Consequences of 2003 CAP Reform for Dutch Agriculture

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Abstract

This paper examines the medium term consequences of the Luxembourg CAP reform agreement in June 2003 for Dutch agriculture. Under this agreement, the EC has proposed to reduce the amount of support to EU agriculture that is coupled to agricultural production and to replace it through decoupled payments. The Netherlands has chosen for fully decoupled direct payments for crops, sucker cows, bulls and ewe premiums, while it holds the slaughter premiums for calves and adult cattle coupled. As the effect of this policy measures will largely depend on the extent that the decoupled support will influence the behavior of the farmers regarding their real production decisions, we have experimented with different 'behavioral repercussion' levels for decoupled payments. By evaluating the effects of these experiments on farmer's income levels, we could determine a kind of "optimal" farmers' behavior as the result of decupling of payments.

The CAP impact is measured against the baseline scenario, which is a view of the Dutch agricultural sector under the unchanged CAP (continuation of Agenda 2000). To construct the baseline and address the CAP effect, we have used the Dutch sub-model of AG-MEMOD model. This is an econometric, dynamic, multi-product partial equilibrium commodity model that includes the major arable crops and animal products. The dynamic characteristic of the model allows for multi-annual projections.

Our simulation results show that the decoupling of direct payments will importantly influence the Dutch agricultural sector. In the grain sector, the farmers' productions decisions will not be affected by the decoupling, i.e., farmers will continue to produce grains as would the policy not have changed. However, we expect a significant impact of the decoupling on the farmers' income in this sector because the reactions of production costs and grain prices on production changes is relatively low compared with the decrease in grain production. In the beef and veal sector, producers are expected to react fully on decoupled payments. Thus, they would treat the new payments as fully decoupled. However, the incomes in the beef and veal

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sector will not be significantly changed. Although the reduced animal stock will negatively influence the income level, the lower production cost and higher producer prices will compensate for this effect. At last, the implementation of the new CAP will significantly lower the dairy prices and negatively influence the production levels. Nevertheless, the compensation payments will keep the farmers' incomes in this sector above the baseline level.

Key words: CAP Reform, Agricultural Policy Modeling, Decoupling.

1. Introduction

Background. This paper examines the consequences of the Luxembourg CAP reform agreement in June 2003 for Dutch agriculture up to 2010. Under this agreement, the EC has proposed to reduce the amount of support to EU agriculture that is coupled to production and to replace it through decoupled payments. The Netherlands has chosen for fully decoupled direct payments for crops, sucker cows and ewe premiums, while it holds the slaughter premiums for calves and adult cattle coupled. However, the real behavior of the farmer's on their production activities under this choice is unknown. We have investigated a variety of hypothetical 'behavioral' options and examined their impacts on the farmers' incomes.

Objective. As the reform effect will largely depend on the extent that the decoupled support will affect the production decisions of farmers, we have experimented with different levels of decoupled payments for the Netherlands. By evaluating the effects that these experiments may have on farmer's income up to 2010, we could determine a kind of 'optimal' farmers' behavior as the result of decoupling in terms of consequences for farmers' income. Also, we can indicate a kind of 'worst' case, in which the reaction of the farmer is most negative for income generation. The comparison of the experiments will provide insight into possible development levels for agricultural incomes, productions and prices in future.

The CAP simulation impacts are measured against the baseline scenario, which is a view of the Dutch agricultural sector under the unchanged CAP (continuation of Agenda 2000). To construct the baseline and address the CAP effects, we have used the Dutch sub-model of AG-MEMOD. This econometric, dynamic, multi-product partial equilibrium commodity model includes the major arable crops and animal products. The dynamic characteristic of the model allows for multi-annual projections.

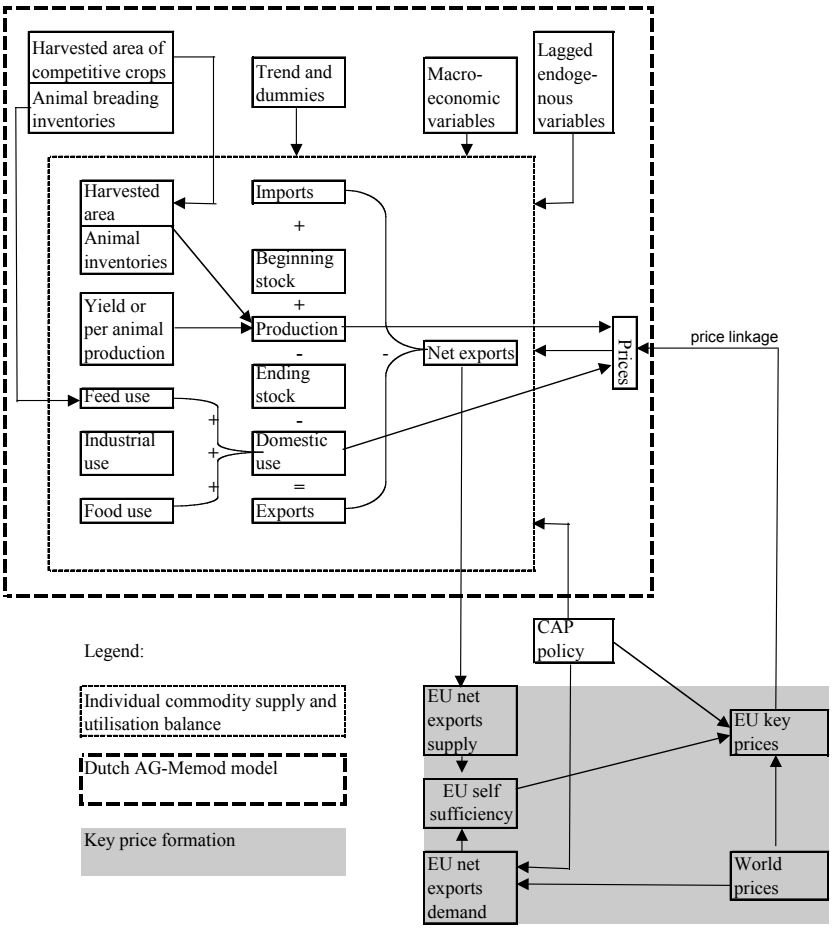
Outline of paper. The document is organized as follows. The second section presents the general structure and some methodological issues like estimation and testing procedure, projection generation and treatment of decoupling. Section 3 describes the two decoupling scenarios and their assumptions. The fourth section is devoted to the potential impacts of the Luxembourg CAP reform agreement and summarizes the results for the scenarios. Finally, the conclusions are drawn in section 5.

