

Amsterdam, mei 2011

Career development after cartel prosecution

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A decorative horizontal line art graphic consisting of several overlapping, jagged, grey lines that create a textured, abstract pattern across the width of the page.

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Discussion paper nr.62

Table of contents

Summary	1
1 Introduction	2
2 Legal framework	3
3 Data collection	5
3.1 Cartel managers	5
3.2 Control group	6
3.3 Future careers	6
4 Career development	7
4.1 Model for career development	7
4.2 Data description	8
4.2.1 Cartel managers	8
4.2.2 Control managers	9
4.3 Comparing cartel managers with control managers	10
5 Empirical results	12
5.1 Description explanatory variables	12
5.2 Cartel versus control managers	14
5.3 Career development cartel managers	15
Binary model	16
Multinomial logit model	17
5.3.1 Conclusion on career development cartel managers	18
6 Conclusion	19
References	21

Summary

Career development of managers after a cartel prosecution by the Netherlands Competition Authority (NMa) is examined. A representative function is used as an indicator for career outcome after prosecution. The career development of Dutch managers involved in a cartel and a control group of Dutch managers of non-cartel involved companies is compared. The different factors that may influence the career development of cartel involved managers are analyzed.

This paper concludes that cartel involved managers face negative career effects after the prosecution of the cartel. A cartel involved manager has lower probability of a representative function than another manager. This negative career effect is smaller if the cartel was active in the construction sector. This might point at a different culture towards cartels in the construction sector in the Netherlands which seems plausible considering the wide ranging cartel in this sector between 1998 and 2001.

1 Introduction¹

In the Netherlands, agreements between companies that restrict, hinder or impede competition - called cartels - face prosecution. A company can be fined if the cartel is detected and prosecuted by the Netherlands Competition Authority (*Nederlandse Mededingingautoriteit*, NMa) for a maximum amount of 10% of its overall world-wide revenues. Furthermore, the executives involved can be personally fined for an amount of up to 450,000 euro (NMa, 2009a). In addition to these administrative fines which represent the direct negative effect on the company and their executives, the prosecution of a cartel is made public. This may cause indirect negative effects in the form of reputation damage and might have negative or positive effects on the career of managers involved in a cartel.

This could have a deterrent effect on the formation of cartels. Are the career chances of cartel involved managers different from those of non-cartel involved managers? If so, one might argue that a manager faces negative reputation damage in the form of decreased career opportunities due to cartel involvement. This could give managers an extra incentive not to engage in these prohibited agreements.

Cartel involvement might, on the other hand also result in a positive effect on career opportunities when shareholders assume that cartels are not easily detected and prefer someone who increases the value of the shares by being involved in a cartel. This research tries to answer whether the career development of cartel involved managers is different from non-cartel involved managers and how their career is affected.

Two research routes are followed in this paper. First career development after prosecution is examined. This is done for Dutch managers involved in a cartel in The Netherlands and a control group of Dutch managers of non-cartel involved companies. The career development of the control group is used to establish whether the cartel managers face negative career effects of their cartel involvement. This is done using a binary logit model.

Secondly, the factors that may influence the career development of cartel involved managers are analyzed using logit models (a binary and multinomial logit model). These factors are: the sector the cartel was active in, the period of job switching (before or after the publication of the cartel by the competition authority), the punishment factor and the level of the fine.

The outline of this paper is as follows. First the legal framework and the research hypothesis are presented in chapter 2. In chapter 3 the data collection is described. This consists of cartel and control companies and their managers. In chapter 4, the model for career development is explained together with a description of the data. In this chapter, the career development for cartel and control managers is compared. Chapter 5 presents the results of the econometric analysis for career development of managers. The difference between cartel and control managers is tested using logit models taking account of the different variables that might influence the career of cartel managers. Chapter 6 concludes on the results of this research.

¹ I like to give credit to dr. Jan-Kees Winters of the Netherlands Competition Authority, prof. dr. Wieland Müller and prof. dr. Jan Boone of Tilburg University and my colleagues from SEO Economisch Onderzoek (*SEO Economic Research*) for their feedback on this paper.

2 Legal framework

The cartel law articles of the Dutch Competition Act are relevant for this research. This chapter explains the working of this articles and the hypothesis of this paper.

In January 1998, the Dutch Competition Act and the NMa were established. Detecting and prosecuting cartels is one of the fields that the NMa is active in. The legal framework for cartels consists of Article 6 of the Dutch Competition Act². Art 6(1) includes the prohibition of agreements and Article 6(3) includes the exemptions in which agreements between companies are not prohibited. If Art. 6(1) applies, but Art. 6(3) does not, there is an infringement of Art. 6 of the Competition Act. Agreements between companies may fix the price of a product between competitors; divide the market; determine the supply conditions or reduce the total output to increase the price.

Firms that are involved in a cartel, could voluntarily confess their cartel to the competition authority and apply for the leniency program. A firm will confess when it is afraid that the cartel shall be detected. When it applies for leniency, it cooperates with the competition authority and supplies evidence on the existence of the cartel. In return, the company will be granted (partial) immunity for fines (Motta, 2004 & NMa 2009b).

