The calendar is the same as for FADN collection. Some FLINT indicators could be included in the FADN, depending on countries and EU decision, but probably not all indicators will remain. Whether and why different contacts were used for traditional FADN and FLINT additional indicators depends on the country. In the Netherlands, a lot of questions are already in the national FADN. Eight thousand farms responded but we do not know how many were contacted, and how many refused. The complete overview will assess the extra work associated with the additional questions.

24. A suggestion was made to include future users of data in the stakeholders' discussion. They would value interaction between economics and sustainability, which is essential for policy making. The steering committee, which includes users, will have a discussion next autumn.

Session 4: Farm income

25. Hans Vrolijk also presented some of the findings of an analysis of the impact of Brexit on farm income in the United Kingdom, which was commissioned by the UK National Farmers Union (NFU).⁴ The whole analysis quantifies the effects of Brexit on UK agricultural production, trade, farm gate prices and farmers' income levels. The presentation focused on farm income and viability. Nine scenarios were envisaged, based on two dimensions: 1) the type of trade arrangement (WTO with MFN tariffs, Free trade agreement, FTA; trade liberalisation, TL); 2) the level of UK direct payment (0%, 50% or 100% of the current level). The impact of trade scenarios on market prices and outputs from Agmemod – a partial equilibrium model of agricultural markets – are fed into FADN data to estimate impacts on farm income by farm category. The farm level analysis considers average farm income for different groups, changes in farm income at farm level (% of farms with negative impact on farm income), and change in farm viability (% farms with improved or deteriorated viability due to Brexit).

26. Under the FTA and WTO scenarios, UK farm-gate prices increase, mainly driven by trade facilitation costs. This supports farm incomes, but reduces consumption. Under more liberalised trade (i.e. the UK TL scenario implying a lowering of the UK's external import tariffs by 50%), farm-gate prices fall, benefiting consumers through lower prices but hitting farm incomes in many sectors. It would have a significant impact on UK meat and dairy prices as current import rates are higher for these products. For most sectors the biggest driver of UK farm income changes is the level of public support payments available. The positive price impacts on farm incomes seen in both the FTA and WTO default scenario are offset by the loss of direct support payments. A reduction of direct payments would further increase the negative impact seen in the UK TL scenario.

27. Participants noted with interest the dominant effect of direct payments over market conditions on income. They questioned the assumptions about future trade relationships, in particular the conditions under which imports from third countries would enter, which affect the impact on domestic prices and thus market receipts.

4. The May issue of EuroChoices contains several articles on the impact of Brexit on agriculture, including one "Brexit: Breaking Away – Would it Pay?" by Hans and his colleagues. <http://onlinelibrary.wiley.com/doi/10.1111/euch.2016.15.issue-2/issuetoc>.

Session 5: Farm flexibility

28. Raushan presented preliminary results of the analysis of farm flexibility using data on farms in England and Wales provided by DEFRA. Flexibility is the ability of firms to adjust to fluctuation in demand by switching from one product to another at relatively low cost. It explains the coexistence of large and small firms within the same industry. This work aims to contribute to a better understanding of the determinants of structural adjustment by measuring farm flexibility and identifying its determinants and by estimating the effect of farm flexibility on farm productivity. Flexibility is measured by the Michaely-Stoikov (MS) flexibility index, which aggregates changes in production shares across time and products, and expresses the firm capacity to adjust quickly its production to changes in demand for firm outputs. Data from the UK Farm Business Survey (FBS) for England and Wales cover the period 2007-14. The MS index is defined using FADN Standard Output (SO) shares by product groups. Eighteen product groups are used, including five non-commodity outputs.

29. Initial results show that small farms appear to change production plans more frequently than their larger counterparts. However, farm flexibility as measured by the MS index was not found to have a significant positive effect on farm labour productivity. The link between flexibility and cost of production is not clear. Agricultural policies might have not encouraged farmers to use more flexible technologies. Absence or a low degree of market risks might have led to development of technologies exploiting economies of scale, while neglecting natural resource scarcity.

30. The presentation raised a lot of questions on the concept of farm flexibility and its concrete meaning and measurement. The first question is whether farm flexibility is an objective. It is not necessarily but it increases farm resilience. However, it is difficult for small farms to be flexible because they do not have enough land. It was also noted that farm flexibility partly reflects rotations, and that the situation between part-time farming and full-time farming is different. In fact, the diverse activities include both agricultural and on-farm non-agricultural activities, but not off-farm activities.

31. Raushan was also asked about the choice of the method: economies of scope are not estimated because we wanted to use a simple methodology. There were also questions about the results, for example the impact of changes in prices and the relationships between flexibility and other farm characteristics such as labour productivity or high costs. While flexibility can be a strategy for high cost farmers to survive, the link with labour productivity is less clear.

32. It is envisaged to apply the methodology to Switzerland subject to time and data availability.

Session 5: Future work and Joint Seminar

33. Catherine Moreddu presented areas of the 2017-18 PWB, where the network could contribute. They include the continuation of work on the determinants of farm productivity, sustainability and competitiveness, including innovation, as well as a new project on the impact of taxation on farmers' ability to manage risk and improve performance. OECD work on antimicrobial use in livestock would also benefit from farm-level information on practices, but the focus would be on large emerging countries, such as China.

34. Participants were invited to stay for the joint seminar that took place the following day during the APM meeting. The joint Seminar between the network and the APM included two presentations by network members, which will be posted on Delegates' Corner and the network website. The first one was on "Deregulation Reforms and Productivity Growth of Dairy Industry in Australia", by Eric Sheng, ABARES, Australia. The second one was on the "Impact of innovation on dairy farm productivity in the Netherlands", by Johannes Sauer, Technical University of Munich, Germany. This preliminary analysis is part of OECD work on the evaluation of productivity and sustainability at the farm level, under activity 2 proposed in the scoping paper TAD/CA/APM(2015)20. A draft report of the full analysis was presented at the May 2016 APM meeting. Discussion on both presentations was launched by Shingo Kimura.

Conclusion and summary of next steps

35. The OECD Secretariat will undertake the following:

- Send the Summary Record to participants for comments.
- Prepare a written report including the Summary record, Agenda and List of participants for the meeting of the Working Party on Agricultural Policies and Markets on 28-30 November 2016.
- Organise the 18th meeting of the Network on 24-25 October 2016.
- Open access to the website.

36. Participants were invited to:

- Liaise with Raushan on participation in future activities.
- Provide comments on farm-level analysis reports planned for the November 2016 APM meeting.

37. Concerning the website:

- The final Agendas, Lists of Participants, and Summary Records will be posted on the website.
- Presentations made at the meeting will be posted if the authors agree.