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POTORI Norbert\*, KOVÁCS Máté\*\* and VÁSÁRY Viktória\*

## The Common Agricultural Policy 2014-2020: an impact assessment of the new system of direct payments in Hungary

In Hungary, the rates of direct payments to farmers under the Common Agricultural Policy for the period 2014-2020, the distribution of these payments, and ultimately their impacts on farming decisions, will depend on the combination of mandatory and optional Pillar I support schemes to be introduced in 2015. This paper presents estimations of the structural impact of six new support policy option mixes (scenarios) compared to 2013 (baseline), and discusses the policy implications in terms of the degressivity of direct payments versus the possible introduction of the Redistributive Payment in particular. The calculations of direct payment rates and the distribution of these payments were based on the database of the Hungarian Agricultural and Rural Development Agency for 2011, and the moving averages of the descriptive parameters of farms were obtained from the Farm Accountancy Data Network. To assess the structural impacts an agent-based simulation model was developed. Decisions were modelled at the micro-level and macro-outcomes were modelled as the consequences of these micro-level decisions. From an economic point of view, the Redistributive Payment would have no real advantage over the reduction of direct payments in Hungary as the Redistributive Payment would benefit only farms of relatively small size and would shift funding away from even mid-sized family farms. Furthermore a top-up on the first 30 hectares would neither cause any significant structural changes in arable production, nor in livestock farming. In terms of employment and rural livelihoods, however, the picture might be more nuanced.

**Keywords:** CAP reform, scenarios, allocation of payments, farming structures, Hungary

\* Agrárgazdasági Kutató Intézet, Zsil u. 3-5. 1093 Budapest, Hungary. Corresponding author: [vasary.viktoria@aki.gov.hu](mailto:vasary.viktoria@aki.gov.hu)

‡ Current address: Nemzeti Agrárgazdasági Kamara, Budapest, Hungary.

### Introduction

On 26 June 2013, the European Commission (EC), the European Parliament (EP) and the Council of the European Union (EU) reached agreement on reforming the Common Agricultural Policy (CAP) for the period 2014-2020. This paper contributes to assessing the structural impacts of the new system of CAP direct payments on farmers in Hungary. Since no consolidated legal text has subsequently been published by the EC, our assumptions have had to be based on the information gathered from several other sources, such as the working documents on the proposal for a Regulation establishing rules for direct payments to farmers under support schemes within the framework of the CAP and related issues, published by the Council of the EU (Council of the EU, 2013a-f), and the frequent AGRA FACTS news bulletins about the CAP published by Agra-Europe, Bonn.

In Hungary, the rates of future direct payments and the distribution of these payments, and ultimately their impacts on farming decisions, will depend on the combination of mandatory and optional Pillar I support schemes to be introduced in 2015. There are several important decision options for national agricultural policy makers to be evaluated *ex ante*. The aim of this study is to assist in this process by simulating the adaptation of farmers to some of the possible changes in their support environment, *ceteris paribus*.

For Hungary, the decision on whether to cap the direct payments for individual farms (reducing the amounts higher than EUR 150,000 by at least 5 per cent), or rather opting for a Redistributive Payment (a top-up on the first 30 hectares, amounting to at least 5 per cent of the direct payment envelope of Hungary and not exceeding 65 per cent of the national average payment per hectare) as from 2015 onwards, is considered by policy decision makers and representatives of farming groups to be of key importance from both political and economic aspects. Determining the exact

amount of the subsidy for small farmers within the range of EUR 500-1,250, and defining who can apply for it and how, is of equally high importance. This paper presents estimations of the structural impact of six new support policy option mixes (scenarios) versus 2013 (baseline) in Hungary, and discusses the policy implications in terms of the degressivity of direct payments versus the possible introduction of the Redistributive Payment in particular.

