Operational planning in arable farms –
The effects of income tax

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Abstract

Rationally acting farmers focus their short term-efforts on optimising payment flows. Farmers can make use of their cash-flow after taxation, so it is essential to consider taxes in the business planning process. The Austrian income tax legislation offers several possibilities to ascertain the taxable income of agricultural businesses. These include flat-rate methods, which are either based on a percentage of the taxable value or the total receipts. This study analyses the influence of these two methods on the optimal short-term product range of arable farms. Necessary changes in crop rotation are determined. The results illustrate that it is necessary to select the product range according to the taxation system.

Keywords: arable farm, business planning, income tax, product range

1. Introduction and conceptual formulation

The integration of income taxes in the micro-economical business planning process is "state-of-the-art" in scientific discussions and the practical corporate management. It is generally accepted that post-taxation performance data is decisive for investors and entrepreneurs (SCHWINN, 1933, KUßMAUL, 1998). However, specialised agricultural literature, textbooks and even the practical agricultural management models often do not take tax issues into consideration. One possible

reason for this tendency could be the fragmented structure of the agricultural sector and the resulting low tax volume of farmers.

When determining the income generated in the agricultural and forestry sectors special agreements regarding an ascertainment of profits based on a flat-rate[1] system have to be considered, as these affect the vast majority of agricultural enterprises. These special agreements have to be included in the operative business planning process – especially in the production planning phase. This contribution, starting with a short description of the specialised agricultural tax legislation in Austria, offers a theoretical explanation of the effects the ascertainment of profits has on the cultivation strategy of arable farms. Furthermore, it analyses the effects of the tax factors with a practically-orientated, linear planning model for a model farm. The chosen approach integrates the success taxes simultaneously.

2. Ascertainment of profits and income taxation for Austrian agricultural enterprises

In principle the Austrian tax legislation sees the comparison of business assets as the basis for the ascertainment of profits (DORALT, 2003). However, the framework of the flat-rate clause offers those agricultural businesses that do not exceed a certain assessed value the possibility to take advantage of a full or partial flat-rate scheme (Table 1). The main reason for the introduction of such flat-rate systems is the desire to simplify the process of ascertaining farm income (DORALT, 2005).

Only roughly 5% of the 217,000 agricultural enterprises in Austria engage in an accountancy process (STATISTIK AUSTRIA, 2001). This means that roughly 95% ascertain their profits via a flat-rate approach. The basis of a full flat-rate ascertainment is the assessed value. This value is allocated to every Austrian agricultural business by the respective tax authorities. The assessed value, as a standardised earning-capacity value, mirrors the natural and economic earning conditions (BMLFUW, 2004, 282). The fiscal profit of an agricultural

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[1] The flat-rate refers to the determination of the taxable income. It does not concern the Austrian income tax tariffs which are progressive.

enterprise currently stands at an equated rate between 37% and 45% of the assessed value. Transferred social security payments, interest paid on debts, lease interests for land and costs caused by auxiliary services to affiliated individuals after handing over an agricultural unit can be exempt from taxation[1]. As of assessment year 2006, the uniform base value is set at 39% of the assessed value[2].

Table 1: Determination of the taxable income in Austrian agriculture

	Flat-rate methods		**Income-expenditures statement**	**Double entry accounting**
	Full-flat rate	**Part-flat rate**		
Assessed value (AV) in €	< 65,500	65,500-150,000	< 150,000	> 150,000
Turnover in €				> 400,000
Income based on	37-45 % of AV	30 % of receipts	actual values	

Source: JILCH, 2002, 27

The partial flat-rate scheme can be seen as an income-expenditure statement based on standardised, income-dependent business expenses. Farmers using this method therefore have to ascertain their income. The profit is defined by taking 30% of this income and deducting the same items used in the full flat-rate approach. The tax base is defined by the total income of a tax-payer over an entire year and is then taxed simultaneously. Under consideration of allowances and deductibles the income tax is ascertained following the progressive tax tariffs illustrated in Table 2.

