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Accounting treatments and policies for biological assets from the perspective of IAS 41 - Agriculture

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Abstract
Agriculture is representing one of the main income generating pillars to the state budget and for this reason the specific regulations on treatments and accounting policies represent the goal of many other orders and specific rules and regulations. On the other hand biological assets represent a major interest for economical agents that can use both in terms of stocks in order to obtain immediate incomes and productive biological assets, which have a high reproductive capacity. In the current macro economical context that is heavily hit by an intensified inflation and a destabilizing exchange rate, accounting approaches related to IAS 41-Agriculture require enhanced precaution, especially related to stored production and productive biological assets. The instable landownership domain requires precaution related to protecting future or ongoing investments. We can see a preoccupation of the management of agricultural entities with reducing whole expenses, especially fixed ones, which were somewhat destabilized after the contributions have been transferred from the employer to the employee. Another domain that interests agricultural investors is the significant growth (20%) of the costs with electricity and natural gas. The objectives of the study target the empirical analysis of the accounting, standardization context of the treatment of biological assets and statistical dissemination of information obtained from the study of financial data reported on a national level on two important directions of agricultural activity regulated by CAEN 141 and 130. The research proposes meta-analysis synthesis through the approached directions of treatments and accounting policies for biological assets and concentrating the information obtained through econometric modelling. The model is useful to management of agricultural entities and users of financial information, meaning it shows an improved perspective of the accounting approach on biological assets.

Keywords: Biological assets, IAS-41, agriculture, accounting policies;
JEL: M41

1. Introduction

Agriculture is an area that, besides the revenue-generating role, also has a security and safety role in terms of the need to feed the population in a region / country. (Cotula, Vermeulen, Leonard & Keeley, 2009, p. 15; UNCTAD, 2009, p. 96).

These functions of agriculture in the context of globalization are supported by foreign direct investments, given in the first place the need for know-how in agriculture. (IFRI, 2009, p.2; UNCTAD, 2009, p. 163).

In this context, access to international research to develop farm holdings and maximize the financial impact of business in the field can play an active role in promoting sustainable development. (Ghauri & Yamin, 2009, p. 105; Kolk, 2016, p. 22; Oetzel & Doh, 2009, p. 109).

In quantifying the effects of these actions on the development of agricultural production an important role is played by the regulatory framework in general and the accounting in particular. For the agricultural sector international accounting bodies IASB – International Accounting Standards Board and FASB - The Financial Accounting Standards Board, have regulated a dedicated standard - IAS 41 (Agriculture).

The Standard requires for the biological assets to be the subject of this study, their assessment and reporting at fair value. (Herbohn, K. & Herbohn, J., 2006, p. 66; Dowling & Godfrey, p. 49, 2001; Penttinen, M., Latukka, A. Meriläinen, H., Salminen, O. and Uotila, E, 2004, p. 69). Argilés, Blandon, Monllau (2011) argue that agriculture based on the valuation of biological assets at historical cost is difficult due to the multiplying effects of assets, or reducing them based on the life cycle of the components of biological assets.

It is noted the quasi-unitary opinion of the experts in favor of valuation at fair value compared to the use of historical cost method, the method that adequately reflects the biological transformations and the processes of increasing the value of these types of assets during the life cycle due to the especially transformable character of the biological assets.

Damian, Mănoiu, Bonacia & Strouhal (2014), Svoboda & Bohusova (2018) identify for some categories of biological assets such as fruit tree plantations, viticulture, fish farms, the need for a more appropriate point solution than the general solution provided by IAS 41, on the fair value measurement of all biological assets.

In the opinion of these authors, there are principal exceptions in what the provisions of IAS 41.24, 25 and IAS 41.30, where IAS 41.24 provides that in limited circumstances (circumstances where the biological transformation of the asset is minimal in the analysis period), cost may be the fair value indicator.

Considering the period 2018-2019, in the context of expected economic and food crises, we see that the approach through costs of biological asset valuation, (historical cost) is not appropriate just below the premise of a minimum asset transformation, due to the external economic of the entity that may affect, by dilution of the bid for bio-assets, currency devaluation, inflation, unemployment, etc.