2. Overall structure of Dutch AG-MEMOD model

Figure 1 presents the overall Dutch AG-Memod model structure. The "inner box" indicated by the dotted lines represents the individual commodity supply and utilization sub-model. The Dutch AG-Memod model produces estimates of supply and demand components for grains (soft and durum wheat, barley and maize), oilseeds (rapeseed, soybeans and sunflower seed), root crops (sugar beet, sugar and potatoes), livestock (cattle and beef, pigs and pork, poultry, and sheep and sheep meat), and milk and dairy products (cheese, butter, whole and skim milk powder). Within the AG-Memod framework, we link all markets through substitution and technological relations in production and(or) consumption processes. For example, grains are used as feed inputs for livestock production, the dairy sector is supplying calves for the Dutch beef production, and pig meat is considered as a substitute for beef, poultry and sheep meat.

We have modeled the supply and demand side for all commodities using behavioral equations base on a microeconomic theory of consumer and producer behavior. Fore example, we have assumed negative own price elasticity for the own demand, positive price elasticities for the demand of competitive commodities, and positive income elasticity for demand. The explanatory variables in the demand and production equations are the prices of the considered commodities and their closest substitutes from a production or consumption point of view. Additionally, we explain the consumption and production growth by income levels in the consumption equations and by livestock production levels in the feed demand, breading inventory, and slaughter equations. To represent rigidity in the adjustment of agricultural production levels and consumption patterns, we used lagged production or stocks to explain production development, and lagged consumption to explain the consumption growth. Time trends are seen as a proxy for technological change, while dummy variables would represent special policy regulations (like quota periods) or extraordinary events like very bad weather and animal health crises.

Further, the agricultural production and consumption is influenced by agricultural policy variables. The Dutch AG-Memod model includes three main types of instruments that influence the crop and animal production: production and payment rights quotas, direct (headage or area) payments and intervention prices. The production quotas and payment right quotas influence production levels through stock equations in the animal sector and harvested area equations in the crop sector. The direct payments increase the return from production and hence influence the production levels. The intervention prices enter the stock level equations. In addition, the cereal set-aside reduces the crop area and the reference yield is used to calculate direct payments per hectare and, so, it influences the production return and level. For the animal sector, the butter for direct consumption subsidy and skimmed milk powder (SMP) for animal feed subsidy affect butter consumption demand and SMP feed use respectively. Finally, the maximum stocking density threshold limits the number of headage payments in animal sector and in this way influences the animal stock level.



Source: authors modification of AG-Memod structure from Chatreuil (2002).

Figure 1. AG-MEMOD model structure

Equilibrium on national commodity markets is attained under the condition that production plus beginning stocks plus imports is equal to domestic use plus ending stocks plus exports. As there is no guarantee that variables computed with our econometric model will automatically satisfy the supply and demand equilibrium condition, a closure variable is chosen to ensure that identity. Hence, for each commodity market there exists one endogenous variable, generally the export or import variable, which is determined through a supply and demand identity and

which is closing the model. The EU level model (shadow part of figure 1) calculates aggregated supply and utilization balances for all the commodities of the member states, and determines the EU net-exports and prices. The country models are linked with the EU model by price transmission equations and trade flows.

The Dutch model on itself doesn't represent a closed economy because other member states and the rest of the world normally influence the Dutch commodity markets. To allow for such impacts, AG-MEMOD uses price transmissions to reflect the influence of EU and world market prices on the Dutch prices. Agricultural prices, trade policies, transport costs, products differentiation, consumer preferences and market organizations may influence the extent and speed of the transmission. For each commodity, the market of a specific member state is seen as the key market while it's respective price is considered as the EU key price. In the case that a commodity's key market is not defined, world prices will directly influence the Dutch prices. To measure the influence of market imperfections on Dutch commodity prices, the price linkage equations covers EU and Dutch self-sufficiency rates for the respective commodity. The exceptional case is where the Netherlands is considered as the key market, and hence is not simply the 'price follower'. In such a case, the Dutch key price must be linked to the world price, the EU intervention price, and agreements under the WTO Uruguay Round to order impacts on the commodity markets of other member states. The Netherlands delivers key prices for potatoes and skimmed milk powder.

