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**Viability of corporate farms in the New Member States under the Common
Agricultural Policy: A game theory approach focusing on rented land**

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Abstract

This paper aims to investigate whether distributional issues within corporate farms in the New Member States (NMS) will be exacerbated by the introduction of the Common Agricultural Policy (CAP) direct payments. The payments are allocated on a per hectare basis under the Single Area Payment Scheme (SAPS), without an obligation to produce at all but providing that the land is kept in good agricultural and environmental conditions. In this context one major challenge faced by the farming sectors in the NMS relates to the viability of their corporate farms, which consist of various stakeholders. As the CAP direct payments will be allocated to farm holdings, they might exacerbate the distributional conflicts among these stakeholders regarding the way profit (including direct payments) is distributed between investment, dividends, rentals and wages. If the stakeholders are not satisfied with the manager's decision to use the payments, they have the option to exit the corporate farm, which may lead to its disappearance. The conflicts between managers and landowners are crucial, as corporate farms rent most of their utilised agricultural area from individual landowners. Before the accession to the EU the landowners did not have strong incentives to withdraw their land, as the other available opportunities were not associated with higher returns on land ownership. However, this situation might change as landowners can cash the direct payments themselves, providing they keep their land in good condition.

The paper focuses on the specific impact of the direct payments on the rent negotiations between corporate farms and private landowners. Game theory is used to model the negotiations between a corporate farm's manager and a representative landowner. The model suggests that the CAP direct payments might induce more rent renegotiations, and that the latter will be successful and thus not followed by withdrawals. Results from a survey of 381 landowners in Slovakia and the Czech Republic corroborate these findings. They indicate a potential change in landowners' behaviour induced by the introduction of the CAP direct payments, namely that more landowners intend to renegotiate their rent level in the next five years. All this leads to the conclusion that the CAP support will not result in the quick disappearance of corporate farms.

Keywords: CAP direct payments, corporate farms, Czech Republic, distributional conflicts, game theory, landowners, Slovakia,

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1. Introduction and context

During the negotiations for accession of Central and Eastern European countries (CEECs) to the European Union (EU) agriculture was one of the most sensitive chapters. The farming sector in these countries plays an important role in the economy and employment. The combined utilised agricultural area of the CEECs-10 is one third of the one in EU 15. However, the structural deficiencies and low productivity of the sector brought about fears that farms would not be able to compete in the single market after the accession. Pre-accession, most of farmers in the New Member States (NMS) have operated very small holdings (large farms are mainly incorporated and are successors of the state and collective farms from the previous system) with low productivity and low farm incomes. In the NMS, individual farms typically have less physical, financial and landed capital than in the EU-15 and often the only item they own is a parcel of land. The average farm size in the eight NMS from Central and Eastern Europe plus Bulgaria and Romania is 5 ha and 27 percent of the land is cultivated by farms smaller than 5 ha. The net farm income per annum per farm in countries where individual farmers prevail varied pre-accession from 2,150 euros in Latvia to 5,600 in Slovenia. The farmers in the candidate countries were hoping that the Common Agricultural Policy (CAP) support, in particular the direct payments granted to the EU 15 farmers, would provide them with funds to improve farming technologies and thus to converge to the EU 15.

The issue of extending the direct payments to the CEECs has been extensively debated. On the one hand, there was a danger that such big transfers to the farmers in the NMS would slow down the restructuring effort and will lock-in farms with structural inefficiencies in agriculture. There was also a danger that such massive injection of money would introduce income disparities between farmers and non-farmers. On the other hand, the exclusion of NMS farmers from the CAP was not politically acceptable and it would not have been compatible with the EU concept of a common policy. The final decision was taken in 2003 and the Treaty of Accession provided for a gradual phase in of direct payments in NMS from 2004 onwards. The Treaty of accession also provided for a slightly boosted (in comparison with the provisions for the EU-15) support to rural development financed by structural funds.

