

The Transition to Biological Dairy Farming

Final Presentation

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We will discuss the following topics

Agenda

Problem recap

Findings

Calculating the true price of milk

Policy recommendations for the banks and the government

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Banks ignore the effects of externalities in their financing decisions; would financing decisions change when these externalities are included?

The problem

The problem centres around the following points

Banks primarily focus on the current and projected financial performance of the farm when making lending decisions.



Banks may not finance the transition due to negative short-term profitability



The true cost of the farmer to produce milk are not known to the bank



Potential hidden risk in the loan portfolio



Pricing externalities highlights the currently hidden value of biological farming

To draw a conclusion, we looked at five different cases

1

Case A



2

Case B



3

Case C



4

Case D



5

Case E



Financed?

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The current bank portfolio contains hidden risks due to non-priced externalities; quantifying these externalities could help banks reduce the risk of their portfolio

Conclusion

We find that...



There are significant hidden risks in the current bank portfolio

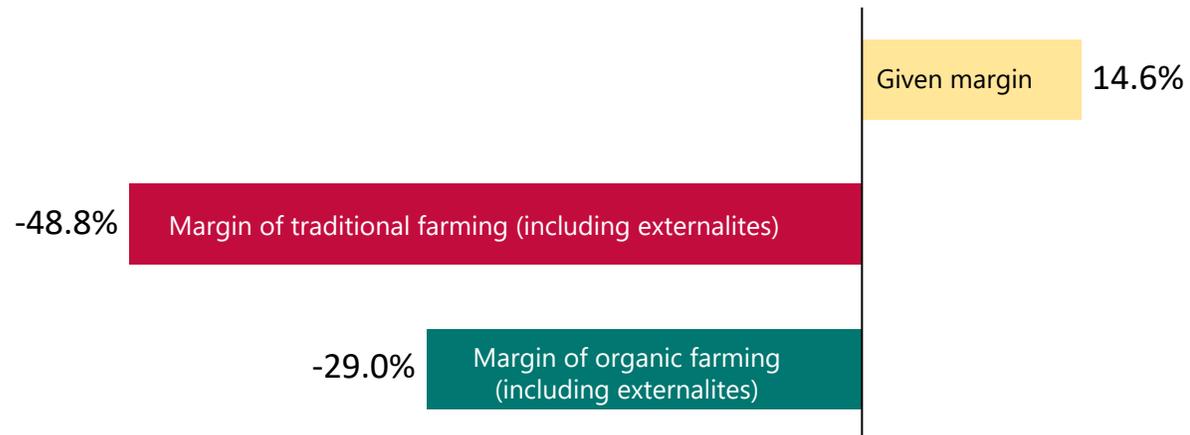


Organic farming significantly reduces the systematic risk of dairy products



There is a trade-off between revenue and profit margins

The average margins before and after including externalities



The banks and the government should...

1

Perform research to fill the current lack of tools

2

Focus on long-term orientation

3

Analyse consumer behavior

4

Inspect subsidies

5

Think outside of the box to find financial support for the biological transition of the farmers

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To quantify the effect of externalities we first calculated the true price for both traditional and biological farming; next we compared profit margins to draw conclusions

The process of finding the true price

—*What do we mean with the true price?*—

The true price of milk includes negative externalities, such as the amount of greenhouse emissions and the effect of farming on biodiversity

—*The process of finding the true price*—

We incorporated:

- Cost of greenhouse emissions
- Cost of biodiversity loss
- Cost of regional fodder (biological farming)
- Cost of land (biological farming)



We included:

- Imputed costs
- Unallocated costs

- We calculated the true price
- We compared the profit margins

First, we will discuss how we calculated the true price for both traditional and biological farming

The process of finding the true price

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The following inputs were used to calculate the true price of milk for **traditional farming**

The true cost of traditional farming; the cost of greenhouse emissions and biodiversity loss