### Agricultural production sectors in Hungary

According to Hungarian Central Statistical Office data, in 2011 the utilised agricultural area (UAA) in Hungary was 5.34 million hectares, while 1.92 million hectares were covered by forests, 65 thousand hectares by reeds and 35 thousand hectares by fish ponds. The arable area totalled 4.32 million hectares, and fruit orchards, vineyards and kitchen gardens occupied around 92, 82, and 82 thousand hectares of the UAA, respectively. The remaining 759 thousand hectares were grassland.

The principal arable crops in Hungary have traditionally been maize, wheat, barley, sunflower and oilseed rape. Normally, the production of each of these would exceed domestic needs by about twofold, thus they represent the bulk of exportable agricultural goods. While in the past maize and wheat had relatively stable sowing areas of 1.2 million and 1.1 million hectares respectively, the area devoted to oilseeds has increased significantly at the expense of other field crops such as barley. In the years following Hungary's accession to the EU on 1 May 2004, the area under oilseed rape has more than doubled to 240-260 thousand hectares, paralleling the boom in biodiesel production within the EU, an industry heavily dependent on rapeseed oil. Thanks to the increase in vegetable oil prices, sunflower has also considerably gained in popularity, lifting the sowing area by around 20 per cent to 600 thousand hectares.

Fruits and vegetables account for over 20 per cent of the value of agricultural production in Hungary. The fruits sector is dominated by apple production with sour cherries, plums, peaches, apricots and pears being next in importance. In the vegetables sector, sweet corn, green pepper, tomatoes and water melons are the major products, with sweet corn, either frozen or canned, being an exportable good of outstanding economic importance.

Livestock numbers in Hungary have been falling for decades. This process was accelerated firstly by the splitting of large cooperatives during privatisation after transition, accompanied by the collapse of the COMECON market where most of the livestock products were sold, and later by EU accession (i.e. the elimination of trade barriers and the termination of direct support to non-ruminants) as well as the dramatic increases in feed grain and oilseed meal prices. According to official statistics, by the end of 2011 the number of pigs had fallen to almost 3 million, this being the lowest figure since 1949, while the number of sows hit an all-time negative record with just around 210 thousand. The declines in cattle raising and milk production appear to have recently been reversed. The number of cattle increased significantly in 2011, reaching 694 thousand in December, the highest level until then since EU accession. The number of dairy cows bottomed out in 2010 and also increased, by 2.1 per cent to 197 thousand, in 2011, while milk production gained 3 per cent in the same year. Nevertheless, only around 82 per cent of the national milk quota was used in the 2011/12 marketing year. The number of suckler cows (including dual-purpose breeds) reached 130 thousand, showing a remarkable 12.1 per cent increase over 2010 as a response to the intense demand for beef cattle from Turkey. The number of ewes declined to 821 thousand in 2011, the lowest since EU accession, representing just over 70 per cent of the national quota. Broiler chickens and laying hens represent 80 per cent of the Hungarian poultry flock. In 2011, the number of broiler chickens was around 33 million (12 per cent less than in 2003), while the number of laying hens fell by 30 per cent to 11.4 million during the same period. In 2011, turkeys and waterfowl (i.e. geese and ducks) numbered around 3 million and 5.6 million, or 30 per cent less and 1 per cent more than in 2003, respectively.

### Application of the Single Area Payment Scheme

Hungary introduced the CAP on becoming an EU Member State. The country opted for the Single Area Payment Scheme (SAPS) as a substitute for all direct payment schemes financed from the Guarantee Section of the European Agricultural Guidance and Guarantee Fund (EAGGF) between 2004 and 2006, and from the European Agricultural Guarantee Fund (EAGF) from 2007 onwards with a decoupled flat rate payment per hectare of agricultural land. The Single Area Payment (SAP) was complemented by a complex system of national direct payments (Complementary National Direct Payments; CNDPs) that favoured arable, ruminant and tobacco farmers the most (Potori and Nyárs, 2007). The amount of the SAP increased from EUR 70.2 in 2004 to EUR 233.0 per hectare in 2013.

