



# **Assessment of Latvian RDP 2014-2020 impacts on fostering the competitiveness in agriculture with PSM-DiD method**

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# Latvian RDP 2014 - 2020

## Outline

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### **RDP overview (CEQ 27 context)**

- **Intervention Logic - Sector indicators related to CEQ 27 for using the method**
- **Level of uptake by priority and focus area**

### **Evaluation purpose and questions**

- **Background of the evaluation**
- **Evaluation questions, judgment criteria and indicators used**

### **Evaluation approach**

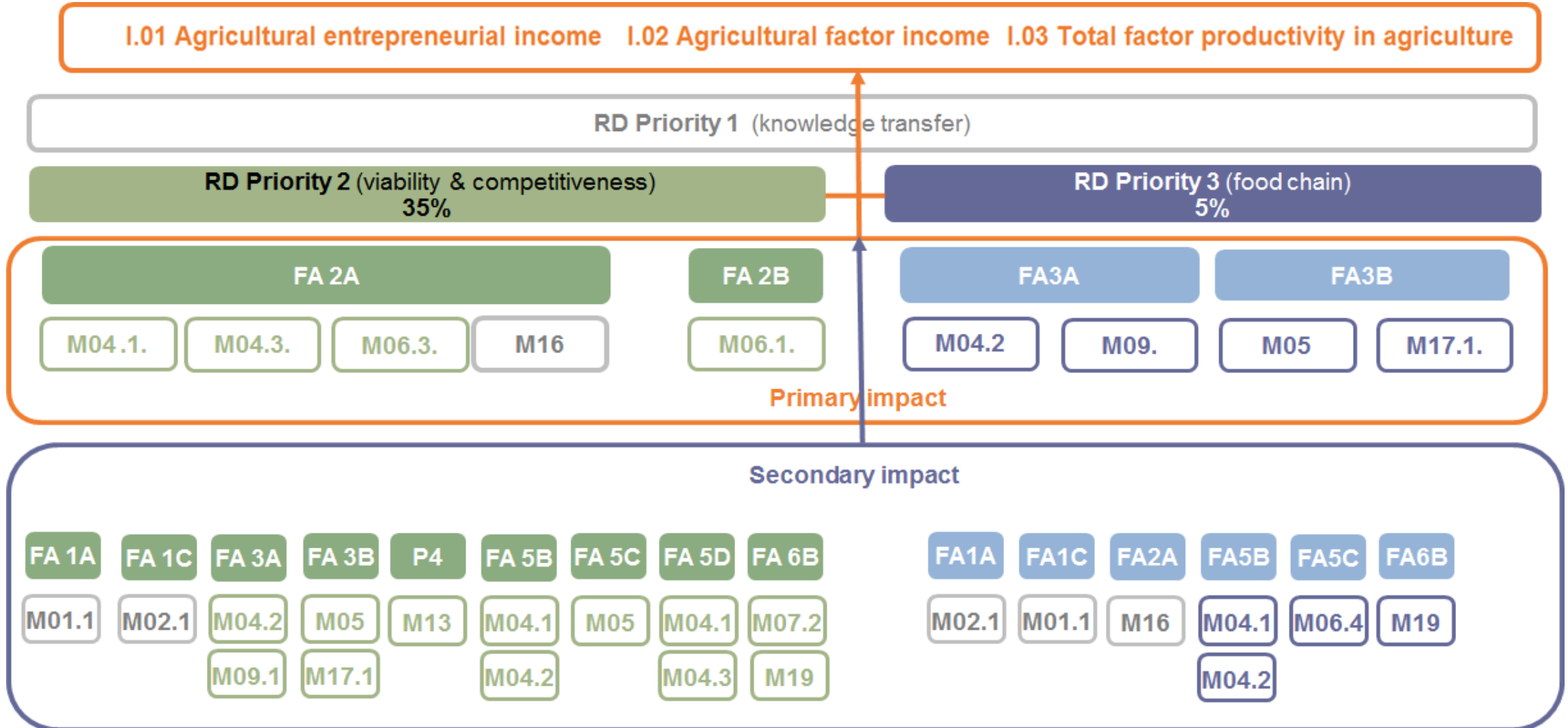
- **Steps in evaluation**
- **Data situation**
- **Preliminary findings**
- **Strengths and weaknesses**