In its first annual report the NMa states that the Dutch business sector soon realized that, with the establishment of the competition authority, the Dutch business environment had changed (NMa, 1998). Now, more than ten years after the introduction of the Competition Act and the NMa, one may assume that cartels are seen as undesirable by companies due to the sanctions associated with it (this does not imply that cartels do no longer occur). The bad reputation of cartels is expected to negatively affect the career chances of cartel involved managers. Future employers will be less willing to hire a manager who was active in a cartel.

The central hypothesis of this research is that *managers involved in a cartel face negative career effects*. For the analysis this would imply that the career development between cartel managers and control managers is different. More specifically cartel managers will end up in a less representative function than managers from the control group. A representative job is in this paper defined as a management function or a function in the board of directors.

² This law is very similar to the legislation which is used by the European Commission, Article 101 of the Treaty on the Functioning of the European Union.

3 Data collection

In this chapter is discussed how the cartel and control managers are collected and how their jobs after the cartel prosecution is found.

3.1 Cartel managers

Data is gathered for Dutch companies involved and punished in a cartel. It could be the case that in a specific sector, cartel-involvement is seen relatively often. An example is the construction sector. It appeared from the investigations started by the NMa that a lot of companies in this sector were involved in a cartel. Therefore, one could expect that in this sector, cartel-involvement is not seen so much as negative. Hence, managers in this sector might face a different career development after the prosecution than managers in other sectors. To get a representative view of the whole economy, cartel companies from all sectors are selected.

To select the cartel involved companies, the decisions about infringing Article 6 of the Competition Act, of the NMa are used. Through the history files from the Chamber of Commerce, the former managers of the companies are found. Not all companies are registered here and some have merged or went bankrupt after the cartel. In case of a merger it is impossible to track down which parts of the cartel company were taken over or still exists. Furthermore, it might be the case that a manager is fired because of downsizing after the merger and not because of his cartel-involvement. Therefore, merged and companies that are not registered are excluded from the dataset. Foreign companies are also excluded since those managers could not be traced in the Dutch databases.

Before tracking down where the cartel involved managers work after the cartel, it has to be clear at which date future employers could be aware of the cartel involvement.

For sectors other than the construction sector, there are two options. The first one is the end date of the cartel as defined in the decision by the NMa. However, it might be the case that a future employer does not know about the existence of the cartel when the cartel ended but no decision has yet been published by the NMa. Therefore, a second option is the date that the NMa publishes its decision on the cartel case. Both options are used and two datasets are made. One that will include all the executives who got a new job in the period between the end date of the cartel and the date of the decision by the NMa. This dataset will be called Dataset 1. The other will include all executives that left the cartel company after the publication date of the decision, which will be called Dataset 2. Executives that left the cartel company before the end of the cartel are not included.

For the construction sector also two options exist. The first option is to use the moment at which the whistleblower told about the practices in this sector. This was in November 2001³. At that moment it was not clear yet which companies were involved in the large cartel, but future

³ From January 1998 (and earlier) until December 2001, several companies in the construction sector engaged in price agreements or agreements about dividing the geographical market. The NMa investigated this sector and wrote report 4155 in which the companies are listed which were involved in this mass fraud. (NMa, 2004a). In total, the NMa had to deal with 650 companies that were involved in the “construction case”. (NMa, 2004b) This all came to light in November 2001 due to the statements of whistleblower Ad Bos.

employers could be alerted about the possibility of the cartel-involvement of applicants from a construction company. The second date is when the NMa published report 4155 at the end of the investigations (13 October 2004). In this report most of the companies that applied for leniency or handed-over their administration are included. This second date may be the most suitable since then, future employers could know for sure whether a participant came from a cartel involved company. As with the other sectors, two datasets are made to compare. Dataset 1 will include the managers that left the cartel company between November 2001 and October 2004 and Dataset 2 will include the managers that left the company after October 2004.

3.2 Control group

The control group consists of managers of similar companies (in sector and size) as the cartel involved companies but differ in the way that they were never prosecuted for cartel involvement. In theory, the control companies could also be cartel companies, but since they are not prosecuted, the managers do not face possible career effects. The control companies are selected by picking a company from the peer group of the cartel company in the Amadeus database⁴. Here, the size of the company and the type of activities (sector) are criteria to form a peer group for companies. As is well known, a lot of companies in the construction sector were involved in cartel fraud. Therefore, it is not worthwhile to make a control group for that sector. In this case a control group is composed from the general sector, consisting of 50 managers from 13 companies using the same selection method as before.

3.3 Future careers

To find the current jobs of the managers, the Company.info database is used⁵. Here 750,000 managers and members of boards of directors can be found. This database has some drawbacks. Only management functions and functions in the board of directors are included in the database. So if, a former cartel manager still works at the cartel company after the prosecution but no longer at a representative level, he is not included in that database. Also, managers that are retired are not included.

It might be the case that a manager of a cartel company got another job somewhere else before he retired. Also former cartel involved managers could have had more than one job after the cartel, but searching on managers, Company.info only publishes the current job.

In the next chapter, the model for career development is explained.