Economic Accounts for Agriculture. The Dutch AG-MEMOD model includes agricultural incomes and environmental indicators too. Regarding the income indicators, the Economic Accounts for Agriculture (EAA) contains elements like:

- agricultural sector output at producer prices and basic prices;
- total intermediate consumption;
- gross and net value added at basic prices;
- product subsidies;
- operating surplus or agricultural sector income.

The production quantities and prices for the crop and animal commodities received from AG-MEMOD provide estimates for the agricultural output value. Horticultural products contribute almost 40 percent to Dutch agricultural output value and even more to Dutch agricultural sector income, but they do not belong to the standard commodity coverage of AG-MEMOD. To assure that the Dutch model provides credible agricultural sector incomes, we have incorporated simple estimates for the Dutch horticultural production value on the basis of trends and GDP deflators.

The total intermediate consumption cost in the EAA covers:

- *total feed value*: these are calculated with information on quantities and prices for grains, potatoes, sugar beets, oilseed meals, grass and cassava used as animal feed;
- *fertilizers and soil improvers costs*: these are linked to a yield trend and the total crop area from the crop commodity models. The time trend is regarded as a proxy for the yield trend, and the GDP for the prices of fertilizers and soil improvers.

- *other intermediate consumption costs*: these are derived as a function of the agricultural output measured in constant prices and a GDP deflator.

Product subsidies are estimated on the basis of production quantities and direct headage or area payments. Further, we have assumed that labour costs (compensation of employees) proportionally grow with output and depend on technological progress via a time trend. Finally, the remaining EAA components like fixed capital consumption, other taxes and subsidies on production, subsidies on rape and turnip rapeseed, other subsidies and taxes on products are exogenously fixed on their last observation levels.

The EAA components now let in the possibility to calculate agricultural sector outputs at producer and basic prices, total intermediate consumption expenditures, gross and net value added at basic prices, and the operating surplus of agricultural businesses.

The Dutch AG-MEMOD model further includes a link with environmental indicators like CH_4, CO_2 and N_2O emissions. Calculations are based on emissions values per production quantity unit from external sources, and on production estimates from our commodity models.

Estimation and testing methodology. In principle, all Dutch commodity equations have the following functional form:

$$\log(Y) = \alpha_0 + \alpha_1 t + \sum_i \beta_i \log(X_i) + \sum_i \gamma_i Z_i + \varepsilon$$

where:

Y	- endogenous variable
X_i	- explanatory variables, $X_i > 0$
Z_i	- explanatory variables, $+\infty > Z_i > -\infty$
T	- time trend
$\alpha_i, \beta_i, \gamma_i$	-parameters of the model
ε	- error term.

Double log relations are generally applied to estimate our models, with the exception of linear forms for cattle death losses, pig death losses and trade in the livestock models, and for yield and trade in the crop models. The term $\sum_i \gamma_i Z_i$ enters the import equations with the self-sufficiency ratio as explanatory variable, and is further used to incorporate policy instruments.

The generalized least squares estimation (GLS) technique is applied to most of the single model equations, and the seemingly unrelated regression (SUR) method to the demand systems for meat and feed. Standard tests were adopted to validate the estimation results concerning potential statistical heteroskedasticity, autocorrelation and goodness of fit. The autoregressive-moving average (ARMA) specification of the error term was used when suggested by statistical tests, and in case of heteroskedasticity it was assumed that the error term variance is not constant over time. Further, the coincidence of the estimation results with a priori expectations and economic theory (magnitudes and signs of estimated parameters) was analyzed. The Partnership considers the economic tests superior to the statistical tests, which has frequently resulted in the adjustment of particular model specifications despite their statistically correctness.

We have severely examined the properly modeling of the stationary error term. As such is important for the dynamic performance of the model, the Durbin-Watson statistic was hold close to two. In principle, variables were kept in the equation at a significance level of at least 10%. Important variables for AG-MEMOD, like policy measures and economic terms, were allowed to have a less severe significance level between 10% and 20%.

Estimations have been based on annual data for the period 1973-2001, which was obtained from NewCronos, FAO, USDA and Dutch statistical offices. The Dutch model provides then production volumes and producer prices for commodities. In order to calculate farmers' incomes, we have estimated equations for subsidies and taxes on products, as well as for inputs used in agricultural production. The Economic Accounts of Agriculture in AG-MEMOD supplies figures on aggregate agricultural income on both national and EU-15 levels.

Projections generation methodology. Analysis with the Dutch AG-MEMOD are conditioned on national and international developments regarding:

- *macro-economic variables* like population growth, real GDP growth, inflation level, exchange rate between Euro and US dollar;
- *international agricultural market prices*;
- *agricultural policy variables* like quotas on production and payment rights, direct (headage or area) payments and intervention prices.

Further, AG-MEMOD provides results under the assumptions of normal weather and stable national and international agreements.