Table 2: Charging of the progressive income tax[3]

Amount of taxable income	Term
> 10 000 €- 25 000 €	[(taxable income – 10 000) x 5 750] / 15 000
> 25 000 €- 51 000 €	[(taxable income – 25 000) x 11 355] / 15 000 + 5 750
> 51 000 €	(taxable income – 51 000) x 0.5 + 17 085

[1] §§ 2 and 13 LuF PauschVO 2001, BGBL II 2001/54.
[2] § 2 LuF PauschVO 2006, BGBL II 2005/258.
[3] § 33 (1) EStG. 1988

As the full-flat-rate method is dependent on the assessed value, the fiscal profit does not, with the exception of the financing influence, depend on the production of the enterprise. Contrary to this, the partial flat-rate scheme is a generalised expense rate dependent on the income. This means that the tax volume changes with the production performance. In this case the production planning process has to be co-ordinated with the tax planning process. DJANANI and POSCH (1998) claim in their general tax textbook that tax payments have to be considered when making decisions regarding the production, if they affect the tax base.

3. Theoretical considerations

The basis for the theoretical considerations is an agricultural business with three possible cultures and 12 hectares of farmland. A maximum of 6 hectares can be used for a single culture. In the event of a flat-rate tax clause, the farm pays taxes worth 370 monetary units (MU), independent from the culture relation (Fig. 1).
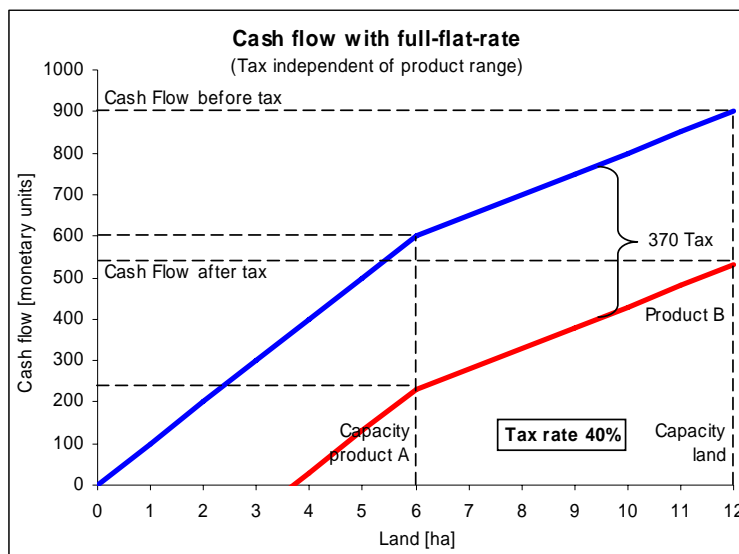

Figure 1: Effect of the full-flat profit ascertainment in agriculture

Should the same farm ascertain its profit via a partial flat-rate approach, 30% of the in-payments will be classified as profit across the board. Both versions are based on a simplified linear tax tariff of 40%. The payments for the respective cultures are displayed in Table 3.

Table 3: Model of a hypothetical product range

Product	Receipts	Expenditures	Cash flow (CF) before tax
A	240	140	100
B	600	550	50
C	120	80	40

In the model farm using the flat-rate system, the cultures A and B have been cultivated to equal parts due to a cultivation limitation, thereby generating a cash-flow of 900 MU before and 530 MU after taxes.

If the taxes are ascertained via a partial flat-rate approach, without changing the production, the tax volume, based on the same in- and out-payments as before, increases to 605 MU (Fig 2).
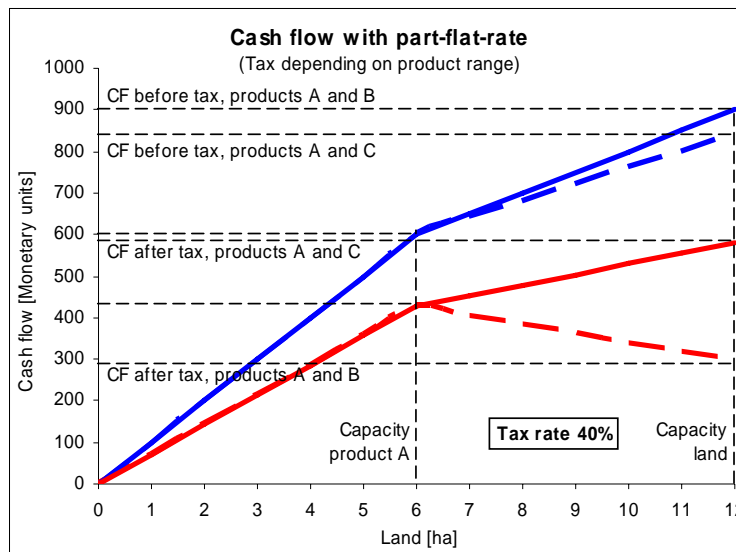