Following the mid-term review, or 'Health Check', of the CAP, pursuant to Article 68 of EC (2009), 3.5 per cent of the

Pillar I funds in Hungary were granted to dairy farmers in the form of a re-coupled support, and a further 6.5 per cent were made available specifically for ruminant farmers, as well as for tobacco, rice, and fruits and vegetables producers.

In 2011, the area eligible for the SAP totalled 4,957 thousand hectares, a decrease of over 120 thousand hectares since 2007, when it peaked at 5,081 thousand hectares, and around 40 thousand hectares less than in 2004, the first year of application. In the same period, the number of farms eligible for the SAP declined from 208.5 thousand in 2004 to 176.3 thousand in 2011. The vast majority of farmers giving up agricultural activity were smallholders with an agricultural area less than 10 hectares.

The average size of farms eligible for the SAP was 28.1 hectares in 2011, 4.1 hectares more than in 2004. In Hungary the structure of farming is strongly dualistic (Davidova *et al.*, 2013). Of the 176.3 thousand SAP beneficiaries, only 1.9 thousand had an agricultural area greater than 300 hectares in 2011, but these farms used 39.0 per cent of the 4,957 thousand eligible hectares. At the other end of the scale, 116.5 thousand farms of less than 10 hectares used less than 8.7 per cent of the SAP area.

Within the next multiannual financial framework (European Council, 2013), Hungary could spend around EUR 7.9 billion on direct payments from the EAGF between 2014 and 2020, 25 per cent more than between 2007 and 2013, at 2011 constant prices.<sup>1</sup> This figure represents a 3.0 per cent share of the financial commitments of the EU for direct payments in agriculture.

According to the agreement of 26 June 2013, EU Member States applying the SAPS in 2013, such as Hungary, may continue to do so until 2020 (EC, 2013). Favouring the SAPS, however, does not impede the introduction already in 2015 of any mandatory and optional Pillar I support schemes other than the Basic Payment Scheme (BPS), including the Redistributive Payment and the subsidy for small farmers, as well as the reduction of direct payments. Clearly, the SAPS can be regarded as a temporary alternative exclusively to the BPS. (It should be noted that if Hungary would choose to replace the SAPS with the BPS as from 1 January 2018 at the latest, it could use up to 20 per cent of its annual Pillar I financial envelope to differentiate the per hectare payments until transition. But studying this option was beyond the scope of this paper.)

## Methodology

The calculations of direct payment rates and the distribution of these payments were based on the database provided by the Hungarian Agricultural and Rural Development Agency (ARDA) for 2011, and the moving averages of the descriptive parameters of farms were obtained from the Farm Accountancy Data Network (FADN) which in Hungary is operated by the Research Institute of Agricultural Economics (AKI) in Budapest. The ARDA database comprises data of the 176.3 thousand direct payment applicants while the Hungarian FADN includes around 1,900 farms. The theoretic-

<sup>1</sup> This increase is to be explained by the phasing in of direct payments during the period 2007-2013.

cal base year was chosen to be 2013, and it was equated to 2011. Six new policy option mixes were selected in which payment rates represent the extremes set in the agreement (EC, 2013) on reforming the CAP (Table 1).

**Table 1:** Policy option mixes used to estimate the structural impact of the new system of the Common Agricultural Policy direct support payments on agriculture in Hungary, 2014-2020.