⁴ Amadeus is a database with financial, economic and location information of European companies.

⁵ Company.info is an online database with information about all companies in the Netherlands. Amongst others annual reports, press articles, market analyses, managers and board of directors and extracts of Chamber of Commerce are found here. More information on www.groep.company.info.

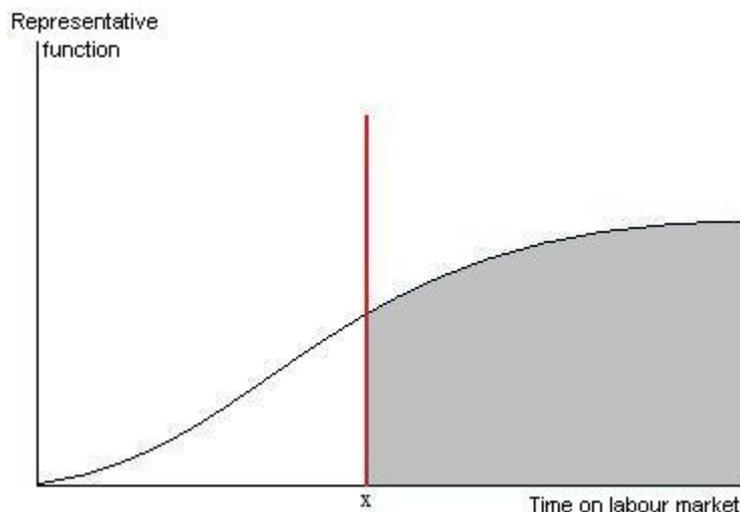
4 Career development

The model for career development is explained in paragraph 4.1. This model helps with the further analysis of career development. The model formulates career outcomes by which the career development for each manager can be categorized. Paragraph 4.2 shows the division of the cartel and control managers into these career outcomes and paragraph 4.3 compares the outcomes for the two groups of managers.

4.1 Model for career development

In figure 1 a typical career path for managers is shown by the upward sloping curve. Suppose that at time x in the life of a manager the cartel is detected and the company and/or manager is punished. Does, after time x , the career follow its original path or is there a negative effect on the manager's career which causes a lower or even no representative function (as shown on the y-axis)? If there is a negative effect, as expected in this research, how does one's career evolve afterwards? Does it get back to its original path or to a lower path? The possible negative career outcomes are indicated by the grey area since there is uncertainty about the career path of a cartel involved manager after the prosecution.

Figure 1 Typical career path



Knowledge about the typical career path of managers is needed. This development can then be compared with the path for cartel involved managers after cartel detection and punishment. The group of not-cartel involved managers functions as a control group, which represents the typical career path of managers. Career theories are investigated but were not useful for this research as its implications could not be exploited due to limited availability of data.

To analyze the career of a manager after cartel involvement, there are three possible situations after the prosecution. These situations do not differ with the age of a manager.

They are formulated in statements to function as criteria to divide the potential career development into three categories⁶.

- A manager moves to a non-representative job or retires;
- A manager keeps his/her representative job at the cartel involved company or a manager gets a representative function at another prosecuted cartel involved company;
- A manager moves to a representative job at another company.

It is not possible to distinguish between retired cartel involved managers and managers that currently have a non-representative function. Therefore, this is considered to be one category instead of two (the first statement). From the statements it appears that a distinction is made between representative jobs (the last two statements) and non-representative jobs (the first statement). Within a representative function, the distinction is made between a cartel company (the original or another cartel involved company, the second statement) and another company (the last statement).

A distinction could be made between better or worse jobs. This could be done with the salary as criterion. Since salary levels are not public information for all companies, one can look at the size of the company since research suggests that there is a positive relation between the salary of top representative functions and the size of a company (Firth et al., 1999). However, this variable appeared to be highly insignificant and therefore, this distinction is not made.

This paper makes the assumption that the whole management of the cartel involved company was aware of the cartel and therefore, could be held responsible for it.

4.2 Data description

4.2.1 Cartel managers

In the construction sector, 25 prosecuted cartel companies that are Dutch, not merged and registered at the Chamber of Commerce database were found. 16 contained useful information about their management. For these 16 companies there are 31 managers that were in function during the cartel. In table 1 one can see the division of these 31 managers over the three categories of career after cartel prosecution.

Starting with 24 cartel companies in the other sectors⁷, that are Dutch, not merged and registered at the Chamber of Commerce database, 18 companies had management data available. For convenience purposes this group is called the general sector in this research. For these 18 companies, 50 managers are found. These are also included in table 1.

For both sectors, a small majority of the cartel involved managers does not have a representative function. Remarkable is that the results differ per sector. In the construction sector almost one third of all managers has a representative job at another company. Of the managers that did get a representative job at another non-cartel company, only four are still working in the construction sector.

For the general sector the opposite is true and only 22% of the managers has found a representative job at another company. The large majority has no representative function.

⁶ A representative job is in this paper defined as a management function or a function in the board of directors.

⁷ This group contains several sectors, amongst others the telecom sector, bike manufacturing sector, fish sector and the gas selling sector.

