



# Passive farming and land development: A real options approach

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## ABSTRACT

The EU's farmers are no longer required to produce commodities to receive direct payments as long as they keep their land in good condition. Some believe this is bad for development because it encourages passive farming. We evaluate, using a real options approach, the implications of decoupled payments for the desirability and optimal timing of agricultural land development when considering sunk investment costs and uncertain future returns. We find that decoupled payments accelerate development while passive farming increases, by adding managerial flexibility, the value associated with land. We then use the Nash bargaining solution to identify the rental share to be paid for leasing land. We show that a deal for the lease of land can always be reached, but that the facility to use passive farming as an outside option allows landowners to extract policy rents, thereby undermining the potential for the Basic Payment Scheme to support tenant farmers' incomes.

## 1. Introduction

The Common Agricultural Policy (CAP) has influenced agricultural development in Europe since its inception in 1962, and has undergone several major reforms to mitigate its negative effects on markets and trade, the environment and its budgetary cost as well as in response to new goals (Phelps, 2007). Modern goals include preserving cultural values associated with agricultural landscapes and ensuring agricultural land is kept in reserve for potential future use (food security) by avoiding land abandonment. To meet these challenges the Mid-Term Review or 2003 reform brought with it a fundamental change in the basis for making Pillar I direct payments to farmers, in that these were decoupled from production (Cunha and Swinbank, 2009). As a consequence, farmers today need not produce commodities to receive payments by way of the Basic Payment Scheme (BPS). Nevertheless, they must satisfy the basic provisions of Regulation (EU) No. 1307/2013 (EU, 2013), which implies that farmland that has been abandoned or overgrown will not qualify for payments. For land to qualify for payments it must be kept in Good Agricultural and Environmental Condition (GAEC hereafter), meaning that it could readily be taken into production if sufficient demand for food arose.

Considering that CAP consumes almost 40% of the EU budget or €54

billion annually and in turn, direct payments 72% or €41 billion of the annual CAP budget (EC, 2017), it is crucial to understand how decoupled payments influence agricultural development,<sup>2</sup> and the potential for capitalization of these payments in land values and rental prices, and hence the potential for these to contribute to achieving CAP goals.

Following its introduction in 2005, the decoupling of payments opened the way for the development of so-called passive farming, as opposed to active farming, whereby a farmer manages their entire agricultural area to meet the GAEC obligation without producing commodities, e.g., grass-sown fallow (Brady et al., 2017). Currently, as much as 10% of the agricultural area in some EU regions, primarily marginal regions, is managed passively (Trubins, 2013; SCB, 2016). Within the industry, the emergence of passive farming is perceived as a bad thing because it is thought to be hindering agricultural development, since active farmers are presumed to be denied access to land that could be used for farm expansion (Vernersson, 2012; LD, 2014, p. 112; Wahlberg, 2014). In chorus, the land managed by passive farmers is referred to as being underutilized or blocked because it could, ostensibly, be used for producing commodities by expansion-willing active farmers (LRF, 2009). Thus from their perspective, society is not served by a general land management payment: it benefits passive farmers to

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<sup>2</sup> Note that, of course, CAP support is not the only factor influencing EU land markets. Other relevant factors include the profitability of production, land-use competition, ownership and production structures and the institutional setting of land markets (see Ciaian et al., 2010).

the detriment of agricultural development.

Indeed decoupled payments have resulted in more farmers remaining longer in the sector (Brady et al., 2009; Ciaian et al., 2010) and thus slowing structural change, which is an integral aspect of agricultural development. However, the extent to which the possibility for landowners to choose passive farming might be bad for development, if at all, is unclear. In an initial study Brady et al. (2017) show that passive farming occurs, generally, because active farmers are not willing to meet landowners' minimal rental prices as a result of the inherently poor profitability of commodity production on marginal land. As payments are decoupled, it is therefore rational for the landowner to manage their land passively rather than abandoning it, and thereby meeting a CAP goal.

However, this analysis, conducted in a static and deterministic framework, will miss the potentially significant implications that decoupling may have on the value associated with land development as well as on the land-rental bargaining process when a stochastic and dynamic setting is adopted. This is because agricultural land development is, essentially, an investment characterized by (i) sunk costs; (ii) uncertain future returns evolving over time; and (iii) the potential to delay the timing of development (Feil et al., 2013). Hence, as real-world investment decisions are usually heavily influenced by these three characteristics, agricultural land development should be evaluated taking a real-options approach, rather than being based on a static net-present-value calculation. This approach, in fact, allows taking into account that a farmer may prefer postponing land development until a particular threshold is passed: where the expected returns associated with the contemplated project have reached a level covering the investment cost and the value of the flexibility about the timing of investment, which is implicitly foregone once the decision to develop is taken. In the presence of investment irreversibility and uncertainty about future returns, this managerial flexibility is, as well-known, precious and increases the land's value.<sup>3</sup>

The contribution of this paper is two-fold. We first aim to evaluate the implications of the BPS for agricultural land development when considering sunk investment costs and the inherent uncertainty of economic returns from farming. This is done by investigating in a real-options framework the impact that the decoupled BPS payment may have on (i) the optimal timing of land development/investment and (ii) the value of land. Second, once the value of land in the presence of the BPS is determined, we study, by considering the bargaining between a landowner and a potential lessee, (iii) the ease with which land, to be actively farmed, can be leased or purchased, (iv) how the value of land is distributed between the parties and (v) to what extent the BPS payments capitalize into land rental prices.