Figure 2: Effect of the part-flat profit ascertainment in agriculture

The cash-flow after taxes correspondingly decreases to 295 MU. The reason for this is that culture B's high in-payments lead to high tax volumes. If culture B is replaced by culture C, the cash-flow before taxes only reaches 840 MU, but at the same time the tax burden slumps to 259 MU, thereby increasing the cash-flow after tax to 581 MU. The adaptation of the production plans in this example therefore results in an advantage of 286 MU.

4. Method

The main aim of the model is to clarify the effects of the flat-rate, tax-related profit determination on the production programme, as well as the operative cash-flow, considering income tax.

The foundation is an operative business planning model based on linear optimisation. The advantage of this method is that the complex basic agricultural conditions can be illustrated in a very detailed form. To implement the taxation effects in the model, the production-related and fiscally pre-defined income is equated with the performances of the production process and is then directly allocated to the respective planning period. This allows to integrate and optimise the tax volume into the model simultaneously with the production planning. This chosen approach is disaggregated in the sectors production, income from the sale of crop, direct payments, transfer activities for the registration and modelling of agriculture-political conditions, as well as a section for the tax payments (Fig. 3). To answer the questions raised in the introduction, the results from the flat-rate and partial flat-rate profit determination processes are compared with each other.

To evaluate the model, a livestock free vegetable business with 60 hectares farmland and an assessed value of € 60 000 was selected. The production planning includes winter wheat, potatoes, onions, sunflowers, the production of vegetable seeds, as well as the necessary fallow areas. The income and expenses of the respective production procedures are listed in Table 4. Furthermore, the current direct payments, consisting of the decoupled payments[1] and the relevant

[1] Council Regulation (EC) No 1782/2003, Betriebsprämie-Verordnung BGBl II 2004/336 and INVEKOS-Umsetzungs-Verordnung 2005, BGBl II 2004/474.

premiums from the Austrian agri-environmental Programme (ÖPUL) are included. The potatoes and onions are subject to crop rotation restrictions. Imputed valuation rates for the supplied capital were included, but not subtracted from the cash-flow. Labour costs are included in the model as an effective option for non-agricultural income. The taxation is considered within the legislative framework explained above. Furthermore, the model includes the taxation-relevant exterior capital interest, social security payments and lease payments.

Cash-Flow	value		RH	basis amount	credit interest	rent for land	social security	income total	income < 10000	income < 25000	income < 51000	income > 51000	tax 10000-25000	tax 25000-51000	tax > 51000	tax total
					-1	-1	-1									-1
result:				V	W	X	Y	Z								
capacity	value		RH													
basis amount	V	=	V	1												
credit interest	W	=	W		1											
rent for land	X	=	X			1										
social security	Y	=	Y				1									
transfer income	Z	=	Z	-1	1	1	1	1								
income spliting	0	=	0					-1	1	1	1	1				
income < 10000	0	<=	10.000						1							
income < 25000	0	<=	15.000							1						
income < 51000	0	<=	26.000								1					
tax < 25000	0	=	0							0.38			-1			
tax < 51000	0	=	0								0.44			-1		
tax > 51000	0	=	0									0.50			-1	
tax total	0	=	0										-1	-1	-1	1

Figure 3: Linear Programming taxation module with full-flat rate

5. Results

Within a full flat-rate model the optimisation criteria require the initial production of winter wheat, as this results in the highest remuneration of the factors labour and land (Table 4). Furthermore, potatoes and onions are cultivated until the crop rotation limit is reached. Finally, sunflowers, vetch and quiescence have to be considered in order to meet the conditions of the environmental programme. Plus the income from non-agricultural operations, based on an hourly wage-rate of € 10, the operational cash-flow results in roughly € 39 400.