The Dutch AG-MEMOD model can used to generate projections whether as component in the EU-wide model, or as stand-alone version. While EU key prices – necessary to derive Dutch prices - are endogenously generated in the combined framework, these are exogenously determined in the stand-alone version. They are derived from external sources, e.g., from projections generated by other models. The theoretical basis for the last approach is the assumption that international prices are independent of the Dutch market ("small country" assumption).

Treatment of decoupling. In the current AG-MEMOD version, direct payments enter the area allocation functions via the adjusted gross return variable. This variable is a function of the moving average of past real market prices and a trend productivity growth (trend yield) and per hectare compensation payments. Compensation payments are assumed to have a smaller effect on total grains area than the market prices since producers participating in voluntary set aside can receive compensation payments without planting a crop. Hence, only 50% of the compensatory payments is taken into account, which can be interpreted as 50% coupling. Further, direct animal payments - bulls and suckler cow premiums - are treated as fully coupled in the current model and enter the suckler cow stock and cattle slaughter equations.

According to the literature, decoupled payments have some impact on production, so they are not fully decoupled from production (Westcott and Young, 2003; Burfisher and Hopkins, 2003). Even when the payments are fully decoupled, it is important to consider whether this

will fully motivate farmers to change their production profile, lower the production activity or finish production. This would probably not happen, because:

- If production without payments remains profitable, then a production stop would mean an income loss;
- The possibility to change the production profile under the CAP reform is (very) limited. Farmers, who will receive single farm payments established on historical basis, cannot switch to alternative production like permanent crops or horticultural products. Only the production of starch potatoes is possible.
- A production profile switch to fodder crops is expected to be limited, because the decoupling of beef payments will probably reduce beef production and thus decrease demand for fodder.

As the CAP reform effect will largely depend on the extent that the decoupled support will affect the production decisions of farmers, we have experimented with different levels for decoupled payments. Through evaluating the effects that these experiments may have on the farmer's income, a kind of 'optimal' expected farmers' behavior leading to the maximal agricultural income generation could be determined. We will simulate the expected decoupling effect by introducing a *decoupling factor* in the Dutch model, which will weight the direct payments according to their assumed impact on production. For example, a decoupling factor of 0.3 means that 30% of the formal decoupling will actually influence the production decisions of farmers after decoupling. Accordingly, the direct payments in the model are multiplied by this factor to simulate the effect of this assumption on the agricultural sector.

3. Scenarios

In order to investigate the medium-term prospects for Dutch agriculture under the CAP reform of June 2003, we carried out the following:

- construction of a baseline scenario (BASE) for the Dutch agricultural sector under an unchanged CAP (continuation of Agenda 2000) to 2010. Such a baseline is necessary to measure the impact of our decoupling simulations;
- investigation of the development of the Dutch agricultural sector up to 2010 under various decoupling schemes by mean of the following two scenarios:
- scenario associated with the decoupling level, which results in the optimal or maximum level of agricultural sector income (which will be called the OPT scenario);
- scenario associated with the decoupling level, which results in the minimum level of agricultural sector income (which will be called the MIN scenario).

This will provide us with a kind of 'confidence' interval, in which the Dutch agricultural income might move under different decoupling levels.

The OPT and MIN scenarios differs in the reaction of farmers on the decoupling of payments for grain (soft wheat, barley and maize), and beef and veal. If there is no reaction of the farmers (decoupling factor=0), it means that they will treat the decoupled payments as they would be coupled payments regarding their production activities. If there is full reaction of the farmers (decoupling factor=1), it means that they will adjust their production activities. To determine the decoupling level associated with both scenarios, we have run several simulations to experiment with different decoupling levels for the different sectors. We have calculated the medium-term average sectoral incomes for all simulations experiments. Then we choose OPT and MIN scenarios as the scenarios associated with maximum or minimum sectoral incomes respectively. For the income calculations, we have used data on standard gross margins for the different agricultural sectors.

Macroeconomic assumptions and exogenous prices. The macroeconomic outlooks incorporated in all scenarios are from external sources. Population projections are from EUROSTAT, whereas projections of most macro economy variables are from the econometrics unit in DG Economics and Finance. Of prime importance is the rate of exchange between the US dollar and the Euro, for which an average of $1.13/Euro is taken up to 2010. Inflation is projected on 2 percent a year, whereas the real average rate of economic growth is expected to be 2.3 percent per year.

We used the stand-alone version of the Dutch AG-Memod model for our scenarios, which captures the world and EU price projections as exogenous. The world market price projections for sugar, oilseeds and oilseeds products are taken from the FAPRI model, which allows for the incorporation of the impact of global supply and demand developments on EU agricultural markets. The EU prices come from the combined EU15 AG-Memod model.

Policy assumptions. The CAP reform for crops and cattle will be implemented in the Netherlands as follows:

- except for the slaughter premiums, all direct payments will be decoupled from production;
- 100% decoupling of slaughter premiums for calves, and 40% decoupling of slaughter premiums for adult cattle;
- reforms will be implemented from 2006.

Moreover, similar to other EU15 countries, the following reforms will be introduced in the dairy sector:

- the 10% reduction in the butter intervention price will take place in addition to the intervention price reductions agreed under Agenda 2000;
- dairy compensation premiums agreed under Agenda 2000 are further augmented to compensate for the reduction in the intervention price for butter;
- compensation payments will be fully coupled to production until 2007, and decoupled from then onwards;
- milk quota will continue until 2014/15.