The phasing in of direct payments to the NMS means that, expressed as a percentage of the full payments received by the farmers in the incumbent Member States, CEEC farmers got 25 percent of the payments in 2004, would receive a 5 percent annual increment up to 2007, expressed again as a percentage of the level of payments in the EU-15, and a 10 percent annual increment afterwards. The full convergence of the support level is scheduled for 2013. However, it was also negotiated that the national governments can top-up the payments that come from the EU according to stringent rules monitored by the European Commission. In such cases, the full convergence of the level of payments will be achieved by 2010.

The accession negotiations were only one of the ingredients that shaped the character of the payments granted to farmers in the NMS. The 2003 CAP reform introduced a Single Farm Payment (SFP) that is decoupled from farmers' production choices and thus that is less distortive. Farmers receive a SFP without an obligation to produce at all, but they have to keep their land in good agricultural and environmental conditions. The payments to the EU-15 farmers under the SFP scheme are calculated according to their production in the reference period 2000-2003 and to historic payments. As it was difficult for NMS to determine the historic payments, the national authorities had the option to allocate the direct payments on a per hectare basis under the Single Area Payment Scheme (SAPS). All countries opted for the SAPS, with the exception of Slovenia and Malta which opted for the standard EU SFP scheme (European Commission, 2004).

In the framework of the introduction of the CAP, the farming sectors in the NMS face two major challenges. The first one is whether individual farmers will use the payments for improving their farm performance or will use them for consumption. The second major challenge applies to corporate farms, such as producer co-operatives, joint-stock companies and limited liability companies. Corporate farms consist of various stakeholders (managers, non-land capital holders, landowners and workers) bargaining on the farm's objectives (Brem and Kim, 2000). As the CAP direct payments will be allocated to farm holdings, they might exacerbate the distributional conflicts among these stakeholders regarding the way profit (including direct payments) is distributed between investment, dividends, rentals and wages. Farms' managers have the power to influence the decisions on the use of the payments. Since they derive an increasing utility from the farm growth, they might

prefer to use the payments for the farming business rather than for increasing the returns to the other stakeholders. If the latter are not satisfied with the manager's decision, they have the option to exit the corporate farm. If many stakeholders quit the farm this may lead to its disappearance. The conflicts between managers and landowners are crucial, as corporate farms rent most of their utilised agricultural area from individual landowners.

Before the accession to the EU the landowners did not have strong incentives to withdraw, as the other available opportunities were not associated with higher returns on land ownership. In particular, individual farming was viewed as non-profitable. However, this situation might change as landowners can cash the direct payments themselves, providing they keep their land in good agricultural and environmental condition. Hence, the application of the CAP in NMS raises the question of the viability of the corporate farms, in particular in the countries where they cultivate the majority of agricultural land, e.g. the Czech Republic and Slovakia.

This paper aims to provide an assessment of the potential impact of the introduction of the CAP direct payments on the corporate farms in the NMS, focusing particularly on rented land. Lessons about the viability of these farms will be useful for the present candidate countries, Bulgaria and Romania. In order to investigate this issue, two approaches are used in this study. First, a game theory model is applied as a theoretical framework for the negotiations between the farm managers and landowners about the level of rent. These negotiations are at the core of the issue, as landowners would withdraw their land if they were not satisfied with the level of the rent proposed by the corporate farm. Second, the conclusions from the theoretical model are confronted with results from a survey of landowners in Slovakia and the Czech Republic.

2. Theoretical representation: the game between managers and landowners

The game

In order to investigate the distributional conflicts concerning land, game theory is used to model the rent negotiation process within the corporate farms between two representative players, the manager and a landowner. This game is designed in a way that allows it to be an appropriate representation of the negotiation process that

usually occurs in the corporate farms. The conclusions about the game's solution are subsequently revised in the light of the introduction of direct area payments.