Table 4: The influence of taxation on product range and operational cash-flow

				Full-flat-rate		Part-flat-rate	
Product	Payments		Cash flow per ha	ha	Cash flow per product	ha	Cash flow per product
Winter wheat	620	-450	170	36.2	6 150	36.2	6 150
Potatoes	2 790	-2 500	290	10.0	2 900	0.0	0
Onion	2 900	-2 420	480	6.0	2 880	0.0	0
Sun flower	650	-600	50	1.0	50	17.0	850
Vetch	0	-170	-170	2.8	-480	2.8	-480
Set-aside area	0	-30	-30	4.0	-120	4.0	-120
Production for the market				**60.0**	**11 380**	**60.0**	**6 400**
Intertillage	0	-60	-60	17.0	-1 020	17.0	-1 020
Total production					**10 360**		**5 380**
Decoupled payments					12 760		12 760
Environment payments					13 170		12 560
Cash flow from non agricultural activities					8 410		14 930
Cash flow before income tax					**44 700**		**45 630**
Income tax					-5 330		-4 240
Cash flow after income tax					**39 370**		**41 390**

The right-hand section of Table 4 illustrates the necessary adaptations to the cultivation plan to achieve the optimal cash-flow when using a partial flat-rate profit determination. The first distinctive feature is the fact that neither potatoes nor onions are produced in this scenario. This results, as in the theoretical considerations, from the fact that the cash-flow per hectare for these cultures is low, despite high revenues. However, 30% of the in-payments are taxed, which would lead to a low or possibly even negative cash-flow of these mentioned cultures. Alternatively more farmland is allocated to sunflowers. The excess labour time can be used for non-agricultural operations, which results in a nearly twice as high income compared to the full flat-rate model.

It is noticeable that the cash-flow before tax in a full flat-rate business is lower than that of a partial flat-rate business. This is due to the fact that shifting to non-agricultural operations would not change the fiscal income from the agricultural enterprise. Additionally, the income from non-agricultural operations would be taxed separately. Therefore, this

enterprise is better off to use its labour time in its original business. Finally, one should note that the adaptation of the crop rotation has increased the cash-flow in the model business by roughly € 2 500 or 6.5% per year respectively (Table 5).

Table 5: Surplus resulting with part flat rate and consideration of fiscal influences

Conventional production	Cash flow
Part-flat rate without adaptation of the product range	38,860
Part-flat rate with adaptation of the product range	41,390
Gain caused of adaptation	2,530
Gain in %	6.5%

6. Conclusions

Fiscal conditions have an influence on the production planning process. According to the calculations for the model farm, the partial flat-rate taxation aims at achieving a preferably more advantageous income-expenses relation than the fiscal system's 30:70 valuation. Should selected productivity rates not be achieved, it is more advantageous to extend the business and invest more labour time outside the farm. As opposed to this, the full flat-rate taxation is fiscally neutral regarding the produced crops.

Overall, this system encourages an intensive cultivation of an agricultural enterprise, as an increased creation of value does not lead to an increased tax volume. A shift to non-agricultural operations is only carried out when the marginal productivity is lower than that in the partial flat-rate system. This means that this model for ascertaining profits supports the agricultural policy aim to secure family-owned agricultural businesses.

References

BMLFUW (2004): Grüner Bericht 2004. Vienna: Bundesministerium für Land- und Forstwirtschaft Umwelt und Wasserwirtschaft

DJANANI, CH. and POSCH, I. (1998): Einfluss der Besteuerung auf Produktions- entscheidungen. In BERTL, R.; DJANANI, CH. and KOFLER, H. (eds.): Handbuch der österreichischen Steuerlehre. Vienna: Verlag Orac.

DORALT, W. (2003): Steuerrecht 2003. Vienna: Manz.

DORALT, W. (ed.) (2005): Kommentar zum Einkommensteuergesetz. updated 1.3.2005. Vienna: WUV-Universitätsverlag.

JILCH, M. (2002): Die Besteuerung pauschalierter Land- und Forstwirte. 2nd ed., Vienna, Graz: Neuer Wissenschaftlicher Verlag.

KUßMAUL, H. (1998): Betriebswirtschaftliche Steuerlehre Arbeitsbuch. Munich: Oldenbourg.

SCHWINN, R. (1993): Betriebswirtschaftslehre. Munich: Oldenbourg.

STATISTIK AUSTRIA (2001): Agrarstrukturerhebung 1999. Vienna: Verlag Österreich.

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