Scenario	Parameters of direct support payments
A	5 per cent reduction above EUR 150,000, and a EUR 1,250 subsidy for all small farmers (mandatory up to a total of EUR 1,250 in direct payments)
B	5 per cent reduction above EUR 150,000, and a EUR 500 subsidy for small farmers (mandatory up to a total of EUR 500 in direct payments)
C	A top-up on the first 30 hectares, amounting to at least 5 per cent of the direct payment envelope of Hungary, and a EUR 1,250 subsidy for small farmers (mandatory up to a total of EUR 1,250 in direct payments)
D	A top-up on the first 30 hectares, amounting to at least 5 per cent of the direct payment envelope of Hungary, and a EUR 500 subsidy for small farmers (mandatory up to a total of EUR 500 in direct payments)
E	A top-up on the first 30 hectares, amounting to 65 per cent of the national average payment per hectare, and a EUR 1,250 subsidy for small farmers (mandatory up to a total of EUR 1,250 in direct payments)
F	A top-up on the first 30 hectares, amounting to 65 per cent of the national average payment per hectare, and a EUR 500 subsidy for small farmers (mandatory up to a total of EUR 500 in direct payments)

We assumed that Hungary will not introduce the optional Pillar I support scheme for areas with natural constraints. As from 2015, voluntarily coupled support may be granted up to 13 per cent of the direct payment envelope of Hungary with a further 2 per cent paid specifically to protein crop producers. We accounted for these amounts but did not allocate coupled support to any of the production sectors because that was beyond the scope of this paper. Based on the results of earlier research (Potori *et al.*, 2013) we transferred 0.5 per cent of the Pillar I funds for an additional payment to young farmers.

To assess the structural impacts of the six new support policy option mixes on agriculture in Hungary, an agent-based simulation model was developed which, in the broad sense, belongs to the family of general equilibrium models (see e.g. Arrow and Debreu, 1954) since prices, supply and demand factors are determined endogenously. This model cannot be classified into the family of applied or computed general equilibrium (AGE/CGE) models (Mitra-Kahn, 2008) because our modelling approach was substantially different: agents aiming at maximising revenue were allowed to be heterogeneous, their objective functions, initial states, or even their choice paradigms could vary. Decisions were modelled at the micro-level and macro-outcomes were modelled as the consequences of these micro-level decisions. As an epilogue to the modelling process, several economic variables were estimated based on the simulation results.

For the modelling process, data were retrieved from the FADN database (Keszthelyi and Pesti, 2012). Each data provider was regarded as an individual decision maker representing a group of similar decision makers in the real economy. The properties of these agents were derived directly from

FADN data. Only the principal agricultural sectors, namely wheat, barley, maize, sunflower and rapeseed production, as well as broiler, turkey, duck, goose, slaughter pig, sow, sheep and beef cattle keeping, and milk production were covered. Multiannual crops and vegetables production were omitted from this modelling exercise either due to their less flexible response, or to being under-represented in the FADN, or to the heterogeneity of production technologies and costs.

The operation of our model can briefly be described in the following steps:

- Loading and construction of data and agents (i.e. producers, consumers, sectors);
- Equilibrium search:
  - based on the initial prices, every agent determines its supply and demand of every produce;
  - the ‘auctioneer’ function calculates the excess supply vector;
  - prices are modified so that the Euclidean norm of the excess supply vector decreases.
- Equilibrium-state conditions (prices and production) are saved, and the effects of the equilibrium state are calculated.

The optimum problems were solved by using the COBYLA algorithm (Powell, 1994). We sought to replicate the CAP regulations precisely in the model which led to ‘badly behaving’ objective functions and boundary condition forms. There are several commonly used methods for equilibrium search (see e.g. Scarf, 1967). Because of these problems, the equilibrium search was transformed into an optimum problem which was then solved using the COBYLA algorithm again. The Euclidean norm of the excess supply vector was minimised.

We assumed that all producer agents optimised their objective functions. For simplification we assumed that all cost functions are linear, none of the agents have applied or will apply for financial credit and the agricultural area managed by every agent remains constant. The demand side was assumed to be represented by demand functions. To help interpret the results, the model outputs are given as annual moving indices.

## Results

In Hungary, the reduction of direct payments above EUR 150,000 by 5 per cent would affect only 225 of the 176.3 thousand farms which received direct payments in 2011. The total of direct payments that could thus be transferred to Pillar II would amount to around EUR 2 million, or EUR 8.8 thousand per farm, without deducting the wages paid to employees with taxes and social contributions. Consequently, the reduction of direct payments by the minimum amount would have no significant impact on large farms.