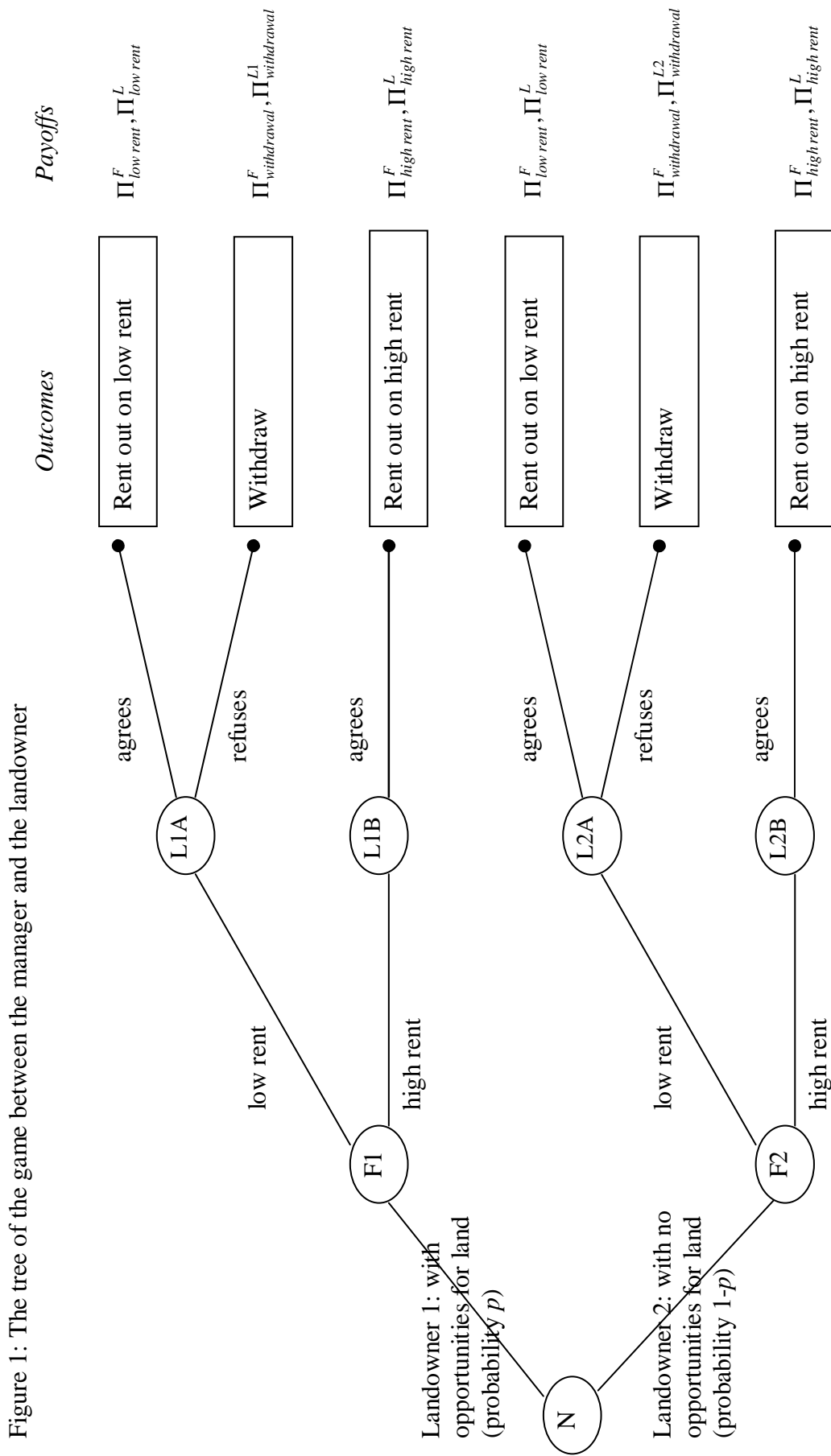
The game is represented in its extensive form by the tree depicted in Figure 1. It is a sequential non-cooperative game, where players move one after another. The farm's manager is F, who makes the first move by announcing to the landowner, L, the level of the rent. It is assumed that only two offers are possible, a low rent and a high rent. The low rent is the rent that is usually paid to the landowners, while the high rent includes an increase following a renegotiation. Once the manager has played, the landowner decides whether to accept or to refuse the proposed rent. If they accept, the game ends and the land is rented at the agreed rent level. If they refuse, the game also ends but the rental contract is terminated and the land is withdrawn. However, this can only happen when low rent is offered. When high rent is offered, it is assumed that the landowner never refuses it. In other words, the high rent always matches the landowner's expectation; it is not less than what the landowner could get elsewhere. The landowner's decision of accepting or refusing the level of rent proposed by the manager depends on whether they have a better opportunity elsewhere for their land. This is modelled here by introducing two types of landowners. Type 1 is a landowner who has a better opportunity for the land outside the corporate farm. For example, another farm might have offered a higher rent, or they might be able to obtain a higher payoff by farming the land individually or by receiving the CAP direct payments without producing. In other words, such a landowner represents a credible threat of withdrawal. By contrast, the type 2 is a landowner who has no better opportunity for their land elsewhere and there is no credible threat of withdrawal. Let us denote the probability that the landowner is of type 1 (credible threat) by p , that is to say the proportion of type 1 landowners in the population. $(1-p)$ is hence the probability of landowner of type 2 (no credible threat). In the game tree in Figure 1, Nature (N) actually plays the first move of the game by randomly choosing the type of landowner. Both paths from nodes F1 and F2 are similar, what is different between the two paths is the probability p or $(1-p)$ and some payoffs.