The farm payments in the Netherlands will be linked to the historical reference period 2000-2002.

4. Results for Dutch agriculture

This section summarizes the main results of the simulation experiments conducted to determine the decoupling levels for the OPT and MIN scenarios. Second, the medium-term projections for Dutch agriculture under the 2003 Luxembourg CAP reform agreement will be presented for both scenarios. Projections to 2010 are measured against the baseline scenario.

Table 1. Results of pre-simulation experiments with different decoupling levels

Variables and policy instruments		Scenarios									
		BASE		MIN			OPT				
'Behavioral' decoupling factor	cereal payments	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.70	0.50	0.30
	bull premium	0.00	0.00	0.00	1.00	0.00	1.00	1.00	0.70	0.50	0.30
	suckler cow premium	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.70	0.50	0.30
Incomes level (mil. EURO)	gains	154.16	149.46	142.45	149.69	150.06	150.30	143.23	145.18	146.57	147.80
	beef&veal	371.39	370.64	370.46	370.86	371.34	371.54	371.35	371.34	371.38	371.21
Price changes compared with baseline (%)	soft wheat	0.00	0.00	0.45	-0.02	-0.04	-0.06	0.40	0.27	0.17	0.09
	cattle	0.00	0.10	0.10	0.46	0.27	0.65	0.65	0.52	0.43	0.31
Area harvested or animal numbers changes compared with baseline (%)	Soft wheal	0.00	-0.02	-7.10	0.21	0.60	0.85	-6.29	-4.33	-2.92	-1.68
	Cattle other than cows	0.00	-0.51	-0.51	-1.80	-1.41	-2.72	-2.72	-1.87	-1.38	-0.97
	Suckler cows	0.00	-3.03	-3.01	-2.74	-48.07	-47.98	-47.97	-37.57	-29.17	-19.70

Simulations to determine OPT and MIN scenarios. To determine the 'behavioral' decoupling levels associated with the OPT and MIN scenarios, we have run several simulation experiments with varying decoupling levels for hectare payments for grains, bull premiums, and suckler cow premiums. Table 1 presents the simulation results for the income levels in the grain and beef and veal sectors. Further, it contains price changes of soft wheat and cattle, and the changes in activity levels measured by harvested area and animal number in the simulation experiments compared with the baseline.

In the OPT scenario, the grain producers will not change their production profile when payments will be decoupled to maintain high level of incomes. It means that they will treat the

decoupled payments as fully coupled. In the beef and veal sector, however, producers are likely to react fully on decoupled payments; i.e., they will treat them as fully decoupled. The opposite situation is observed in the MIN scenario. Beef and veal producers do not react on decoupling, whereas grain producers do.

The results show that incomes of the beef and veal sector are not much affected by different 'behavioral' levels of decoupling under the various experiments. The decrease of the animal stock in this sector will result in lower production costs and higher prices, which might compensate the negative impact from the lower production level on income. In spite of the insignificant difference in income levels between different decoupling scenarios for the beef and veal sector, the producers will choose for the 'full-reaction-on-decoupling' strategy. This will give them not only a slightly higher income, but also a lower working time due to the lower animal stock.

The decoupling impact on grains is much higher. The reaction of production costs and prices for grains to production changes is relatively low compared with the decrease of the production level in this sector.

According to our simulation experiments, the various behavioral reactions on decoupling will have significant impacts on the production level. In the MIN scenario, the soft wheat production will decrease by more than 8% (see difference between BASE and MIN scenario in figure 2). At a full reaction on decoupling of bull and suckler cow premiums, the number of cattle (other than cows) will decrease by up to 2.7%. (see change in the number of cattle other than cows for the OPT scenario in table 1), whereas the suckler cow number will reduce by almost 50% (see table 1). The impact of decoupling on prices is low (under 1%), which is mostly due to the stabilizing impact of intervention prices (see table 1).