In sum, the group of managers that still has a representative function is larger in the construction sector than in the general sector, respectively 67.7% versus 36%.

Table 1 Small majority of all cartel managers has no representative function after cartel⁸.

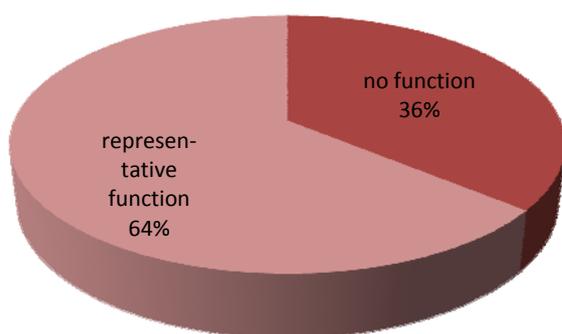
Category	Construction sector		General sector		All sectors	
	Frequency	%	Frequency	%	Frequency	%
No representative function	10	32.3	32	64.0	42	51.8
Function at cartel company	12	38.7	7	14.0	19	23.5
Function at other company	9	29.0	11	22.0	20	24.7
<i>Total</i>	<i>31</i>	<i>100.0%</i>	<i>50</i>	<i>100.0%</i>	<i>81</i>	<i>100.0%</i>

4.2.2 Control managers

The group of control managers consists of 50 managers from the general sector. Since the total group of possible non-cartel involved companies in the general sector is very large, the use of statement 2, *a representative function at the same or another cartel company*, is of little value for comparing the control group with the cartel involved managers⁹. Therefore, for the comparison of the cartel managers with the control managers, only two values for career are used; no representative function and representative function (both at the same as another company, category 2 and 3). For the econometric analysis in chapter 5, the comparison between the both groups will therefore only be done by means of a binary logit model. Part two of this research, the effect of different factors on the career of cartel managers is done with a multinomial model.

As is shown in figure 2, the majority of the control managers has a representative function. In the next paragraph this outcome will be compared with the career development of the cartel involved managers.

Figure 2 Majority of managers from control group has representative function



⁸ The division in this table is based on 16 of the 25 cartel companies in the construction sector and 18 from the 24 cartel companies in the general sector. Hence, it represents the majority of all cartel companies and its managers.

⁹ It appears that only 4% of the control managers is still at the same company or at a company from the selected sample. Due to the small size of the sample, this percentage is relatively low.

4.3 Comparing cartel managers with control managers

The careers of the cartel managers as described in table 1, are compared with a control group of non-cartel involved managers to see whether the career developments are different. When a significant difference between the career development of the two groups is found, it can be concluded that cartel involvement affects the career of the managers.

The best way to compare the control managers with the cartel involved ones is by comparing them only to the managers from the general sector since all the control managers are from the general sector. Notice that in this comparison, there are only two possible outcomes for career.

As shown in figure 2 and figure 3, the division between the two categories is completely opposite for the control and cartel involved managers. All figures are characterized by a negative effect of cartel involvement on the career of the managers. The first two are significant on a 5% level, the third at 10%.

Figure 3 Majority of cartel managers in general sector has no representative function (see table 1)

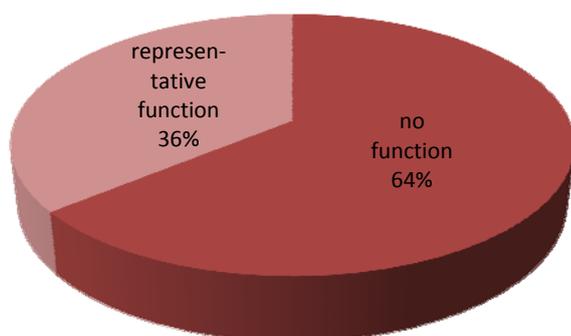
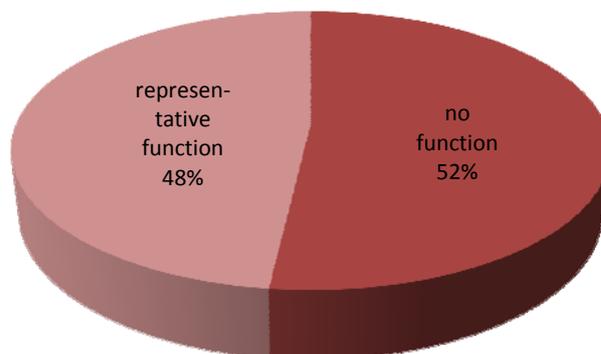


Figure 4 Small minority of all cartel managers has representative function (see table 1)



In table 2, the number of managers per group with a representative function is shown, together with the confidence interval of this number. Using the confidence interval a range for the percentage of managers with a representative function is calculated (see third column)¹⁰. The percentages in the figures might vary within this confidence percentage without changing the conclusions.

¹⁰ The confidence interval of *all cartel managers* is not representative since this group is significant at 10% and the confidence interval is set at 5%.