Externalities	How does it arise?	Price range (€/kg milk)		
		Min.	Max.	Avg.
1 Greenhouse emissions				
 CO ₂	<ul style="list-style-type: none"> CO₂ is emitted during the production of fertilizer and fodder 			
 Methane	<ul style="list-style-type: none"> Methane is emitted directly from the cows as a result of intestinal fermentation 	0.03	0.28	0.15
2 Biodiversity loss				
 Land usage by cows	<ul style="list-style-type: none"> By using the land as grassland for the cows, the overall biodiversity is reduced 	0.04	0.04	0.04
 Land conversion	<ul style="list-style-type: none"> Conversion of land for the production of fodder, both in the region and abroad (South America) 	0.02	0.02	0.02
 Nitrogen	<ul style="list-style-type: none"> The urine and feces of the cows include large amounts of nitrogen, which evaporates and ends up in the environment 	0.02	0.09	0.05



Including the negative externalities increases the cost of milk with **67%** on average; this will have considerable effects on profits

True cost of traditional farming

To determine the true cost, we included the following externalities (as discussed)

1 Greenhouse emissions

CO₂

Methane

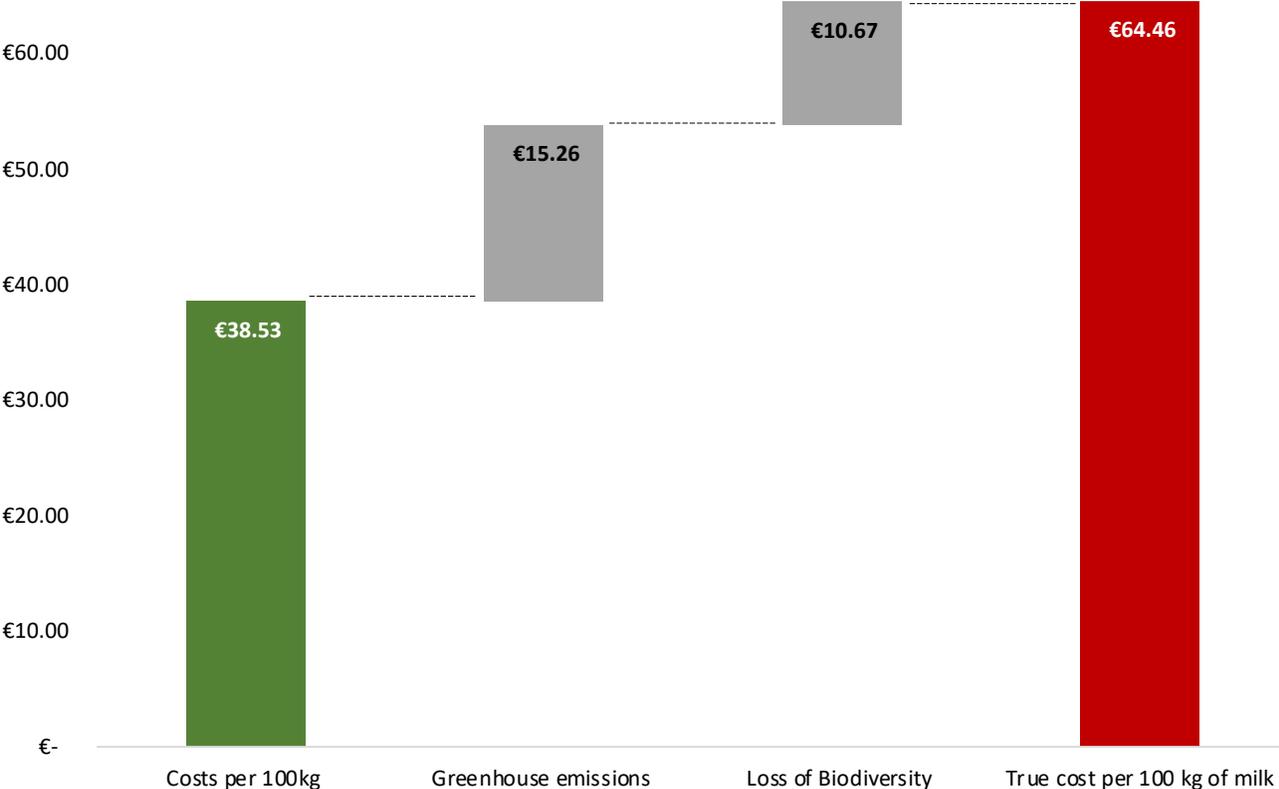
2 Loss of biodiversity

Land usage by cows

Land conversion

Nitrogen

The cost per 100 kg of milk increases with approximately **67%**



Sources: Vakblad V-Focus; Blonk et al (2011); van Reijs et al (2014); van Duursen en van Leeuwen (2016); Monetisation of true pricing (2020); EPA (2015); de Bruyn et al. (2010); Moore & Diaz (2015)