There are four possible strategy profiles for the game and hence four possible payoff vectors (Table 1). Table 1 offers an alternative representation to the game tree, showing the actions available to each player. From the tree in Figure 1 it is clear that the farm's manager can choose between the two actions "offer low rent" and "offer

high rent”. As for the landowner, the tree shows that they can either agree or refuse. This is based on their willingness to accept a low or high rent. Hence, the process can alternatively be viewed as the manager and landowner meeting together once to decide about the level of the rent and making simultaneous offers. The landowner would then ask either for a low rent or for a high rent, hence the two possible actions “low rent” and “high rent” in Table 1.

Table 1: The payoff vectors of the game

		LANDOWNER	
		Low rent	High rent
FARM	Low rent	$\Pi_{low\ rent}^F, \Pi_{low\ rent}^L$	$\Pi_{withdrawal}^F, \Pi_{withdrawal}^L$
	High rent	$\Pi_{high\ rent}^F, \Pi_{high\ rent}^L$	$\Pi_{high\ rent}^F, \Pi_{high\ rent}^L$



N: Nature. F: corporate farm's manager. L: landowner.

If both players choose the action “low rent” or if both players choose the action “high rent”, they reach an agreement. The landowner rents the land out to the farm for the specific rent level agreed upon. If the landowner asks for a low rent while the farm’s manager proposes a high rent, it is straightforward to assume that there is an agreement on renting the land at the high rent. Finally, if the farm’s manager offers a low rent but the landowner asks for a high rent, there is no agreement on the level of rent and the rental contract is ended. The landowner withdraws their land from the farm.

The payoffs for each player and strategy are not explicitly written here, but assumptions about their ranking have been made in order to solve the game. The farm manager prefers to give a low rent than a high rent to the landowner. However, the land withdrawal is costly for the farm as it reduces the area farmed and consequently decreases the revenue and farm profit. Therefore, the farm’s withdrawal payoff is less than the payoff in the worse case of an agreement on the rent (i.e. with high rent):

$$\Pi_{low\ rent}^F > \Pi_{high\ rent}^F > \Pi_{withdrawal}^F . \quad (1)$$

As far as the landowner is concerned, whatever the type they are, they prefer to receive a high rent instead of a low rent. But the payoffs when a withdrawal occurs are different. The payoff of type 1 (credible threat) landowner in the case of a withdrawal is greater than the payoffs in the case they rent land to the corporate farm. On the contrary, the payoff of type 2 (no credible threat) landowner in the case of a withdrawal is strictly less than the payoffs in the case they rent land to the corporate farm:

$$\Pi_{withdrawal}^{L1} \geq \Pi_{high\ rent}^L > \Pi_{low\ rent}^L \quad (2)$$

$$\Pi_{high\ rent}^L > \Pi_{low\ rent}^L > \Pi_{withdrawal}^{L2} . \quad (3)$$

Players choose to play the strategy that maximises their payoff. The type 1 landowner is indifferent between receiving a high rent in the corporate farm and withdrawing the land, but rules out renting out the land to the corporate farm for a low rent. In other words, if the farm plays “low rent”, the landowner’s best response is to play “high rent”, and if the farm plays “high rent”, the landowner is indifferent between “low rent” and “high rent”. Therefore, to ask for a high rent is a strongly dominant strategy,

as it will be played by the landowner regardless of what might be played by the opponent (Rasmusen, 1994). Similarly, the type 2 landowner's strongly dominant strategy is to ask for a low rent in order to avoid the termination of the rental contract.

There is no dominant strategy for the manager as their payoff maximisation depends on the landowner's strategy. The manager has a set of two best responses. If the landowner plays "low rent", the manager's best response is "low rent", but if the landowner plays "high rent", the manager's best response is "high rent". If the landowner's type is common knowledge, the manager knows about the type of landowner they face and hence knows which action will be taken by the opponent. Therefore, in the case of a type 1 (credible threat) landowner, both players choose to play "high rent" and the outcome is that land is rented out for a high rent. In the case of a type 2 (no credible threat) landowner, both players choose to play "low rent" and the outcome is that land is rented out for a low rent. This means that, in reality, if the manager has information about the landowner's type, the land always stays in the corporate farm. If the manager cannot identify the opponent's type, several outcomes are possible. It is assumed that, despite this information asymmetry, the manager knows the prior probability of the landowner's types, p and $(1-p)$. Hence, the manager knows that "high rent" will be played by the opponent with probability p , and "low rent" will be played with probability $1-p$. The manager will thus play the strategy that brings the greater expected payoff. If the manager plays "low rent", respectively "high rent", their expected payoff would be $E\Pi_{low\ rent}^F$, respectively $E\Pi_{high\ rent}^F$, where:

$$E\Pi_{low\ rent}^F = (1 - p)\Pi_{low\ rent}^F + p\Pi_{withdrawal}^F \quad (4)$$

$$E\Pi_{high\ rent}^F = (1 - p)\Pi_{high\ rent}^F + p\Pi_{high\ rent}^F = \Pi_{high\ rent}^F . \quad (5)$$

Whether $E\Pi_{low\ rent}^F$ is smaller or greater than $E\Pi_{high\ rent}^F$ is specific to each farm as it depends on the value of the payoffs $\Pi_{low\ rent}^F, \Pi_{high\ rent}^F, \Pi_{withdrawal}^F$. Hence, all three outcomes are possible but their frequency depends on the value of the probability p .

The effect of the CAP direct payments

The game theory framework presented above allows draw conclusions about the outcomes that are likely to arise from the conflicts of interest that occur within the

corporate farms about the level of rent. When landowners are not satisfied with the level of rent they receive, they may ask for a rent increase, thus play “high rent”. The described game is hence appropriate to represent these rent renegotiations. It suggests three potential outcomes.

1) No change in the rent level (game outcome “low rent”)

The game predicts that this outcome is likely to happen in reality whatever information the manager has about the opportunities of the landowner elsewhere. However, the larger the proportion of landowners with better opportunities elsewhere (credible threat), the less frequent this outcome will be.

2) Increase in the rent level (game outcome “high rent”)

The game predicts that this outcome is also likely to happen in reality whatever information the manager has. The larger the proportion of landowners with better opportunities elsewhere, the more frequent this outcome will be.

3) Withdrawal of land (game outcome “withdrawal”)

The game predicts that this outcome would be only observed for farms whose landowners have better opportunities elsewhere but this is not known to the manager. However, the whole game has been based on the assumption that the farm is able to offer two levels of rent low and high. If the farm is financially constrained and cannot afford a rent increase, the game reduces to the upper half of Table 1. In such a situation, in the case of a type 2 landowner (no credible threat) the solution will still be land rented for low rent, but in the case of a type 1 landowner (credible threat) the solution will be withdrawal. Hence, the outcome withdrawal can happen for any farm which is financially constrained and hence cannot afford a rent increase.