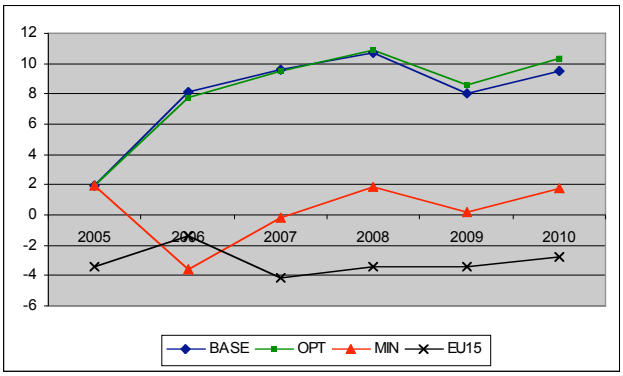


Figure 2. Soft wheat area harvested: growth rate 2004=100

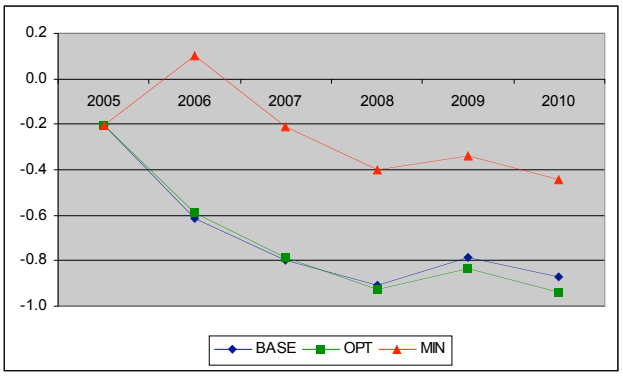


Figure 3. Soft wheat price: growth rate 2004=100

Results for OPT and MIN scenarios. Despite the cereals compensation payments, grain farmers do not change their production profile in the OPT scenario (table 1). In model terms, it means that cereal compensation payments will be treated as coupled by farmers (decoupling factor=0). On the other hand, they will be booked as decoupled payments in the income calculation process. The similar situation occurs in the MIN scenario for bull and suckler cow premiums. They are decoupled from production but farmers will not change their production decisions accordingly.

The most important simulation results concerning the three main sectors affected by the CAP reform, (namely, soft wheat, beef and veal and dairy sector) are presented in figures 3 to 6. For production levels, the Dutch results can be compared with EU15 projections (EC, 2003).

The model simulations show a small shift from the production of sugar beets, barley and maize to soft wheat and potatoes in the BASE and OPT scenarios. Soft wheat area harvested will increase (figure 2), which can be explained by the relatively high soft wheat yield growth compared to other crops. This improves soft wheat production profitability. Also, the high soft wheat area growth from 2006 is due to the small soft wheat area projections in 2004, which are due to the low soft wheat harvested area observed in 2003. In the OPT scenario, the soft wheat harvested area is just a fraction smaller than in the BASE due to modulation. Compared with the BASE, the coupling of payments by farmers in the MIN scenario will result in a significant lower growth of the soft wheat harvested area. Growing area harvested will cause production increase and slightly lower soft wheat prices (figure 3).

In the BASE and MIN scenarios, we have predicted a recovery of beef and veal production (figure 4). In the OPT scenario, the decoupling of payments may have a significant impact on beef and veal production. After a short-term increase of production associated with the reduction of the herd size, the beef and veal production will decrease. From 2008 it might be 0.6% to 1.9% lower than in the BASE and MIN scenario.

The cattle prices will move in the opposite direction than the production volumes (figure 5). In the short-term, they will sharply drop due to a larger meat supply. Then, they will quickly recover and stabilize on an about 1% higher level than in the BASE and MIN scenarios.

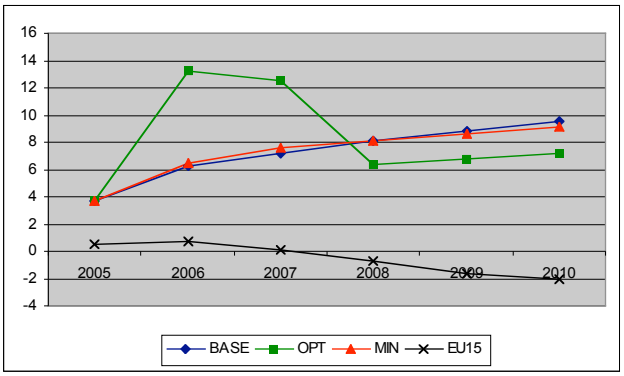


Figure 4. Beef and veal production: growth rate 2004=100

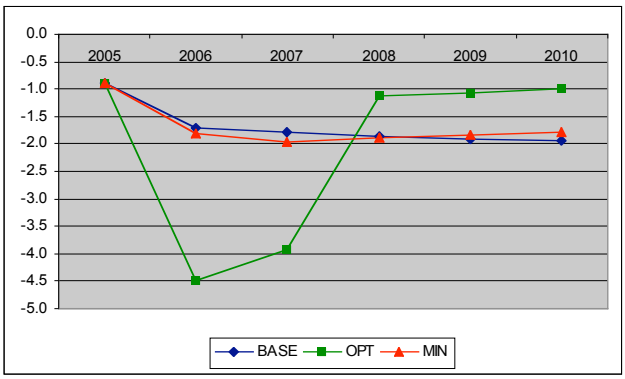


Figure 5. Beef and veal price: growth rate 2004=100

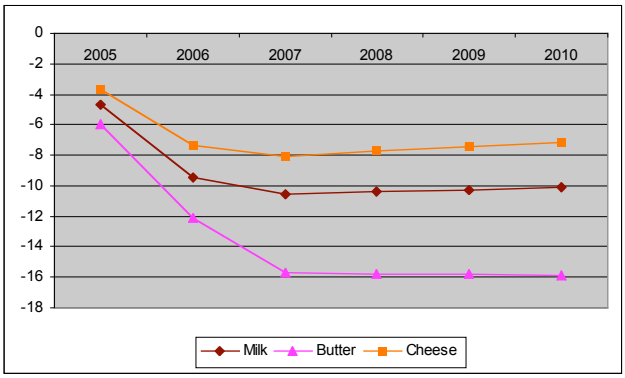


Figure 6. Dairy aproduct prices: growth rate 2004=100

Changes in the beef and veal production in the OPT scenario have very limited impact on the other meat production compared with BASE scenario. It is due to the limited price effect of these changes. The gap between domestic demand and supply for beef and veal is satisfied by lowering stocks and exports.