The following additional costs were included to calculate the true price of milk for **biological farming**

Additional costs of biological farming; the additional cost of regional fodder and land

Additional costs	How does it arise?	Price range (€/100 kg milk)		
		< 14,000 kg milk/ha	~ 16,000 kg milk/ha	~ 20,000 kg milk/ha
1 Regional fodder	<ul style="list-style-type: none"> In order to get the Skal certification, at least 60% of the biological feed has to come from the farm itself or from the region (Europe) 	0.30	0.60	1.00
2 Land				
+ Cost of new land	<ul style="list-style-type: none"> The costs of acquiring new land to keep the ratio of cows per ha within the regulations of biological farming 			
 Rent and redemptions	<ul style="list-style-type: none"> The interest as well as the principal repayments per year that are associated with the purchase of the land 	0.00	1.73	4.15
 Disposal of cattle slurry	<ul style="list-style-type: none"> The disposal costs per ton of cattle slurry 			

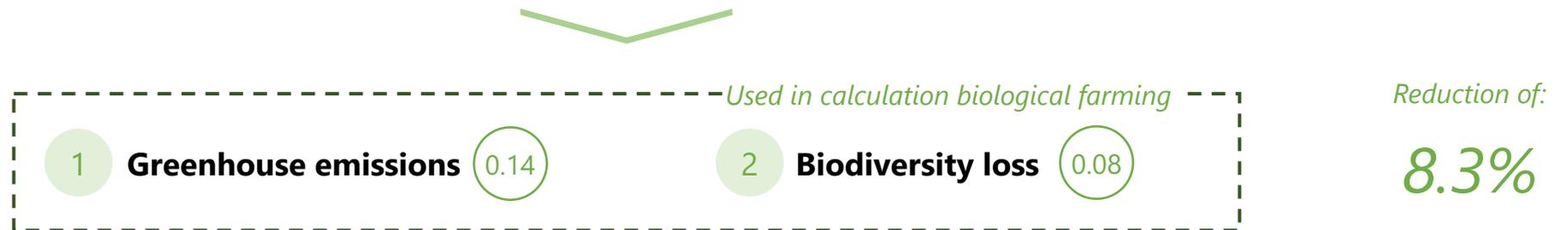
Used in calculation biological farming

1 Regional fodder	0.30	2 Land	0.00
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To calculate the true price of **biological farming** we had to adjust some of the externalities; overall, we find a slight reduction in the costs associated with the externalities

True cost of biological farming; the cost of greenhouse emissions and biodiversity loss

Externalities	Assumptions externalities biological farming	Price range (€/kg milk)			Reduced?
		Min.	Max.	Avg.	
1 Greenhouse emissions					
 CO ₂	<ul style="list-style-type: none"> Since biological farming uses biological fodder, we assumed the CO₂ emissions to decrease 	0.03	0.25	0.14	✓
 Methane	<ul style="list-style-type: none"> The methane emission per kg of milk remains equal as we assume less cows, but also less milk to be produced 				
2 Biodiversity loss					
 Land usage by cows	<ul style="list-style-type: none"> We keep the land constant. We assume that farmers do not buy additional land, but instead produce less milk with less cows 	0.04	0.04	0.04	~
 Nitrogen	<ul style="list-style-type: none"> The emission of nitrogen decreases due to the use of biological fodder and no use of fertilizers 	0.01	0.07	0.04	✓



Switching to **biological farming** also increases the cost of milk significantly, namely with **59%**; however, a higher selling price will partially reduce the impact of the transition

True cost of biological farming

To find the true cost of biological farming we incorporated the following additional costs