Table 2 All groups show a negative effect of cartel involvement on career

Group	Managers with representative function	5% confidence interval	Figure
Control managers in general sector ¹¹	32 out of 50	25-30 out of 50 50-78% with representative function	2
Cartel managers in general sector	18 out of 50	11- 25 out of 50 22-50% with representative function	3
All cartel managers ¹²	39 out of 81	30-48 out of 81 37-59% with representative function	4

Figure 2 and 3 clearly indicate that the career development for the two groups of managers (cartel group and control group) are different and that the cartel-involvement negatively affects the career. 64% of the managers from the control group have a representative function while this is true for only 36% of the cartel involved managers.

Comparing the control group with all cartel involved managers (general and construction sector), gives a less drastic difference, as is seen in figure 4. However, this is mainly because 67.7% of the cartel managers from the construction sector were able to keep their representative function. However, also for this figure, there is a statistically significant (at 10%) negative relation between cartel involvement and career.

These first descriptive results lead to the tentative conclusion that the career of managers in the general sector is negatively influenced when they have been involved in a cartel. This conclusion is tested in paragraph 5.2 using a binary logit model.

Furthermore, part two of this research investigates whether this negative effect is influenced by factors such as the company size, period of switching jobs, the punishment factor and the financial penalty set by the NMa, described in paragraph 5.1. This is done by using a binary and multinomial logit model (with three outcomes for career), in paragraph 5.3.

¹¹ The significance of this group is the same as for 'cartel managers in general sector'. A logistic regression of cartel involvement on career for all managers (cartel and control) in the general sector is run.

¹² Significant at 10%.

5 Empirical results

In this chapter the comparison of the career development of cartel and control managers is tested more profoundly to find whether cartel involvement has an effect on the career of a manager. Furthermore, the effect of explanatory variables on the career development of cartel managers is examined.

First the explanatory variables are explained and described. In paragraph 5.2 the effect of cartel involvement on one's career is examined using a binary logit model and in paragraph 5.3 the factors influencing the career outcome are analyzed using both a binary and multinomial logit model.

5.1 Description explanatory variables

In this paragraph the explanatory variables which might influence the career development (*career_binary*) are described. The following variables are included: a dummy for cartel involvement, the fine and the punishment factor set by the NMa, a dummy variable to indicate in which sector the cartel was active¹³, a dummy variable for Dataset 1 and 2¹⁴, and the age of the manager.

The expected effect on the dependent variable career for all independent variables is presented in table 3.

As shown in chapter 4, cartel involved managers face negative career effects compared to non-cartel involved managers. This outcome is represented by a dummy for cartel-involvement with managers from the control companies as the base group¹⁵. The hypothesis is that the managers from the control group have a higher (or positive) probability of getting or keeping a representative function.

Table 3 The expected effect on *career*

Variable	Expected effect on career
Fine	+
Punishment factor	-
Construction sector	-/+ less negative than general sector
Age	-
Dataset1	-/+ less negative than Dataset2
Cartel dummy	-

The size of the company influences the career of a manager. This is expected to be a positive relation since, even if cartel involvement has a negative effect on career, having experience as a manager of a large company might increase career chance at other companies. Even a negative

¹³ Only the construction sector and general sector are distinguished in this variable due to the low number of observations in the separate sectors of general sector.

¹⁴ General sector; Dataset 1: managers that left the company between the end date of the cartel and the date of the decision by the NMa. Dataset 2: executives that left the cartel company after the publication date of the decision. Construction sector; Dataset 1: managers that left the cartel company between November 2001 and October 2004. Dataset 2: managers that left the company after October 2004.

¹⁵ Cartel managers are given a 1 and managers from the control group are given a 0.

impact on one's career might then result in a representative function. This is measured by the amount of the fine, since the fine takes up about 10% of the revenue of the company¹⁶. It might be assumed that the larger the company, the higher the revenue and hence the fine¹⁷.

The expectation is that the higher the anti-competitiveness of the cartel, the less a manager is able to keep or get a representative function. This is measured by the punishment factor announced by the NMa in its decisions (*rekenfactor*, in Dutch)¹⁸. This depends among others on the duration of the cartel.

Being active in a cartel in the construction sector might diminish somewhat the negative effect on one's career since a lot of companies in that sector have been involved in a cartel. The hypothesis is that this only works for intra-sector job changes since the culture in the general sector is expected to be different.

The expectation is that age negatively influences the career since the older a person, the higher the probability on retirement.¹⁹ Regarding Dataset 1 and 2, the expectation is that future employers are more aware of the cartel-involvement of the managers when the manager applies for a new job at a later point in time than directly after the end of the cartel. Hence the managers of dataset 2 are assumed to face more negative results.

In Table 4, the descriptive statistics of the dependent and independent variables are summarized. In the dependent variable *career-binary*, also the control group is represented. This is also the case for the independent variable *cartel dummy* which indicates that 62% of all managers in the analysis are cartel managers (81 managers of the 131 in total). For the other variables, the cartel and control managers are described separately.

Since the managers from the control group did not get a fine and no punishment factor, and are all from the general sector, they have no value for these independent variables. The only independent variables for the control group that do have a value in this analysis are *age* and *dataset1*. These independent variables are shown at the bottom part of Table 4. Comparing the age of cartel managers with that of control managers shows that, not only are the control companies similar to the cartel companies, but also the managers are rather similar as appears from the average age. In the analysis, these variables are included in the variable *age* and *dataset1*.