Under the CAP reform the dairy sector will be highly influenced by a decrease of the butter and SMP intervention price of 25% and 15% respectively. The dairy product prices follow the intervention price developments and move similarly in both the OPT and MIN scenarios. Accordingly, milk, butter and SMP prices might decrease by 10%, 16% and 7% in the long-term (figure 6).

Compared with the baseline, the butter price might change the most. It will decrease with more than 9% in the long-term, whereas the milk and cheese prices will fall with almost 3% and 2.3% respectively (figure 7).

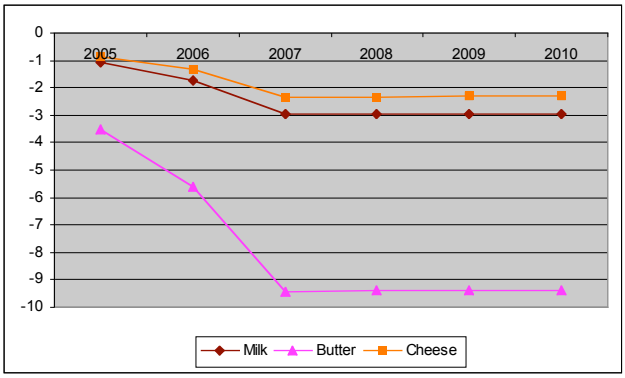


Figure 7. Dairy product price changes compared with the BASE (%)

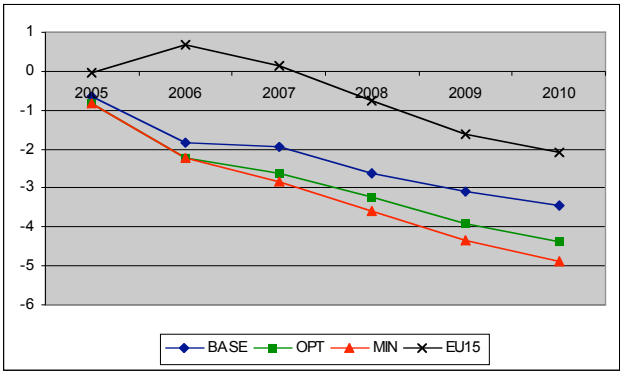


Figure 8. Milk production: growth rates 2004=100

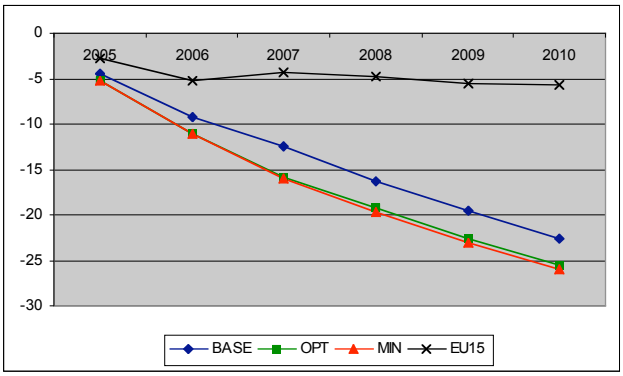


Figure 9. Butter production: growth rates 2004 = 100

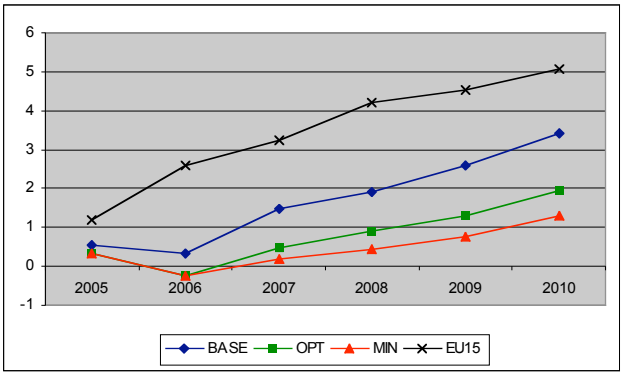


Figure 10. Cheese production: growth rates 2004 = 100

Lower dairy prices will negatively influence the dairy production (figure 8, 9 and 10). Due to higher feed prices in the MIN scenario compared with the OPT scenario the profitability of the dairy production is lower in MIN scenario than in the OPT scenario. As a result, the dairy production in the OPT scenario is higher than in the MIN scenario.

Lower milk prices will cause a reduction in the milk production in absolute terms and compared with BASE scenario. Production will however remain above the quota level except for the year 2010 in the OPT scenario. The compensation payments will not hold the production on the current – above quota – level since they are based only on the production quota (not including the milk produced above the quota). Conform past trends, dairy production will decrease in all scenarios, except for cheese production, which is most profitable.

The decrease of butter production will with 25% cause a significant reduction of butter stocks in the long-term. The increased cheese production will result in lower imports, which might drop with about 15% in the long-term.

The development of income in the grain and beef and veal sectors will be optimistic (figures 11 and 12). Incomes in the grain sector will increase as a result of higher yields and harvested area growth, which will overshadow the impact of decreasing prices on incomes level.

In 2007, the beef and veal sector is expected to recover after the BSE crisis due to lower feed prices, efficiency growth and yield increase.