IAS 41.25 relates the value of biological assets to the value of the land on which they are located, (Booth & Walker, 2003, p. 53; Elad, 2004, p. 631, Thurrun Bakir, 2010, p. 34), considering the expected economic crisis again, previous experience has revealed a sharp devaluation during the crisis period of the real estate components, in our case land. From this perspective, we argue that the standard on this issue should be revised by determining the value of the biological asset separated from the land.

2. Research Methodology

Biological assets such as typology and accounting treatment carry specific characteristics, characteristics that make the subject addressed is an analytical billing and modeling by statistical and econometric methods.

Considering the diversity of the types of biological assets of a productive nature or, of the nature of the stocks, in order to compact the study and to increase the homogeneity of the sample so that we can obtain statistically representative results (Table 1), we selected 2 categories from the list of relevant CAEN codes:

- CAEN code 141: Breeding of dairy cattle
- CAEN code 130: Growing of plants for propagation

Table 1. Presentation of the characteristics the booth chosen sectors of activity and their weight in the national economy

CAEN code 141: Breeding of dairy cattle	CAEN code 130: Growing of plants for propagation
Statistical Data: No. of economical agents: 757 economical agents -0,04% out of all the economical agents of Romania *Turnover:* -626,6 million lei (142,4 million euro) -0,05% of Romanian turnover *Employee Number*: -2.843 employees -0,07% of total number of employees in Romania *Profit:* -87 million lei (19,8 million euro) -0,10% of net profit realized in Romania	*Statistical Data:* No. of economical agents: 190 economical agents -0,01% out of all the economical agents of Romania *Turnover:* -129,6 million lei (29,5 million euro) -0,01% of Romanian turnover *Employee Number:* -800 employees -0,02% of total number of employees in Romania *Profit:* -15 million lei (3,4 million euro) -0,02% of net profit realized in Romania

The data in the table are schematically centralized as follows (figure 1):

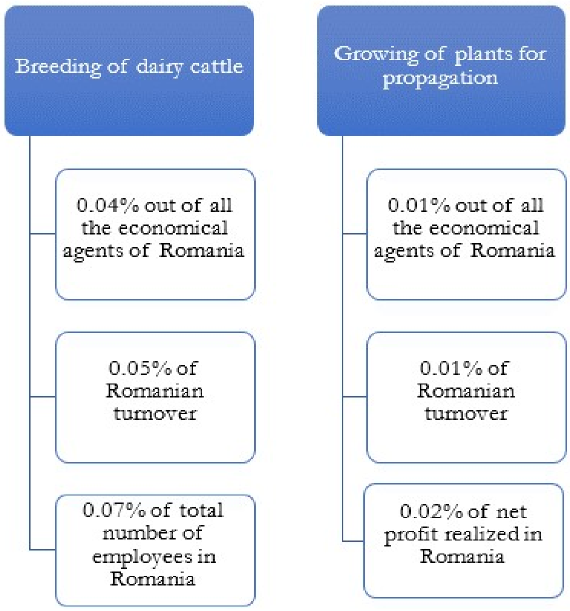


Figure 1 - Structure of selected agricultural sectors

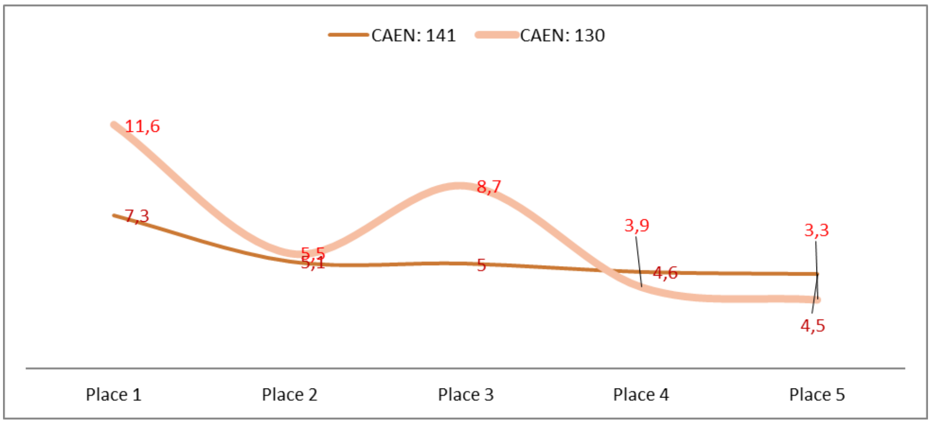
According to the maximization of the turnover criterion, the first 5 companies from the country were differentiated for each CAEN code.