¹⁶ The fine is not always 10% of the revenue of the company. The amount can be multiplied with a factor representing the punishment factor. When a company applies for leniency, the fine can be reduced. No companies from this dataset applied for leniency.

¹⁷ A combination of the fine and punishment factor is not statistically possible. Fine divided by punishment factor gives collinearity with cartel dummy and the other combination are not significant.

¹⁸ The percentage for the financial penalty is set at 10% of the revenue of the company. This 10% is multiplied with the punishment factor which represents the anti-competitiveness of the cartel. For most conducts, this factor ranges from 1.5 to 3 (NMa, 2007).

¹⁹ When a manager is retired it is found in the group of *no representative function*.

Table 4 Descriptive statistics for dependent and independent variables

Variable	Number observations	Mean	Standard deviation	Min	Max
Career_binary	131	0.54	0.50	0	1
Independent cartel variables					
Fine (in thousands)	81	3505.38	4948.71	5	12630
Punishment factor	81	1.42	0.66	0.2	2.42
Construction	81	0.38	0.49	0	1
Age	80	59.45	9.27	35	87
Dataset1	81	0.28	0.45	0	1
Independent control group variables					
Cartel dummy	131	0.62	0.49	0	1
Age	50	61.92	9.16	46	89
Dataset1	50	0.56	0.50	0	1

* one observation is missing.

5.2 Cartel versus control managers

In paragraph 4.3 the career development of cartel and control managers is compared based on the number of managers with a representative function after the cartel prosecution. The conclusion in 4.3 is that the career of managers in the general sector is negatively influenced when they have been involved in a cartel. The effect of cartel involvement on the career of managers from both sectors was less clear.

In this paragraph, this effect is analyzed by means of a binary logit model with two career outcomes; no representative function and a representative function.

The regression is as follows²⁰:

$$\text{Career_binary} = \beta_0 + \beta_1 \text{fine} + \beta_2 \text{punishmentfactor}^2 + \delta_1 \text{construction} + \beta_3 \text{age} + \delta_2 \text{dataset1} + \delta_3 \text{carteldummy}$$

Table 5 Regression output of binary logit model

Variable	Coefficient	P> z
Fine (thousand)	0.0002291	0.000*
Punishment factor ²	-0.0180903	0.911
Construction	2.411759	0.000*
Age	-0.0141913	0.521
Dataset1	-0.2627717	0.531
Cartel dummy	-2.557122	0.000*
Constant	1.606256	0.206

N=130, Pseudo R² = 0.1581 Prob > Chi2 = 0.0001

* = significant at 5% level

As can be seen in table 5, this logit regression has a R² of 0.1581 which is rather low. This model has a significant Chi² and hence points at a relationship between *career* and the explanatory variables. The variables *fine* and *cartel dummy* have the expected signs. Whether *construction* has the

²⁰ In this model, the square of *punishment factor* is taken since this gives the lowest Bayesian Information Criterion (BIC) outcome.

expected effect on one's career can be determined by the marginal effect. This effect calculates the change in the probability on a representative function, by a shift from the general sector to the construction sector.

The sign of *cartel dummy* indicates that being a cartel involved manager has a negative effect on your chances for a representative function.

To interpret the results from table 5, the marginal effects (ME) are calculated. The following situation is taken as benchmark: the fine is 3,505 thousand euro (the mean), the punishment factor² is 1.5 (the mean), the cartel was active in the general sector, age is 59.5 years and the manager is found in Dataset 2. Table 6 gives the probabilities that managers have a representative function (at the cartel company or other company) for cartel managers and control managers.

Table 6 Non-cartel involved managers have higher probability of representative function

Variable	ME for cartel managers	ME for control managers
Probability of representative function	26.3%*	82.1%*

* this does not add to 100% since these are not two different outcomes of *career* but a distinction between the two values of the independent variable *cartel dummy*.

This same model cannot be used to analyze the effect of all the different explanatory variables on the career of the managers. This is because of collinearity of *punishment factor* and *fine* with *cartel dummy*. Especially the correlation between *punishment factor* and *cartel dummy* is high (see table 7).

Table 7 High correlation between *punishment factor* and *cartel dummy*

	Cartel dummy
Punishment factor	0.80
Fine (thousand)	0.40

Furthermore, the number of control managers that have a representative function at the same company (or at another company within the control group) is small due to the small size of the control group (see paragraph 4.2.2). Therefore, the analysis of the independent variables is presented in paragraph 5.3, both with a binary and multinomial logit model.

As discussed in paragraph 4.3 and at the beginning of this paragraph, the career of managers in the general sector is negatively influenced when they have been involved in a cartel. The binary logit model shows a negative effect of cartel involvement on the career of managers. Furthermore, the marginal effects indicate that a cartel involved manager has a lower probability of a representative function than a control manager. It can therefore be concluded that cartel involvement negatively affects the career of managers.

5.3 Career development cartel managers

In the last paragraph it is concluded that cartel involvement has a negative effect on the career of managers. In this paragraph the different factors influencing the career of the cartel manager are analyzed.