### **Lessons learnt and recommendations**



# Latvian RDP 2014 - 2020

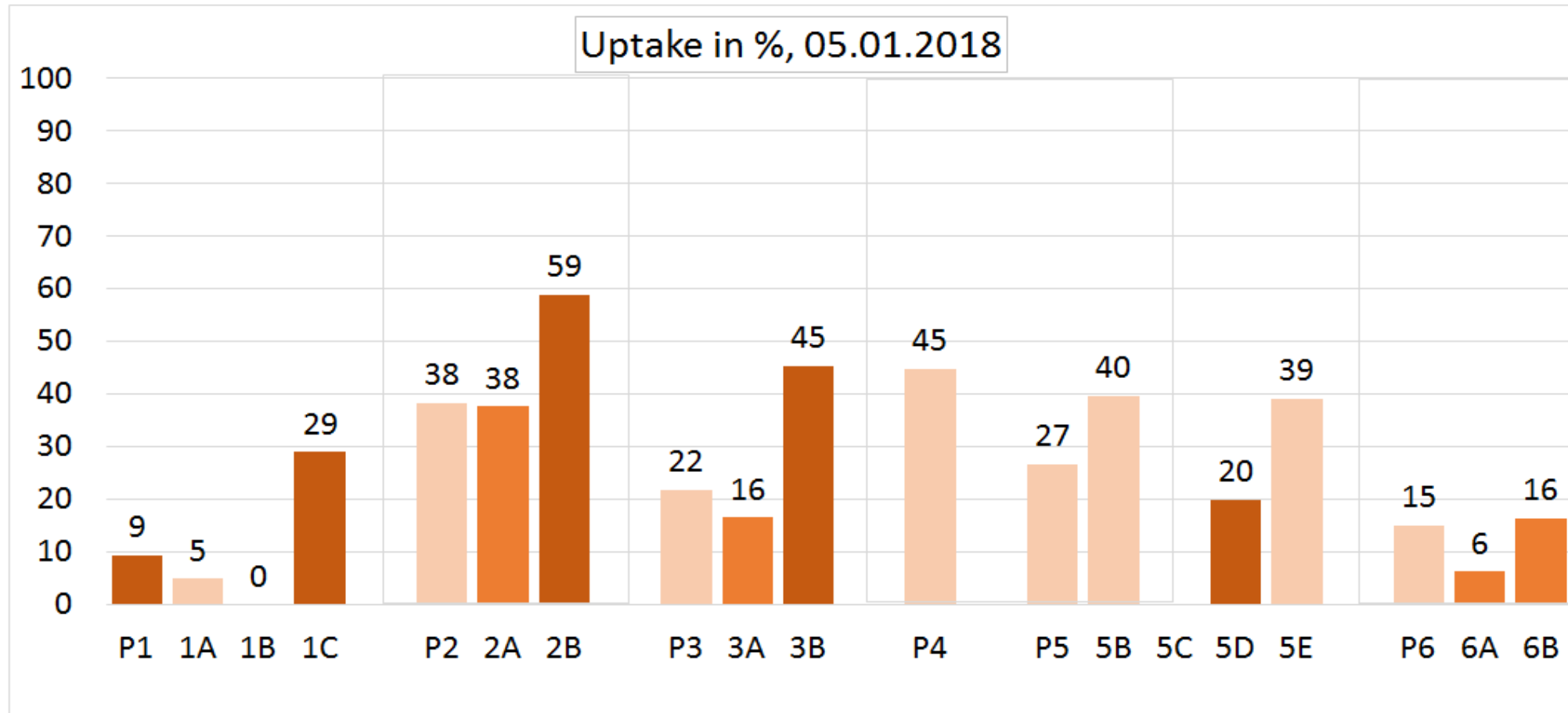
## Intervention Logic - Sector indicators related to CEQ 27