Concerning the first aim, the literature that we consider close to our work is the study of the impact of subsidies on the timing of investment and project value in a real options frame (see e.g. Pennings, 2000). In general, in this literature, the main question concerns how one may, through a subsidy, foster the switch from a specific productive regime (or state) to an alternative one targeted by the policymaker. The subsidy may for instance be paid in order to encourage the afforestation of degraded land (see e.g. Thorsen, 1999), the cultivation of energy crops (see e.g. Song et al., 2011; Musshoff, 2012), the switch from conventional to organic farming (see e.g. Kuminoff and Wossink, 2010) or the conservation of habitat (see e.g. Schatzki, 2003; Isik and Yang, 2004). As shown in the literature the subsidy fosters, by making the targeted regime more attractive, the transition. Therefore, in a very stylized fashion, the main point is that the policymaker can by “calibrating” the magnitude of the subsidy “control” the timing of the switch from a specific current regime to an alternative one that is considered more desirable.

<sup>3</sup> See Dixit and Pindyck (1994) for a complete treatment of the theory of investment under uncertainty and irreversibility.

By investigating the BPS and the possibility to choose passive farming we broaden the policy context to consider a wider set of potential land uses. These uses are, again, in a very stylized fashion, categorized explicitly in our model as “active” and “passive” farming. Both farming regimes are assumed to achieve the GAEC obligation, and hence qualify for the BPS payment, as in reality. In this respect, the only assumed difference is given by the fact that while active farming qualifies automatically for the payment, some minimal but costly maintenance practices must be undertaken when land is passively farmed. A land manager (the landowner or lessee) then, as far as the mere entitlement to the payment is concerned, may contemplate two potential land uses. Thus, the BPS payment provides managerial flexibility, when it comes to the use of land, compared to the pre-2005 coupled payment scheme. Since the proper evaluation of land development must include both current and future potential uses, it becomes then interesting to study the impact that this flexibility has on land values and the likelihood and timing of the transition between passive and active farming. In this respect, we find that the BPS, in line with the previous literature, fosters land development if compared to a scenario where no policy is in place. The opportunity of receiving a payment, in fact, (i) lowers, by providing a substantially risk-free return, the volatility of the total future returns, i.e. profits from active farming plus BPS payments, and (ii) reduces the burden of the investment cost associated with land development. This in turn makes an earlier exercise of the option to invest/develop profitable. The anticipation of land development induced by the BPS depends, however, on the wedge between the net payments received as “active” rather than “passive” farmer, i.e. BPS payment and BPS payment minus compliance costs, respectively. The opportunity of receiving a payment as a passive farmer in fact makes postponing the exercise of the option to develop, i.e. choosing “active” farming in the future, less costly. The parallel, in financial terms, is straightforward: the land manager, holding a call-like investment/development option, is paid a dividend, i.e. the payment that is conditional on keeping the call option open. Hence, when evaluating the exercise of the option to develop, the net payment received for passive farming represents, as it would be implicitly foregone if the option were exercised, an opportunity cost that must be taken into account. It follows that the higher the net payment cashed for passive farming the later land development occurs. This result has important implications since, as shown later in the paper, it would be possible to foster land development by reducing, having incentive compatibility as the only limit, the net payment accruing to passive farmers. Finally we show that the BPS has, using once again a scenario with no policy in place as the benchmark, also a positive impact on the value of land and that both parties are better off. The increase in value is of course related to the fact that the land manager is entitled to a payment irrespective of the actual state of the land (passive or active farming). More specifically, having the payment decoupled increases the value of the land asset by (i) increasing the value of the investment option associated with the asset and (ii) providing risk-free income support over time.

Once determined the value of land in the presence of the BPS, we model the bargaining process between a landowner and a potential lessee for the lease of a specific land parcel. As we intend to reproduce the perceived situation that passive farming is blocking development, we assume that the landowner is not willing to take initiatives in terms of land development but is able to meet, by undertaking the required minimal maintenance practices, the GAEC obligation and qualify for the payment as a passive farmer. In contrast, the potential lessee is willing to invest and develop land for agricultural activities if it is beneficial to her. If the land is cultivated (developed), the GAEC obligation will be automatically met and the BPS payment paid. However, as discussed above, due to uncertainty characterizing the returns from farming, land may, once leased, not necessarily be immediately worth developing. If this is the case, the lessee may in the meanwhile qualify for the payment, by managing the land passively. As one can immediately see, the BPS is providing the landowner with an alternative to the lease of his

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