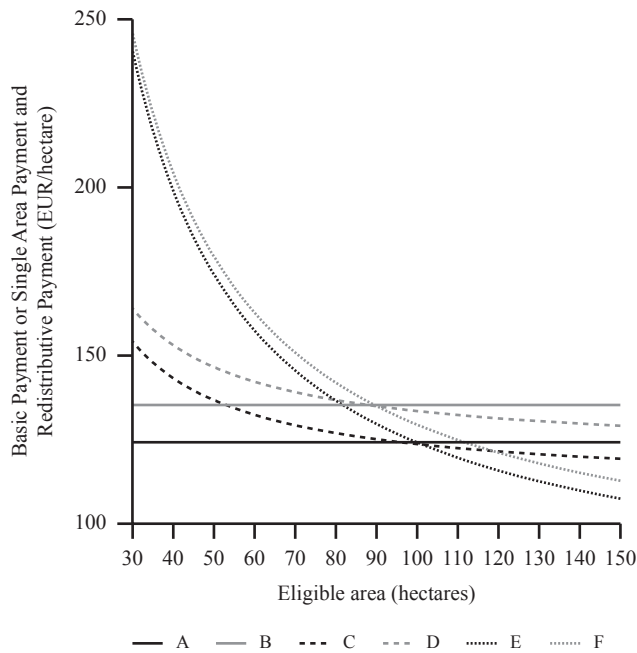
As regards the financing, the number of potential claimants and the per hectare amount of the Redistributive Payment, scenarios C, D, E and F show clear differences (Table 2). In scenarios E and F, this payment scheme would require around 20 per cent of the direct payment envelope of Hungary in contrast to the 5 per cent in scenarios C and



**Table 2:** The size of the Redistributive Payment to farmers under the six different direct payment scenarios in Hungary (claimants of the subsidy for small farmers excluded).

Scenario	Financial envelope of the payment scheme		Potential claimants		Area eligible for the Redistributive Payment used by the potential claimants		Unit amount of payment	
	000 EUR	%	Number	%	ha	%	EUR/ha	%*
A	-	-	-	-	-	-	-	-
B	-	-	-	-	-	-	-	-
C	65,400	5.1	80,249	45.5	1,499,001	30.3	43.6	39.8
D	74,072	5.8	127,536	72.4	1,698,450	34.3	43.6	36.6
E	238,577	18.8	70,909	40.2	1,430,745	28.9	166.8	227.3
F	277,624	21.8	115,839	65.7	1,664,905	33.6	166.8	212.0

\* Expressed in percentages of the Basic Payment per hectare  
Source: Department of Agricultural Policy Research, AKI


**Figure 1:** The break-even point for benefiting from the Redistributive Payment under the six different direct payment scenarios in Hungary.

Note: The break even points for scenarios C and E are where the curves C and E cross line A, while for scenarios D and F the break even points are those where the curves D and F cross line B

Source: Department of Agricultural Policy Research, AKI

D. The number of its potential claimants may range from around 40 per cent (scenario E) to over 70 per cent (scenario D) of the 176.3 thousand beneficiaries of the SAP in 2011. The relationship between the number of the potential claimants in scenarios C and D, and scenarios E and F is explained by the amount of the subsidy for small farms (i.e. EUR 500

**Table 3:** The size of the subsidy for small farmers under the six different direct payment scenarios in Hungary.

Scenario	Financial envelope of the payment scheme		Potential claimants		Eligible area used by the potential claimants	
	000 EUR	%	Number	%	ha	%
A	65,064	5.1	92,882	52.7	252,777	5.1
B	8,934	0.7	45,171	25.6	64,635	1.3
C	68,596	5.4	95,985	54.5	272,138	5.5
D	9,946	0.8	48,698	27.6	73,290	1.5
E	79,561	6.3	105,325	59.8	340,995	6.9
F	13,528	1.1	60,395	34.3	106,835	2.2

Source: Department of Agricultural Policy Research, AKI

versus EUR 1,250). The amount of the Redistributive Payment would be at least around EUR 43 per hectare (scenario D) and it could increase up to EUR 167 per hectare (scenarios E and F). That is, it would be in the range of around 37 to 227 per cent of the Basic Payment.