First a binary logit model is used and later on a multinomial model. In table 8 the values for the dependent variable career are shown.

Table 8 Values of *career* in binary and multinomial model

Career_Binary	Career_Multinomial ²¹
No representative function	No representative function
Representative function	Function at cartel company Function at other company

Binary model

The regression is as follows:

$$\text{Career_binary} = \beta_0 + \beta_1 \text{fine} + \beta_2 \sqrt{\text{punishmentfactor}} + \delta_1 \text{construction} + \beta_3 \text{age} + \delta_2 \text{dataset1}$$

The signs of the explanatory variables and their significance are the same as is shown in table 5 except *punishment factor*²². To calculate the marginal effects, the same benchmark situation is used as described in paragraph 5.2 except that *punishment factor* ($\sqrt{}$) is now 0.5. The marginal effects of the explanatory variables in this situation are shown in table 9.

Table 9 Marginal effect on probability of *career* for cartel managers²³

Variable	Marginal effect
Probability of representative function = 58.6%	
Fine (thousand)	+ 0.0059%
Punishment factor ($\sqrt{}$)	- 46.0%
Construction	+ 34.0%

The probability of a representative function is 58.6% in the benchmark situation. The marginal effect of an increase of the fine by 1 million euro, increases with the level of the fine. A manager has at most a 6.1% higher probability when the fine increases by 1 million. This is when the fine is between 2.7 million and 3.2 million euro. The probability of a representative function also increases with the amount of the fine.

As is shown by the negative sign of the marginal effect, the higher the *punishment factor* ($\sqrt{}$), the lower the probability of a representative function (see also footnote 22). The size of the marginal effect of *punishment factor* decreases with the value of the *punishment factor*. At the highest value, 1.55, the marginal effect is at the lowest, 20.4%.

The managers from the construction sector have a higher probability of a representative function than those from the general sector. In the benchmark situation the probability of a representative function increases with 34% if a manager was active in a cartel in the construction sector.

²¹ 1) A manager moves to a non-representative job or retires;

2) A manager keeps his/her representative job at the cartel involved company or a manager gets a representative function at another prosecuted cartel involved company;

3) A manager moves to a representative job at another company.

²² In this model, *punishment factor* is significant with $P > |z| = 0.000$ and a coefficient of -2.16 . Pseudo R^2 is now 0.1463

²³ In this model, the square root of *punishmentfactor* is taken since this gives the lowest Bayesian Information Criterion (BIC) outcome.

Multinomial logit model

As is shown in table 8, the dependent variable *career* now has three outcomes.

The regression is as follows:

$$\text{Career_multinomial} = \beta_0 + \beta_1 \text{fine} + \beta_2 \sqrt{\text{punishmentfactor}} + \delta_1 \text{construction} + \beta_3 \text{age} + \delta_2 \text{dataset1}$$

In table 10 the marginal effect of the significant explanatory variables for each outcome of *career* is given.

Table 10 Marginal effects (ME) on probability of *career* outcome in benchmark situation.

Variable	ME No representative function	ME Function at cartel company	ME Function at other company
If the fine increases with 1.000 euro	- 0.0063%	ns	+ 0.0055%
If punishment factor ($\sqrt{}$) increases with one	+ 46.5%	ns	- 48.1%
If the firm is in the construction sector	- 42.4%	+ 34.9%*	ns
If the manager leaves the company earlier (dataset 1)	ns	- 10.2%	ns

ns = not significant, * = significant at 10%.

The benchmark situation is the same as described above (paragraph 5.3).

The variable *fine* has a negative effect on the outcome of *no representative function* and again a positive effect on *a function at other company*. Apparently, having experience as a manager of a larger company positively influenced your career opportunities on a representative function. The marginal effects for both categories of *career* show an inverse u-curve, first the marginal effect increases with the level of the fine, then the effect decreases.

The higher the *punishment factor* ($\sqrt{}$), the higher the probability of *no representative function*. This is shown by the positive sign of the marginal effect. This effect is expected since, the more intense the anti-competitiveness of the cartel, the higher the punishment factor and hence, the higher the probability of *no representative function*.

For *function at other company*, the effect is different. The higher the value of *punishment factor* ($\sqrt{}$), the lower the probability of a *function at other company*. This is also expected and points at a negative effect between the size of the anti-competitiveness of the cartel and the probability of a representative function at another company.

For both outcomes of *career*, the marginal effect decreases with the value of *punishment factor* ($\sqrt{}$). This indicates diminishing negative effects of the punishment factor on *career*.

Moving a manager from the general sector to the construction sector decreases its probability of *no representative function* by 42.4%.

For *function at cartel company* the marginal effect of Dataset1 is significant. This marginal effect indicates that when a manager leaves the cartel company earlier (before the decision by the NMa), he or she has a lower probability of a function at a cartel company. This is awkward since one would expect that the later the job switching, the higher the negative career effects. This negative marginal effect for managers that left the cartel company before publication of his cartel-involvement might indicate that other cartel companies prefer hiring a manager with cartel experience.