1 Regional fodder

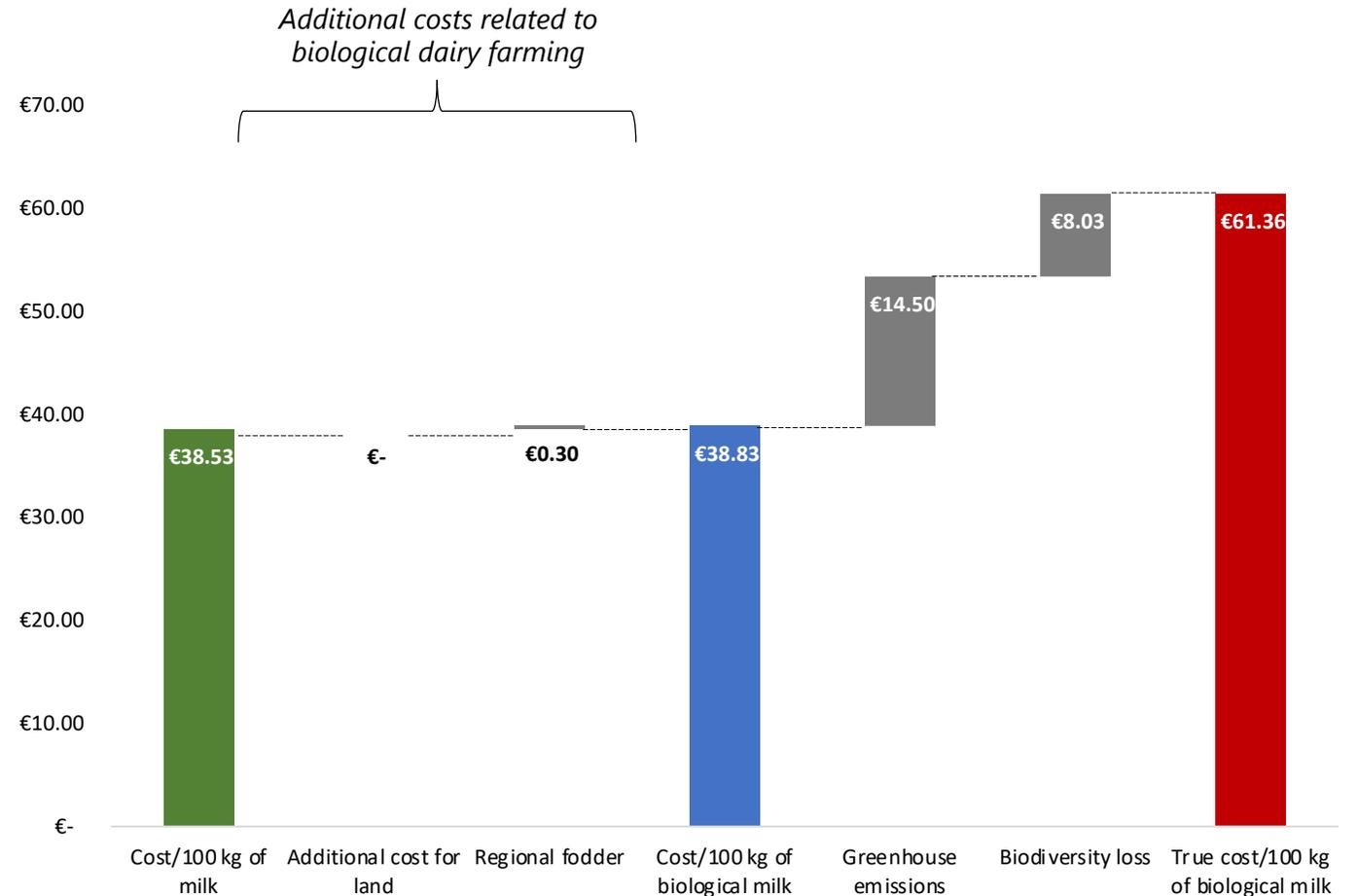
2 Land

Next, we included the costs of the negative externalities

1 Greenhouse emissions

2 Loss of biodiversity

The cost per 100 kg of biological milk increases with approximately **59%**



Next, we investigate the margin differences between traditional and biological farming to draw conclusions