# Latvian RDP 2014 - 2020

## Level of uptake by priority and focus area (total uptake 37%)





# Latvian RDP 2014 - 2020

## Evaluation purpose

### Rural Development Evaluation Division (LAND), AREI

- Contracted by MA to assess impact indicators for Latvian RDP
- Possibility to use the same approach for ex-post evaluation

### Evaluation purpose

- Answer to the CEQ 27: *To what extent has the RDP contributed to the CAP objective of fostering the competitiveness of agriculture?*

### Indicative timeline for AIR 19

- Start: October 2018
- Current situation:
  - revision of necessary information for AIR19 indicators,
  - FADN data panel 2013-2017 updated by November 2018
  - RDP measures results update by January 2019



## Evaluation questions, judgment criteria and indicators used

Evaluation questions	Judgment criteria	Indicators
<b>Common evaluation question 27</b>		
To what extent has the RDP contributed to the CAP objective of fostering the competitiveness of agriculture?	Agricultural entrepreneurial income has increased	I.01 Agricultural entrepreneurial income
	Agricultural factor income has increased	I.02 Agricultural factor income
	Total factor productivity in agriculture has improved	I.03 Total factor productivity in agriculture
<b>Additional evaluation questions:</b>		
To what extent has the RDP contributed to the change in the share of family labor in farm income?	Family farm income per family work unit has increased	Family farm income per family work unit
To what extent has the RDP contributed to the labor productivity in agriculture?	Farm net value added per Annual Work Unit has increased	Farm net value added per Annual Work Unit
	Total output per Annual Work Unit has increased	Total output per Annual Work Unit
To what extent has the RDP contributed to the land productivity in agriculture?	Total output per unit of land has increased	Total output per unit of land
To what extent has the RDP contributed to the farming efficiency?	The share of costs in output has declined	Costs as % of output
To what extent has the RDP contributed to the improvement of farm competitive position without subsidies?	The share of subsidies in farm net income has declined	Subsidies as % of farm net income



# Latvian RDP 2014 - 2020

## Evaluation approach

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1. **Quantitative assessment at micro-level:** propensity score matching (PSM) and difference in differences (DiD)
2. **Quantitative assessment at macro-level:** bottom-up approaches upscaling micro level findings
3. **Qualitative assessment:** survey of beneficiaries and non-beneficiaries

### Reasons for choosing this approach

- *Immediate access to Latvian FADN panel data*
- *Previous experience with the RDP 2007-2013 ex-post evaluation and AIR 2017*
- *Complexity of qualitative survey design with respect to specific accountancy indicators*
- *Partial robustness, validity, transparency & credibility*
- *Practicability & Cost effectiveness*



# Latvian RDP 2014 - 2020

## Evaluation approach - steps in evaluation (1)

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### 1. **Micro-level assessment** : *PSM combined with DiD*

- **Step 1:** Elaboration of a beneficiary list with client numbers, public financing amount in primary target focus areas and secondary target focus areas (binary variable) on 12.31.2018 from data files supplied by PA
- **Step 2:** Calculation of all relevant indicators necessary for calculation of common and additional indicators for all panel data units using FADN and Eurostat data in base year (2010), a year before (2013 or 2014) and after (2017) the intervention





# Latvian RDP 2014 - 2020

## Evaluation approach - steps in evaluation (2)

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### Primary impacts

- **Step 3:** Construction of treatment and control groups from FADN data panel. Only those units with support in measures with primary targets in P2 and P3 mentioned above are selected for treatment group. All units unsupported in any of measures are selected for controls
- **Step 4:** Estimation of RDP direct effects on supported units at a micro-level (ATT) on Agricultural entrepreneurial income, Agricultural factor income and Total factor productivity in agriculture
- **Step 5:** Estimation of RDP direct effects on un-supported units at a micro-level (ATU) on Agricultural entrepreneurial income, Agricultural factor income and Total factor productivity in agriculture