In practice, before the accession to the EU and CAP implementation, Outcome 1 (no change in rent) prevailed. Most landowners did not have better opportunities for their land elsewhere as private farming was unprofitable and corporate farms were not able to compete with each other in terms of rent level. Hence, Outcome 2 (rent renegotiation) was infrequent. As for Outcome 3 (land withdrawal), this might have happened, but only due to the reason that farms were financially constrained. The other possible reason, namely asymmetric information, seems less realistic. Within the traditional village and community life in Central and Eastern Europe, the managers probably have had sufficient information about their landowners (social and

values characteristics) and their plot (size, location and quality), and about the other neighbouring farms that might have offered higher rent. Therefore the managers should have been able to decide about the type of the landowner.

From the model, it can be predicted that the introduction of the CAP direct payments in the NMS might decrease the frequency of Outcome 1 due to two reasons. First, more landowners might be able to put a credible threat of withdrawal. Landowners are now entitled to the single area payments without the requirement to produce. These payments might hence give incentives to landowners to manage their land themselves if the profit from it were to exceed the rent they receive in the corporate farms. Also, the land might become more attractive and valuable, and landowners might be offered a higher rent elsewhere (e.g. by individual farmers) or a high selling price. That is to say, the probability p of type 1 landowners might increase. Therefore, the first outcome “no change in the rent level” is less likely to be observed since enlargement. In other words, it can be expected that more landowners will ask for a rent renegotiation. The question is whether this would lead to rent increases or withdrawals. On the one hand, withdrawals can occur if landowners have private information about their opportunities, unknown to the managers. In reality, this situation might however be rare, as explained above. On the other hand, withdrawals can occur in farms that cannot financially afford to increase the rents. Although this was highly probable during the transition due to the low profitability or the loss-making of corporate farms, the introduction of direct payments is expected to relax the financial constraints. Hence, the third outcome “withdrawal of land” is less likely to occur after the introduction of the CAP direct payments.

3. Results from a survey in Slovakia and the Czech Republic

In order to cross-check the theoretical findings from the game theory approach, a survey was undertaken in Slovakia and the Czech Republic in spring 2005. A questionnaire was sent to owners of land in corporate farms. The questions related to the owners' past behaviour and their future intentions within a five-year horizon regarding rent renegotiation and land withdrawal. 381 landowners were surveyed, including 183 in Slovakia and 198 in the Czech Republic. Table 2 presents some characteristics about the plots of the respondents. In both countries the average size of

the plots is very small, less than four hectares, with a maximum of 45 hectares in the Czech Republic. The inheritance law in both countries, which allows land to be split between heirs, helps explain this fragmented structure. The annual average rent received per hectare is about 11 euros in Slovakia and 35 euros in the Czech Republic, which is larger than the national averages (e.g. 22 euros in the Czech corporate farms in 2003; VUZE, 2004) but low in comparison with some other countries (e.g. 115 euros in France 2002; Agreste, 2002).

Table 2 also provides information about the past rent renegotiations and land withdrawals. Very few respondents were offered a higher rent for their plot outside the corporate farm in the past two years, 1 percent in Slovakia and 5 percent in the Czech Republic. This suggests that opportunities for increases in returns on land ownership were limited. This may explain why less than 4 percent of the landowners in both countries have asked for a rent increase in the past two years. The increase requested was on average 87 percent of the rent in Slovakia and 53 percent in the Czech Republic. Most of the landowners justified this demand by the fact that other landowners in the corporate farm had had their rent increased. However, overall only one request (in Slovakia) was accepted. For the remaining, the increase requested was not accepted due to financial constraints in the corporate farm. Eventually, all these landowners decided to keep the land in the corporate farm despite the stagnation of the rent level, except one who withdrew it.

Concerning past withdrawals, 5 percent of the Slovak landowners and less than 3 percent of the Czech landowners withdrew some land from the corporate farm in the past five years. In Slovakia they wanted to start their own farm and did so, while in the Czech Republic they were forced to take their land back due to the corporate farm going bankrupt. They then rented their land to another farm or sold it. Most of the other respondents never considered withdrawing their land because there were not better opportunities elsewhere in terms of the level of rent or profit from individual farming. In addition, they preferred to have their land managed by somebody else.