These companies are presented in the table below:

Table 2. Study sample resulting from application of inclusion criteria (Top 5 national CAEN)

	CAEN: 141 Breeding of dairy cattle	MIL EUR	CAEN: 130 Growing of plants for propagation.	MIL EUR
1st Place	DN AGRAR APOLD SRL	7.3	GARDEN CENTER GRUP SRL	11.6
2nd Place	SAVA ZOOTEHNIC SRL	5.1	YURTA-PROD S.R.L.	5.5
3rd Place	LACTO AGRAR S.R.L.	5	GREEN FACTORY DESIGN SRL	8.7
4th Place	AGRO COSM FAN SRL	4.6	ZOO-GOAS SRL	3.9
5th Place	KOPLAX SRL	4.5	AR-FLORA S.R.L.	3.3
	Total 141	**26.5**	**Total 130**	**33**

The table shows that the companies in the group CAEN: 141 breeding of dairy cattle have a competitive economic advantage over commercial companies CAEN: 130 growing of plants for propagation, approximately 25% more.



The data are represented graphically at the turnover level (million euro) in figure 2.

Figure 2: Economic Performances of Top 5 companies for social companies of CAEN groups 141 and 130

Accounting policies regulate recognition, valuation at the time of recognition, at the time of preparation of the financial statements, as well as the exit of the assets of biological assets. The purpose of accounting policies is to respect the principles of continuity, permanence, prudence, accrual accounting, independence, intangibility, separate valuation of assets and liabilities, non-compensation.

By the proposed model, by the regressive form - composed on the basis of the mobile indices of the assets evaluated by the principle of separate evaluation with respect to the principle of materiality (significance threshold), we intended to obtain an immediate quantification of the financial predictability of the company and to quantify an appropriate accounting treatment for all assets over which the materiality principle generates significant values.

The financial data taken into account in the dynamics between 2010 and 2016 (table 3) have been transformed into performance indicators (Financial Return Ratio - RRF, liquidity of assets, represented by the ratio of fixed assets to Ai-Ac assets and the rotation speed of inventories).

Table 3 - Indicators used in model construction

	RRF- 141	Ai-Ac- 141	VRS- 141	RRF- 130	Ai-Ac- 130	VRS- 130
2016.1	10.71036	3.044244	56.91725	3.973873	0.976165	47.25517
2015.1	-7.02357	3.785654	56.14353	2.897141	0.926347	17.59075
2014.1	31.73653	4.071785	42.89261	8.705272	1.03413	10.76814
2013.1	22.3235	4.449185	33.765	0.304812	0.838234	25.19466
2012.1	-16.0694	4.369527	35.99588	3.410268	0.910318	35.08728
2011.1	62.4499	4.881621	63.27646	1.041298	0.724263	4.984013
2010.1	104.1455	3.214198	297.0006	4.993641	0.651684	18.75035
2016.2	27.99442	2.581138	119.9453	30.51269	0.245463	71.32334
2015.2	54.42617	1.929464	147.2603	25.84213	0.328121	81.63269
2014.2	40.40295	1.50481	153.2491	17.97625	0.409006	81.1591
2013.2	29.51655	1.78141	127.9744	1.208877	0.344719	107.3422
2012.2	35.67892	1.587234	140.0171	9.411435	0.557934	92.27822
2011.2	82.81533	1.423439	87.32718	7.319024	0.588688	59.09104
2010.2	12.38417	1.167549	190.6482	27.1674	0.025364	62.84421
2016.3	44.82894	1.703253	184.2859	16.99565	0.646198	4.619948
2015.3	42.74356	1.725081	185.2764	43.86999	1.190848	3.784151
2014.3	119.606	1.665716	229.1189	22.0384	1.562413	10.47259
2013.3	-87.5473	2.068293	163.7706	37.16907	0.839359	4.392534
2012.3	107.0075	3.376685	129.8071	53.18136	0.393905	33.9872
2011.3	98.76178	4.337374	100.4617	51.92974	6.957775	3.860682
2010.3	101.7822	0	0	58.63247	3.991205	0.228048
2016.4	0.22505	4.390803	17.17239	24.71659	0.572765	108.4249
2015.4	5.135348	3.409087	14.8775	7.943073	4.773606	0.043262
2014.4	14.14519	0.681678	16.59174	0.685524	9.045329	4.592616
2013.4	1.482784	0.459589	43.36223	61.33891	4.15847	6.131914
2012.4	5.198077	0.27711	149.124	2.686501	2.218346	16.87214
2011.4	21.47669	0.875076	504.8178	13.8069	3.908109	0
2010.4	36.63848	1.236003	259.9943	76.73917	0.620956	39.83303
2016.5	-13.5682	2.767545	91.13528	4.071673	0.482875	318.6889
2015.5	-14.5958	2.17211	105.5391	-6.32317	0.550717	293.2955
2014.5	-8.22797	1.993726	95.5098	1039.189	0.502285	348.0284
2013.5	0.93733	2.484922	133.9662	11.37947	0.355318	468.8625
2012.5	6.31466	3.062885	152.5996	-31.6927	0.398577	425.3118
2011.5	5.250606	3.178522	177.6361	29.67007	0.353047	412
2010.5	12.65088	3.452377	182.0718	13.87191	0.406386	340.0371