5.3.1 Conclusion on career development cartel managers

Table 11 summarizes the effect of the significant independent variables (at 5% level) on *a representative function*²⁴. These effects are the same for both models, except for Dataset1.

Table 11 Both models show the same relation between career and independent variables

Variable	Effect on representative function (at cartel and other company)
Fine	Positive effect
Punishment factor	Negative effect
Construction	Positive effect
Age	Not significant
Dataset1	Negative effect (only on function at cartel company)

Based on table 9 and 10

Increasing the financial penalty for cartel managers (*fine*) gives a higher probability of a *representative function* (at a cartel and other company) and a lower probability of *no representative function*.

The anti-competitiveness of the cartel gives the opposite effect. The *punishment factor* negatively affects the probability of a *representative function* (at a cartel and other company) and positively affects the probability of *no representative function*.

Having been involved in a cartel in the construction sector increases the probability of a *representative function*, compared to the general sector. The sector variable indicates that managers from the construction sector have a negative effect on *no representative function* and a positive effect on *a representative function* (at a cartel and other company). This means that managers from the construction sector have a higher probability of *a representative function* than managers from the general sector. The opposite is the case for *no representative function*.

²⁴ For the multinomial model this includes two outcomes; *function at cartel company* and *function at other company*.

6 Conclusion

This research investigates the career development of cartel involved managers after cartel prosecution. This is done in two ways; by comparing this development with a group of non-cartel involved managers from similar companies (in size and sector) in the same period; and by analyzing different factors which influence the career outcome of cartel involved managers. The first part is done by using a binary logit model. For the second part, a multinomial model is used with three outcomes; *no representative function* after the prosecution, a *representative function at a prosecuted cartel company* (the same or another company), and a *representative function at another company* (not a cartel company).

First, a binary model is run with only two values for career: *a representative function* and *no representative function*. Table 1 shows that a slight majority (51.8%) of all cartel managers has no representative function after the prosecution. This is not a convincing majority to conclude that cartel involved managers face negative career effects. Interesting to see is that the result differs for the two sectors. More cartel managers from the construction sectors have a representative function than those from the construction sector.

Comparing this outcome with the control group from the general sector shows that the career development of cartel involved managers is the exact opposite of the development of the control group. 64% of the cartel managers does not have a representative function. For the control group this is only 36%. This statistically significant difference points at a negative career effect of cartel involvement. Also the binary logit model concludes on a negative effect of cartel involved as shown by the negative sign of the coefficient for *cartel dummy*. Furthermore, the marginal effects indicate that a cartel involved manager has lower probability of a representative function than a control manager. It can be concluded that cartel involvement negatively affects the career of managers.

For the cartel involved managers, different explanatory variables are analyzed on their influence on the career after cartel prosecution. Table 11 shows the conclusion for the significant variables. The level of the fine positively influenced your career opportunities on a representative function. This positive effect shows that this variable better represents the size of the company and the experience as a manager of a larger company and hence has a positive influence on the career of the managers, than anti-competitiveness of the cartel.

The reputation of cartel involvement is different in the construction sector since managers from the construction sector have a higher probability of a representative function and a lower probability of no representative function after prosecution of the cartel.

The punishment factor has a negative effect on a representative function. This indicates that the competition authority could increase the career effects of cartel managers by increasing the punishment factor.

It is striking that the managers of the control group have a higher probability of representative functions than the cartel managers from the same sector (general sector). Therefore, this paper concludes that cartel involved managers face negative career effects after the prosecution of their cartel. This negative effect is lower if the cartel was active in the construction sector.

These results show that the cartel policy of the NMa (deliberate or not) is effective in establishing negative reputation damage of cartel involved resulting in negative career effects. This effect could be expanded by increasing the punishment factor and examining the reputation damage of the different punishment options of cartel-involvement. One option that could be examined is the civil prosecution of jail sentence. The expectation is that the reputation damage is large. This could be analyzed by comparing the career effects of cartel involved managers of countries with different punishment options. Another option for future research is to see whether the career effects differ for the different management functions.

References

- Amadeus database
- Chamber of Commerce, 2009, history files
- Company Info, 2010, company.info/
- European Commission: article 81, ec.europa.eu/competition/legislation/treaties/ec/art81_en.html, downloaded at May, 3, 2009.
- Firth, M., Tam, M., Tang, M. (1999). The determinants of top managerial pay, *The international journey of managerial science*, February 1999.
- Motta, M. (2004). *Competition Policy: Theory and Practice*, Cambridge University Press, New York.
- Nederlandse Mededingingsautoriteit (NMa):
 - 1998. Annual report NMa 1998
 - 2004a. Rapport GWW-activiteiten, Nummer 4155_1/50.R19, Den Haag, 13 October 2004.
 - 2004b. Annual report NMa and Dte 2004
 - 2007. Boetecode van de Nederlandse Mededingingsautoriteit, 29 juni 2007
 - 2009a. Dutch Competition Act article 6 and 7, chapter 3.
 - 2009b. Leniency program nmanet.nl/engels/home/Business_information/Leniency/index.asp downloaded at May, 2, 2009.