The break-even point for benefitting from the Redistributive Payment would be around 100 hectares in scenarios C and E, and around 90 hectares in scenarios D and F (Figure 1).

The subsidy for small farms would absorb between 1 and 6 per cent of the direct payment envelope of Hungary (Table 3). Although the share of the potential claimants in the total area eligible for EU direct payments may range from 1 to 7 per cent in the case of this payment scheme, their number could vary between 25 per cent (scenario B) and 60 per cent (scenario E) of the beneficiaries of the SAP in 2011, representing a relatively large proportion which may eventually turn into a majority.

Table 4 shows the extent to which labour intensive vegetable production as well as cattle and sheep keeping would benefit from the Redistributive Payment under the different

**Table 4:** The share of the potential beneficiaries of the Redistributive Payment of the area under vegetables, in dairy production and in the number of other ruminants under the six different direct payment scenarios in Hungary (claimants of the subsidy for small farmers excluded).

Scenario	Vegetables area		Milk production		Suckler cows		Feeder cattle		Ewes	
	ha	%*	.0001	%	No.	%**	No.	%**	No.	%**
A	-	-	-	-	-	-	-	-	-	-
B	-	-	-	-	-	-	-	-	-	-
C	28,409	44.4	130,715	7.8	48,001	37.2	53,823	53.2	442,700	55.8
D	27,811	43.5	117,841	7.1	46,332	35.9	53,149	52.5	424,323	53.5
E	28,762	45.0	132,617	8.0	48,524	37.6	54,118	53.5	449,845	56.7
F	27,934	43.7	122,478	7.3	46,968	36.4	53,350	52.7	428,506	54.0

\* Percentage of the area eligible for the SAP

\*\* Percentage of the total number of the respective ruminant eligible for any direct payment

Source: Department of Agricultural Policy Research, AKI

**Table 5:** The share of the potential claimants of the subsidy for small farmers in the area under vegetables, in dairy production and in the number of other ruminants under the six different direct payment scenarios in Hungary.

Scenario	Vegetable area		Milk production		Suckler cows		Feeder cattle		Ewes	
	ha	%*	.000 1	%	No.	%**	No.	%**	No.	%**
A	5,549	8.7	989	0.1	238	0.2	3,483	3.4	3,968	0.5
B	1,357	2.1	48	0.0	0	0.0	167	0.2	51	0.0
C	6,023	9.4	1,060	0.1	264	0.2	3,722	3.7	4,389	0.6
D	1,537	2.4	64	0.0	0	0.0	193	0.2	51	0.0
E	7,653	12.0	1,374	0.1	369	0.3	4,485	4.4	5,754	0.7
F	2,290	3.6	109	0.0	0	0.0	304	0.3	124	0.0

\* Percentage of the area eligible for the SAP

\*\* Percentage of the total number of the respective ruminant eligible for any direct payment

Source: Department of Agricultural Policy Research, AKI

scenarios. The differences may be considered negligible except for vegetable production (see e.g. scenarios D and E). While the potential claimants of the Redistributive Payment with an eligible area not exceeding the break-even point (Figure 1) would represent only 7 to 8 per cent of total milk production, these farms would possess a considerable 36-38 per cent of the total number of suckler cows, around 53 per cent of the feeder cattle herd, and 54-57 per cent of the ewe flock eligible for any direct payment. They would also cultivate 44-45 per cent of the area under vegetables.