# Latvian RDP 2014 - 2020

## Evaluation approach - steps in evaluation (3)

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### Secondary impacts

- **Step 6:** Construction of treatment and control groups from FADN data panel. All units with support in measures with primary targets other than P2 and P3 with secondary targets in P2 or P3 are selected. All units unsupported in any of measures are selected for controls.
- **Step 7:** Estimation of RDP direct effects on **supported units** at a micro-level (ATT) on Agricultural entrepreneurial income, Agricultural factor income and Total factor productivity in agriculture
- **Step 8:** Estimation of RDP direct effects on **un-supported units** at a micro-level (ATU) on Agricultural entrepreneurial income, Agricultural factor income and Total factor productivity in agriculture



# Latvian RDP 2014 - 2020

## Evaluation approach - steps in evaluation (4)

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### Indirect effects

- **Step 9:** Calculation of deadweight effects at a micro-level with Total Taxes paid
- **Step 10:** Calculation of substitution effects at a micro-level with Total income
- **Step 11:** Calculation of displacement effects at a micro-level with Employment



# Latvian RDP 2014 - 2020

## Evaluation approach - steps in evaluation (5)

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### 2. **Macro-level assessment:** Bottom-up approaches upscaling micro level findings

- **Step 12:** Aggregation of results and calculation of RDP effects at a sector level.
  - Estimated direct primary and secondary impacts at a micro level on Agricultural entrepreneurial income and Agricultural factor income are multiplied by number of beneficiaries and non-beneficiaries, respectively, out of total number of farms in 2013.
  - Estimated direct primary and secondary impacts at a micro level on Total factor productivity in agriculture are multiplied by AWU in beneficiaries and non-beneficiaries, respectively, and weighted against sector total factor productivity in agriculture



# Latvian RDP 2014 - 2020

## Evaluation approach - steps in evaluation (6)

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### 3. **Qualitative assessment** : Survey of beneficiaries and non-beneficiaries

- **LAND survey:** April 2016
- **Objective:** obtaining of the information necessary for the qualitative assessment of the indicators selected for the answers to evaluation questions
- **Survey population:** 24,703 clients of the Paying Agency with e-mail addresses including both beneficiaries and non-beneficiaries of Latvian RDP 2014-2010
- **Survey method:** mixed survey with three blocks - binary, 5-point Likert semi-quantitative scale, 5-point Likert ordinal scale
- **Survey sample:** 867 respondents (275 beneficiaries, 592 non-beneficiaries)
- **Analysis of responses:** comparisons of responses provided by beneficiaries and non-beneficiaries. ANOVA regression for testing statistical significance of differences in sub-sample means
- **Conclusions:** indicative assessment of the Programme impact without causality

**Final step:** Triangulation of quantitative and qualitative results. Aggregation of results and calculation of RDP effects at a sector level.



# Latvian RDP 2014 - 2020

## Data situation - FADN

Indicator	Code	FADN variable
I01, I02, I03	SE010	Total labour input in full time equivalents
I03	SE025	UAA in hectares
I01, I02, I03	SE135	Total Output crops and crop production
I01, I02, I03	SE206	Total Output livestock and livestock products
I03	SE256	Other Output
I01, I02, I03	SE275	Total intermediate consumption
I01, I02, I03	SE360	Depreciation
I01	SE365	Total external factors (wages, rents and interest paid)
I01, I02	SE600	Balance current subsidies and taxes



# Latvian RDP 2014 - 2020

## Data situation - Eurostat

Database	Product code	Product	FADN code	Reference
Price indices of agricultural products, output (2010 = 100) - annual data [apri_pi10_outa]	1000000	Crop output price index, including fruits and vegetables	SE135	Crop Production
	130000	Animal output price index	SE206	Livestock Production
	140000	Agricultural output price index	SE256	Other Output
Agricultural labour input statistics: absolute figures (1 000 annual work units)[aact_ali01]		Salaried	SE010	Labour in AWU
Economic accounts for agriculture - values at current prices[aact_eaa01]	23000	Compensation of Employees	SE010	Labour in AWU
Price indices of the means of agricultural production, input (2010 = 100) - annual data [apri_pi10_ina]	200000	Goods and services currently consumed in agriculture (Input 1)	SE275	Total intermediate consumption
	210000	Goods and services contributing to agricultural investment (Input 2)	SE360	Depreciation
<a href="https://www.statista.com/statistics/576268/capital-market-interest-rate-latvia-europe/">https://www.statista.com/statistics/576268/capital-market-interest-rate-latvia-europe/</a>		Long term government bond yield	SE360	Depreciation
Agricultural land prices by region - historical data (until 2009)[apri_lprc_h]		Utilized agricultural area	SE025	UAA in hectares