Table 2: Results from the survey of landowners

	Slovakia	Czech Republic
Number of landowners surveyed	183	198
Characteristics of their land in the corporate farms		
Size of the plots owned (ha)		
Average	1.68	3.21
Minimum	0.01	0.03
Maximum	12.05	45.00
Annual rent per ha (euros)		
Average	10.8	35.4
Minimum	1.3	0
Maximum	38.7	198.8
Past behaviour with respect to their land		
Share of landowners who were offered a higher rent elsewhere in the past 2 years (%)	1.1	5.1
Share of landowners who asked for a rent increase in the past 2 years (%)	3.9	2.8
Increase asked (% of current rent)	87%	52.5%
Average		
Minimum	50%	5%
Maximum	200%	100%
Share of landowners who had their request accepted (%)	0.5	0

Share of landowners who withdrew land in the past 5 years (%)			2.8
Size of the land withdrawn (ha)		5.0	1.21
Average		16.20	0.24
Minimum		0.60	2.42
Maximum		50.00	
Future behaviour with respect to their land			
Share of landowners who, due to CAP direct payments, consider in the next 5 years (%):			
A) changing their behaviour with respect to their land, including:		20.2	37.3
asking for a rent increase		6.6	19.2
withdrawing land		7.0	5.0
either of these		6.6	6.1
B) not changing their behaviour with respect to their land		79.8	69.7

Finally, Table 2 reports the results from the last part of the questionnaire, which focused on the landowners' intentions within a five year horizon in the CAP context. The modalities of the CAP direct payments were explained to the respondents, although most of them seemed to be well aware of them. Landowners were then asked whether the introduction of CAP direct payments in their country would affect their behaviour towards the corporate farm in which they were renting land. While the majority claimed that their behaviour would not be influenced, 20 percent in Slovakia and 37 percent in the Czech Republic admitted that they would consider renegotiating their rent or withdrawing. However, only a few of them would consider withdrawing their land (7 and 5 percent respectively).

5. Conclusion

The widespread existence of corporate farms in the NMS has raised doubts about their viability under the decoupled direct payments introduced by the CAP in 2004. The preference of the newly emergent landowners in the 1990s to leave their land in the corporate farms was linked to the low level of farm profitability and a high risk in the economic environment. The accession to the EU and the introduction of the CAP support, and in particular direct payments per hectare, have improved the market conditions in these countries and have increased farm incomes. The main question is whether under these circumstances the landowners would still prefer to leave their land in the corporate farms, or whether a quick disintegration of these organisations will be witnessed. This paper develops a theoretical framework about the negotiations between a corporate farm's manager and an individual landowner about the level of the land rent.

The theoretical model suggests that the CAP direct payments might induce more rent renegotiations. Overall, these renegotiations will be successful and thus will not be followed by withdrawals. However, the renegotiations may take a long time to gain speed. In addition, most of the landowners own small parcels of land and direct payments in the NMS are currently relatively low due to the phasing in. Hence the direct payments per landowner, if withdrawing land for individual management, might not be enough to offset the costs of maintaining the land in good agricultural

and environmental condition (in this respect much will depend on the level of enforcement in the NMS).

The results from the survey of land owners in corporate farms in Slovakia and in the Czech Republic seem to corroborate the findings from the theoretical game. Before the accession, very few landowners asked for a rent increase or withdrew land, confirming that the first outcome “no change in the rent level” was the prevailing one. The survey also indicated a potential change in landowners’ behaviour induced by the introduction of the CAP direct payments. More people intend to renegotiate the rent level, while only a few intend to withdraw their land. Hence, the survey confirms that the second outcome “increase in the rent level” predicted by game theory might be the prevailing one following the introduction of the CAP direct payments.

Hence, the research suggests that the CAP support will not result in the quick disappearance of corporate farms and that their future will depend on their competitive position in the same way as the competitive forces shape the future of the individual farms in the NMS.

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