Table 5 shows the extent to which the above mentioned agricultural production sectors would benefit from the subsidy for small farmers under the different scenarios. Here, scenario E could be the preferred choice for small farmers: the smallholders of 12 per cent of the vegetable growing area and more than 4 per cent of the feeder cattle herd would receive some additional funding.

The results of the structural impact assessment of the six scenarios are summarised in Table 6. No significant changes would occur either in arable production or in livestock farming. The area under wheat, rapeseed and sunflower may increase by around 1-2 per cent, and maize may become even more popular with an expansion in area of 4-5 per cent, while the area sown to barley may decrease by 2-2.5 per cent, *ceteris paribus*. Although changes in livestock numbers may differ by the sectors and the scenarios, the estimated values

**Table 6:** Estimated annual percentage changes in the area of the major arable crops and in the number of livestock under the six different direct payment scenarios versus 2013 (baseline) in Hungary.

Scenario	A	B	C	D	E	F
<b>Area</b>						
Wheat	0.4	1.1	0.9	0.8	1.4	1.2
Maize	4.2	5.1	4.7	4.4	5.0	4.6
Barley	-1.7	-2.2	-2.4	-2.0	-2.1	-2.0
Rapeseed	1.8	2.1	2.0	1.9	2.2	2.3
Sunflower	2.1	2.1	2.2	2.0	1.8	2.4
<b>Livestock numbers</b>						
Broilers	-0.1	0.1	0.4	0.7	1.1	-0.1
Turkey	-0.8	-0.4	-0.6	-0.2	-0.4	0.1
Ducks	-0.3	0.1	0.4	0.7	-0.3	0.3
Geese	0.4	0.1	-0.1	0.2	-0.1	-0.2
Slaughter pigs	-0.9	-0.6	-0.4	-0.7	0.1	-0.5
Sows	-1.2	-0.9	-0.7	-0.4	-0.6	-0.7
Feeder cattle	-1.0	-0.8	-0.5	-0.7	-0.4	0.1
Dairy cows	-1.2	-1.0	-1.1	-1.6	-1.3	-0.8
Ewes	-0.8	0.1	0.3	0.1	0.1	-0.6

Source: Department of Agricultural Policy Research, AKI

are in almost all cases around or below 1 per cent and thus the impacts of these scenarios on livestock farming could practically be negligible.

Overall, all of the scenarios would favour arable production. The ruminants sectors may be preferred by payments voluntarily coupled to production which, in the case of Hungary, may take up to 13 per cent of the Pillar I resources.

## Discussion

The new design of the CAP for the period 2014-2020 will provide options for the EU Member States to further increase the complexity of their existing direct support schemes. In this respect the question arises as to whether national governments would rather prefer greater flexibility, i.e. the application of all the possible financial tools, to additional simplification and transparency, i.e. a strict selection of optional direct support schemes. Flexibility at the supranational level does not necessarily translate to flexibility at the national level. A rational economic approach at the national or the regional level may justify the implementation of a smaller number of optional support schemes, and favouring the reduction of direct payments against a top-up on the first 30 hectares of eligible farm land along with the introduction of the subsidy for small farmers.

One of the policy implications of our modelling results is that, in the case of Hungary, the reduction of direct payments as an alternative to the Redistributive Payment may be worth considering. The Redistributive Payment would benefit only farms of relatively small size and would shift EU funding even from farms that fall into the 100 to 500 hectares category, i.e. the mid-sized family farms in Hungary, which are explicitly preferred by the government as it is highlighted in the new Land Transaction Law (Act CXXII of 2013 on the transfer of agricultural lands and lands of forestry) recently passed by the Parliament.

The decision to refrain from the introduction of the Redistributive Payment is also supported by the results of our impact assessment which show that a top-up on the first 30 hectares would neither cause any significant structural changes in arable production nor in livestock farming. (Vegetable production may be encouraged the most in scenario E). It may, however, impose an extra burden on the administration.