The model was built on the least squares method using a regression equation based on the dependency variable to quantify the performance of biogas stocks in relation to the financial performance regresses variables and the liquidity degree of the assets held by the entities analyzed. The developed model was tested separately for the two types of CAEN groups (141 and 130), obtaining a higher homogeneity for the entities of the CAEN 141 group.

The model is defined by the following mathematical relationship:

$$VRS = \alpha RRF + \beta AiAc + \epsilon,\text{ where:}$$

- VRS - the rotation speed of inventories;
- RRF - Financial profitability rate;
- Ai-Ac – the liquidity degree of the assets.

The equation disseminated for CAEN 141 in the conditions of the statistical observations in Table 3 is:

$$\hat{VRS} = +\ 0{,}898*RRF + 28{,}\ 2*Ai\_Ac$$
$$(0{,}460) \qquad (8{,}\ 52)$$

n = 35, R-squared = 0, 450
(Standard errors in parentheses)

Model 1: OLS, using observations 1-35
Dependent variable: VRS

	Coefficient	Std. Error	t-ratio	p-value	
RRF	0, 898136	0, 45981	1, 9533	0, 05931	*
Ai_Ac	28, 2478	8, 52049	3, 3153	0, 00223	***

Mean dependent var	128, 2723	S.D. dependent var	97, 45442
Sum squared resid	494545, 1	S.E. of regression	122, 4182
R-squared	0, 449768	Adjusted R-squared	0, 433094
F (2, 33)	13, 48732	P-value (F)	0, 000052
Log-likelihood	-216, 8936	Akaike criterion	437, 7873
Schwarz criterion	440, 8980	Hannan-Quinn	438, 8611

White's test for heteroskedasticity (squares only) -
Null hypothesis: heteroskedasticity not present
Test statistic: LM = 3, 24575
With p-value = P (Chi-square (3) > 3, 24575) = 0, 355266;

It is observed that the model is homogeneous in 45% and statistically strong, with impact on the Ai-Ac regressor ($p < 0,01$).

The equation disseminated for CAEN 130 in the conditions of the statistical observations in Table 3, is:

$$\hat{VRS} = +\ 0{,}\ 342*RRF + 5{,}\ 07*Ai\_Ac$$
$$(0{,}\ 159) \qquad (11{,}\ 3)$$

n = 35, R-squared = 0,133
(Standard errors in parentheses)