# Latvian RDP 2014 - 2020

## Data situation - Eurostat

### Prices of agricultural land

- **Eurostat series (annual data):** End with 2009
- **Eurostat methodology changes:** 2010
- **National Statistics series (annual data):** Begin with 2011
- **Base year for Eurostat price indices:** 2010

### Possible solutions

- **Change of a base year:** 2011 (simply divide all indices by 2011 index)
- **Multiple imputations:** Impute 2010 from panel data (from next slide)

The most accurate way to measure changes in volume from one year to another is to use the most recent base year available. This approach guarantees that weightings are relatively up-to-date and avoids problems, therefore, linked to weighting products that are no longer produced and new products that have emerged. It is for this reason that the EAA/EAF measures changes in volume using the weightings for the preceding year.\*

\* *Manual on the economic accounts for Agriculture and Forestry EAA/EAF 97 (Rev.1.1) Luxembourg: Office for Official Publications of the European Communities, 2000. ISBN 92-828-2996-0© European Communities, 2000*





# Latvian RDP 2014 - 2020

## Preliminary findings

Information gathered from Eurostat for adjustment of individual panel units data:

SE135 (Crop Production); SE206 (Livestock Production); SE256 (Other Output); SE010 (Salaried Labour); SE275 (Working Capital); SE360 (Fixed Capital)

### Missing Eurostat information

Code	FADN variable	Type	2010	2011	2012	2013	2014	2015	2016	2017
<b>Output</b>										
SE025	UAA price	EUR/ha		870	1,585	1,998	2,323	2,501	2,771	2,831
SE025	UAA	Price index (2010=100)								



# Latvian RDP 2014 - 2020

## Strengths and weaknesses of the approach

Strengths	Weaknesses
Established data panel	Panel size
Rigour: exact findings; causality established	Drop-out of the units from the panel
Reliability: quality of data	Insufficient controls due to a large share of participants
Robustness: stable and resilient findings to changes	
Validity: sound conclusions	Incomplete data series for a number of units
Transparency: clear and transparent assignment rules	Lack of opportunities to use units with incomplete data series (two year averages for start and finish years)
Credibility: findings which can be trusted by stakeholders	
Practicability: application without adverse consequences	High imbalance, model dependence and bias*
Cost-effectiveness: sound evaluation findings with spending less resources	
Previous experience: other evaluations, research papers	

\* G. King, R. Nielsen. *Why Propensity Scores Should Not Be Used for Matching?* December 16, 2016



# Latvian RDP 2014 - 2020

## Lessons learnt and recommendations

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- **Availability of data from PA:** finalized data on beneficiaries - end of April
- **Costs of approach:** about 2 weeks - one month depending upon the availability and/or already prepared FADN data panel
- **Preparation of survey:** would be of little use considering the specification of FADN variables necessary for evaluation, e.g., turnover, income, employment
- **Contract the evaluator well in advance:** would be important if evaluators lack and expertise in application of PSM-DiD so they need to hire the outside experts
- **Structure adequately the evaluation framework:** this is by default an important issue irrespective to evaluation scope and context
- **Software requirements:** STATA procedures and commands pscore, psmatch2 and mhbounds are well suited for evaluation purposes



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# Thank you

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Further information:

- <https://gking.harvard.edu/files/gking/files/psnot.pdf>
- <https://ec.europa.eu/eurostat/documents/3859598/5854389/KS-27-00-782-EN.PDF/e79eb663-b744-46c1-b41e-0902be421beb>