The process of finding the true price

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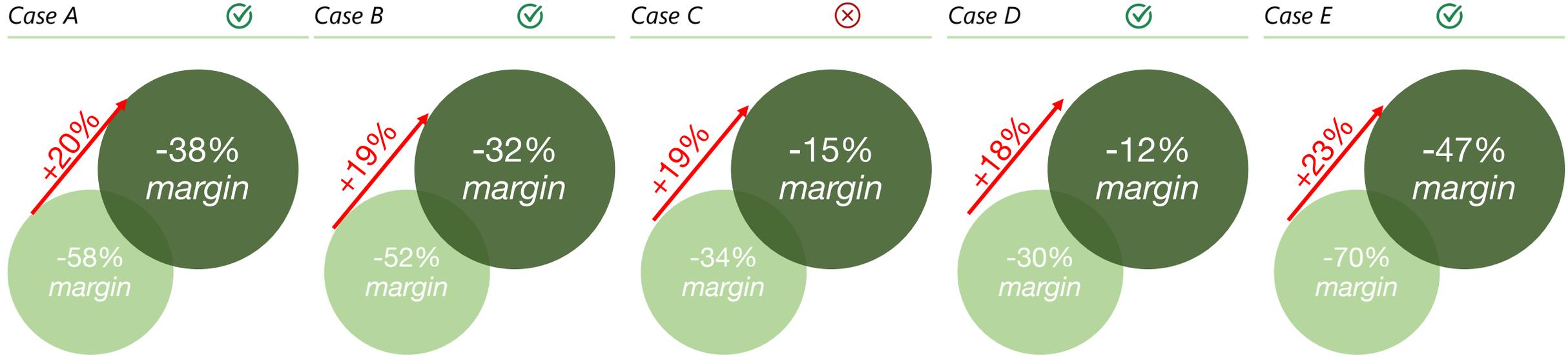
We included:

- Imputed costs
- Unallocated costs

- We calculated the true price
- We compared the profit margins

Detailed analysis of the profit margin development of the business cases

Comparing the profit margins of the traditional and biological farming cases



Overall findings



There are significant hidden risks in the current bank portfolio



Organic farming significantly reduces the systematic risk of dairy products



There is a tradeoff between revenue and profit margins

Old margin ● New margin ● Financed ✓ Not financed ✗

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Recommendations for the banks

1 Long-term orientation

- Transition to sustainable dairy farming could reduce future potential liabilities
- In the long-run banks want to reduce risks; the transition is one path
- However, in the short-run, biological farming might not yet be a viable business option for all farmers

2 Banks' responsibility

- Are banks the institution to finance the transition to sustainability?
 - If a business case is not viable in the short-term, banks will not finance the transition
 - Private banks need to assess their risks and only have a limited responsibility in financing these projects
 - Environmental value needs to be assessed. However, there needs to be a business case for the transition which includes impact *and* economic considerations

3 Who should finance the transition?

- If a transition does not make economic sense to a financial institution like a bank, they will not finance the transition
- Who should?
 - Government
 - Crowdfunding: receive products as a return
 - Banks with government subsidies

Recommendations for the government

1 Lack of tools

- Offer frameworks for a transformation to sustainable dairy farming
- 1) Assess on defining a true price of milk
- 2) Make use of the true price (framework without an integration strategy is not helpful)

2 Consumer behavior

- Problem is deeply rooted in consumer behavior
 - Consumers need to be aware of the "true price"
 - Possible solution: compulsory transparent labeling of products regarding the production and costs of milk production
 - Best-in-practice: Oatly (similar industry) is successfully realizing this strategy of being transparent by labeling their products
- Incentivize a shift of awareness of consumers

3 Subsidies

- The dairy industry is currently directly and indirectly being subsidized by the government
- Governments should quantify and assess future liabilities if no transition is happening
- Offer subsidies for banks to finance transition; if intrinsic business motivation for banks is not given, they need a guarantee from another institution
- Government should focus more on subsidizing the transition to organic farming
 - Price floor for organic milk to reduce risk of dumping prices