Model 1: OLS, using observations 1-35
Dependent variable: VRS

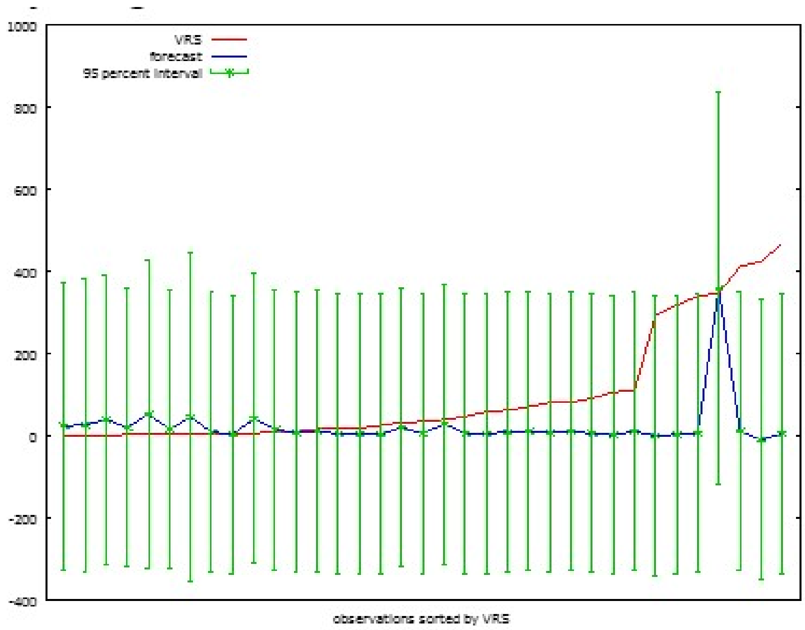
	Coefficient	Std. Error	t-ratio	p-value	
RRF	0, 342111	0, 159497	2, 1449	0, 03941	**
Ai_Ac	5, 06983	11, 3195	0, 4479	0, 65716	

Mean dependent var	101, 6791	S.D. dependent var	143, 3512
Sum squared resid	919045, 9	S.E. of regression	166, 8828
R-squared	0, 133415	Adjusted R-squared	0, 107155
F (2, 33)	2, 540264	P-value (F)	0, 094163
Log-likelihood	-227, 7384	Akaike criterion	459, 4767
Schwarz criterion	462, 5874	Hannan-Quinn	460, 5505

Test for normality of residual -
Null hypothesis: error is normally distributed
Test statistic: Chi-square (2) = 50, 7731
With p-value = 9, 43528e-012.

It is noticed that the model is non-homogeneous, but it is statistically representative, with an impact on the RRF regressor ($p < 0.05$).

Frequency and predictive statistical tests are presented comparatively in Figure 3.