In contrary, incomes of milk producers could decrease slightly as a result of lower intervention prices, which cause drops in the milk prices (figure 13).

In all analyzed sectors, the sectoral incomes are higher in the OPT scenario than in the MIN scenario in the long-term. However, with the exception of milk sector, they are lower than in the BASE scenario. This difference is quite significant for the grain sector where the incomes in the BASE scenario are 1.5% to 2.5% above their corresponding levels in the OPT scenario, and even 6% to 8% above the levels in the MIN scenario.

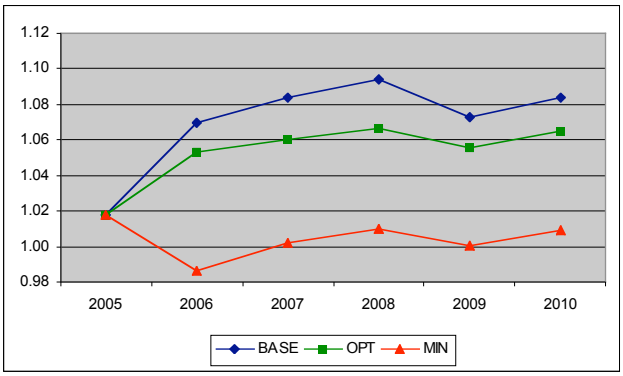


Figure 11. Incomes of the grain sector: growth rates 2004 = 100

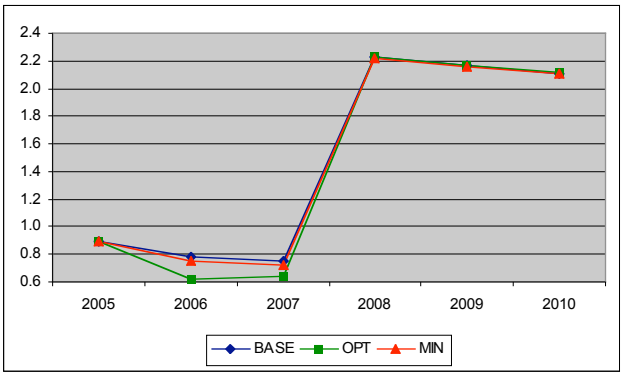


Figure 12. Incomes of the beef and veal sector: growth rates 2004 = 100

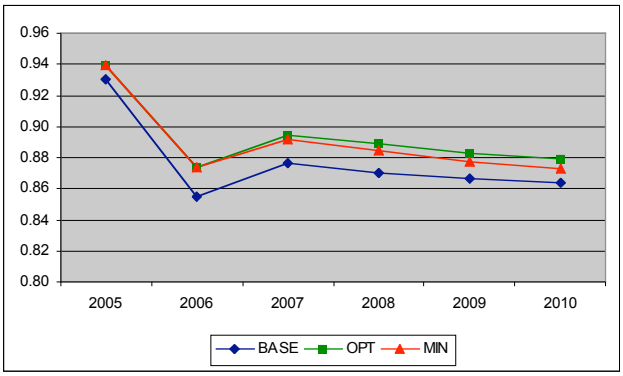


Figure 13. Incomes of the milk sector: growth rates 2004 = 100

5. Conclusions

Our study has examined the consequences of different reactions of Dutch farmers on decoupling of payments from production. In order to maintain high level of incomes, the grain producers seem not to change their production profile when payments will be decoupled. On the other hand, producers in the beef and veal sector will treat the new payments as fully decoupled without losing their incomes. Therefore, we expect that farmers will treat the new payments as these would remain fully coupled in the cereal sector, but fully decoupled in the beef and veal sector after the 2003 CAP reform will be implemented.

According to our simulation results, the CAP reforms will not have a significant impact on farmers' incomes in the beef and veal, and milk sectors compared with baseline scenario (continuation of Agenda 2000). In the case of a full reaction of farmers on decoupling in the grain

sector, the farmers' incomes in this sector can fall by 8% compared with the Agenda 2000. However, we expect a rather moderate decrease of their income by 2.5% at the maximum.

As far as the long-term production developments are concerned, we expect a slight increase of the soft wheat area harvested (0.8%) and a 2% decrease of the beef and veal production compared with the Agenda 2000 continuation scenario. The cattle herd will decrease somewhat more than the beef and veal production. This is except of the suckler cow herd, which will fall by almost 50% when suckler cows premiums will be decoupled. The milk production is expected to stabilize on the quota level in the medium term.

The impact of decoupling on prices in the grain, and beef and veal sectors is low (under 1%), which is mostly due to the stabilizing impact of intervention prices. We expect that after implementation of the CAP reforms the soft wheat prices will slightly decrease below the Agenda 2000 scenario level, whereas beef and veal prices will show a 1% rise in the long-term compared with the Agenda 2000 scenario.

Finally, the dairy sector is highly influenced by a 10% decrease of the butter intervention price compared with the Agenda 2000 level. The dairy commodity prices follow this intervention price development, resulting in decreases of 9%, 3% and 2.3% for butter, milk and cheese prices respectively in comparison with their Agenda 2000 levels on the longer term. This might give a more than 9% fall in the butter production, but an almost 5% increase of the cheese production compared with the Agenda 2000 scenario.

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