From an economic point of view, the Redistributive Payment would have no real benefit over the reduction of direct

payments in Hungary. However, from a social point of view, in terms of employment and rural livelihoods, the picture might be more nuanced. The analysis of the social aspects of the new direct payment schemes was, however, beyond the scope of this paper.

As regards the subsidy for small farmers, the determination of the amount of payment within the range from EUR 500 to 1,250 deserves careful consideration. In Hungary in 2011, farms with less than 30 hectares eligible area represented around 85 per cent of all farms eligible for direct payments. A subsidy level set too high may distort the risk awareness of smallholders, may change their behaviour under uncertainty and may reduce the efficiency of farming. As opposed to the implementation of the Redistributive Payment, the subsidy for small farmers clearly points towards lower administrative costs.

## Acknowledgement

The authors would like to thank Kurics Tamás at AKI, Budapest for his assistance with the modelling work.

## References

- Arrow, K.J. and Debreu, G. (1954): Existence of an equilibrium for a competitive economy. *Econometrica* **22**, 265-290. <http://dx.doi.org/10.2307/1907353>
- Council of the EU (2013a): Working document 13294/13 dated 6 September 2013. Brussel: Council of the EU.
- Council of the EU (2013b): Working document 13294/1/13 dated 25 September 2013. Brussel: Council of the EU.
- Council of the EU (2013c): Working document 13369/13 dated 6 September 2013. Brussel: Council of the EU.
- Council of the EU (2013d): Working document 13369/1/13 dated 25 September 2013. Brussel: Council of the EU.
- Council of the EU (2013e): Working document 13387/13 dated 6 September 2013. Brussel: Council of the EU.
- Council of the EU (2013f): Working document 13387/1/13 dated 26 September 2013. Brussel: Council of the EU.
- Davidova, S., Bailey, A., Dwyer, J., Erjavec, E., Gorton, M. and Thomson, K. (2013). *Semi-subsistence farming: Value and directions of development*. Study. Brussel: European Parliament.
- EC (2009): Council Regulation (EC) No 73/2009 of 19 January 2009. *Official Journal of the European Union* **L30**, 16-99.
- EC (2013): CAP Reform – an explanation of the main elements. Memo/13/621 dated 26 June 2013. Brussel: European Commission.
- European Council (2013): Cover note EUCO 37/13 dated 8 February 2013. Brussel: European Council.
- Keszthelyi, Sz. and Pesti, Cs. (2012): *Results of FADN farms 2011*. Budapest: AKI.
- Mitra-Kahn, B.H. (2008): *Debunking the Myths of Computable General Equilibrium Models*. Working Paper 01-2008. New York: SCEPA.
- Potori, N., Kovács, M. and Vásáry, V. (2013): A közvetlen támogatások új rendszere Magyarországon 2014-2020 között: kötelező elemek és a döntéshozók mozgástere [The new direct payment system in Hungary during 2014-2020: Mandatory measures and options for decision makers]. *Gazdálkodás* **57**, 323-331.
- Potori, N. and Nyárs, L. (2007): EU integration experiences of the agro-food sectors in Hungary, in W. Czartoryski (ed.), *Changes in the food sector after enlargement of the EU*. Warszawa: IERIGZ-PIB, 94-121.
- Powell, M.J.D. (1994): A direct search optimization method that models the objective and constraint functions by linear interpolation, in Gomez, S. and Hennart, J-P. (eds), *Advances in Optimization and Numerical Analysis*. Dordrecht: Kluwer Academic, 51-67. [http://dx.doi.org/10.1007/978-94-015-8330-5\\_4](http://dx.doi.org/10.1007/978-94-015-8330-5_4)
- Scarf, H.E. (1967): The approximation of fixed points of a continuous mapping. *SIAM Journal of Applied Mathematics* **15**, 1328-43. <http://dx.doi.org/10.1137/01151116>