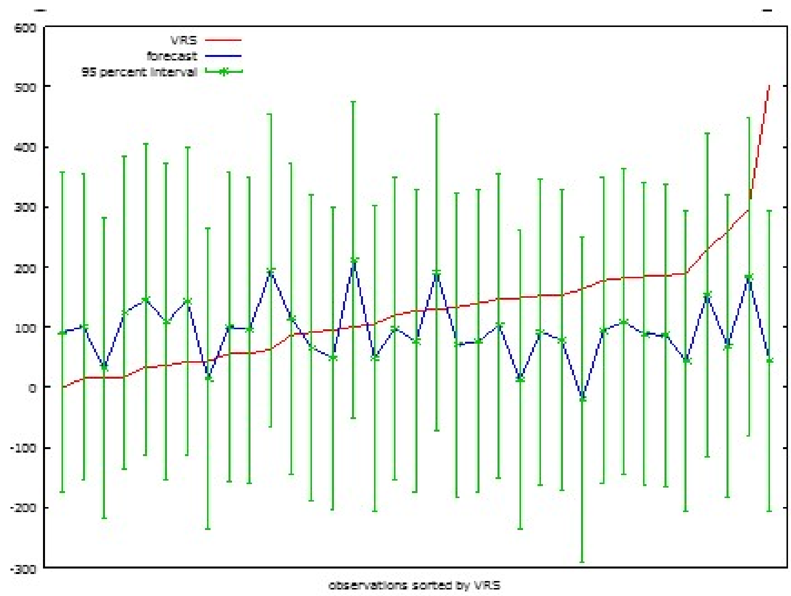


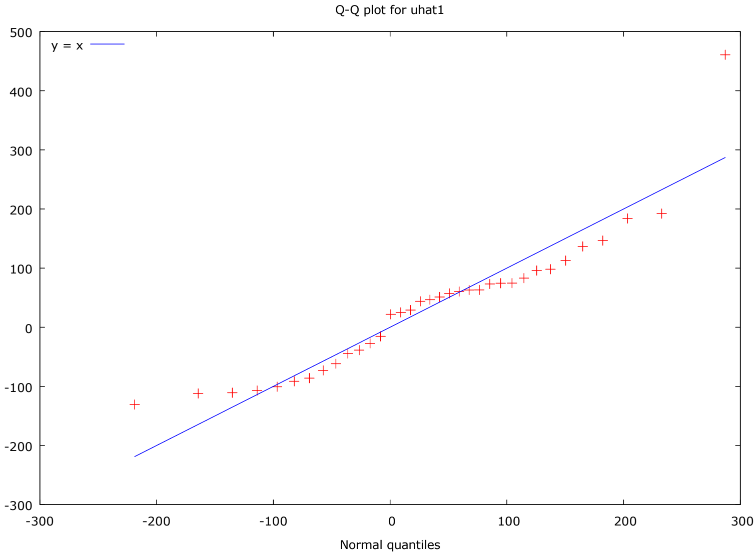
Figure 3 - 95% Confidence Interval Frequency Diagrams

Frequency distribution for uhat1, obs 1-35, CAEN 141
Number of bins = 7, mean = 34, 1335, sd = 117,263

interval	midpt	frequency	rel.	cum.	
< -81,414	-130,71	7	20,00%	20,00%	*******
-81,414 - 17,172	-32,121	6	17,14%	37,14%	******
17,172 - 115,76	66,465	17	48,57%	85,71%	*****************
115,76 - 214,34	165,05	4	11,43%	97,14%	****
214,34 - 312,93	263,64	0	0,00%	97,14%	
312,93 - 411,52	362,22	0	0,00%	97,14%	
>= 411,52	460,81	1	2,86%	100,00%	*

Frequency distribution for uhat1, obs 1-35, CAEN 130
number of bins = 7, mean = 77,6872, sd = 146,454

interval	midpt	frequency	rel.	cum.	
< -6,4841	-49,180	9	25,71%	25,71%	*********
-6,4841 -78,907	36,212	17	48,57%	74,29%	*****************
78,907 - 164,30	121,60	3	8,57%	82,86%	***
164,30 - 249,69	206,99	0	0,00%	82,86%	
249,69 - 335,08	292,39	3	8,57%	91,43%	***
335,08 - 420,47	377,78	1	2,86%	94,29%	*
>= 420,47	463,17	2	5,71%	100,00%	**



The normal Q-Q plot distribution plots are shown in figure 4.

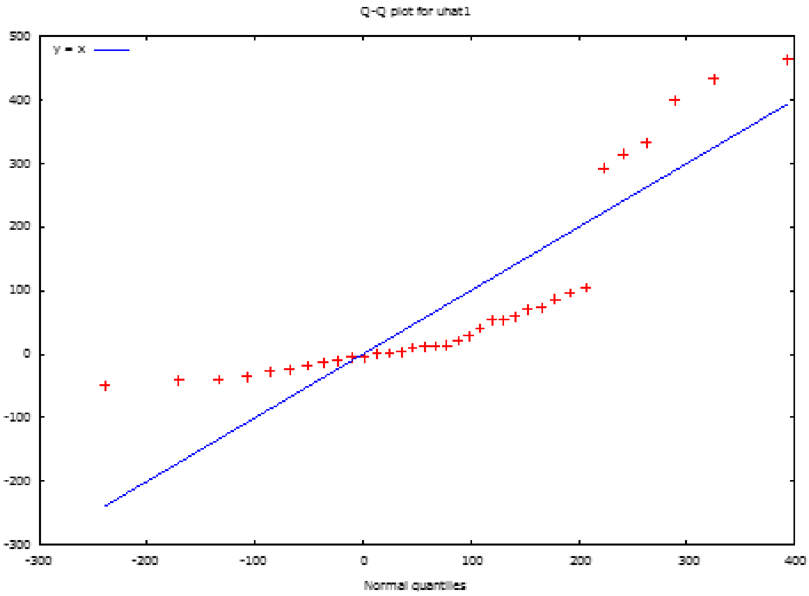


Figure 4 - Distribution from right to trend and histogram distribution

3. Conclusion

Through this work, we presented the mapping of the IAS 41 - Agriculture and related accounting policies on biological assets by main points of interest: IAS 41.24, 25 and IAS 41.30 and an econometric model of financial performance related to stock policy biological assets with phenomenological relief of the stock cycle and their transformation into financial potential depending on the monetary independence reflected by the liquidity fence of the assets held by the agricultural entities.

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