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The link between mobile telephony arrears and credit arrears

Working Paper Document

Helga De Doncker

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National Bank OF BELGIUM
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Abstract

At the request of the Minister for Climate and Energy, Paul Magnette, who is also responsible for Consumer Affairs, the NBB's Microeconomic Analysis Service conducted an investigation into the link between payment arrears for mobile telephony and arrears on loan repayments. In this inquiry, which was carried out using data drawn from the Proventel records and from the Central Individual Credit Register (CICR), the profile of people with arrears for both types of debt was also analyzed.

The profile analysis shows that defaulters with a Proventel registration form a specific group among CICR defaulters. People with payment arrears for both types of debt tend to have a demographic and credit profile which to a large extent matches that of CICR defaulters with no mobile phone payment arrears, but a few differences were also found between both groups of defaulters.

A number of trends in borrowing and repayment behavior turn out to be much more pronounced in the first of these two defaulter groups, but it is above all in regard to the age aspect that the differences are most striking. In cases where people have fallen behind in their payments for both types of debt, it actually turns out to be a younger group. Generally speaking, these borrowers take out their first loan at an earlier age, and they also tend to run up their first arrears when they are younger.

The inquiry further revealed that there is a statistically significant link between payment arrears for mobile telephony and credit arrears, and this applies for various definitions of payment arrears. Repayment problems generally tend to emerge sooner in payment arrears for mobile telephony bills than in arrears on loans.

A simple logistic regression model indicates that dummy variables for a Proventel registration, and for the duration of that registration, still have a definite predictive value with regard to credit arrears, after controlling for a number of demographic and credit variables in the model. As the assessment of the credit risk of private individuals is based on a set of socioeconomic variables, payment arrears for mobile telephony could therefore be a useful complementary variable in that assessment.

Key Words: consumer credit bureau, credits, mobile telephony, payment arrears

JEL Classification: D14, D18, G21 ,G29, L96, R26.

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Research results and conclusions expressed are those of the author(s) and do not necessarily reflect the views of the National Bank of Belgium or any other institution to which the author(s) is (are) affiliated. All remaining errors are ours.

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1 Introduction

At the request of the Minister for Climate and Energy, Paul Magnette, who is also responsible for Consumer Affairs, the Microeconomic Analysis service of the National Bank of Belgium (NBB) investigated the link between individuals' payment arrears relating to mobile telephony and their credit arrears. In the process, the profile of persons with arrears relating to both types of debts also had to be analysed.

Telephony debts are one of the types of debt which often appear in debt mediation cases, alongside credit debts[1]. However, there are also indications that, in regard to preferences for paying off the various types of debt, Belgian households accord low priority to telephony debts, particularly those relating to mobile phones[2]. In other words, this implies that if they have difficulty in repaying their debts, that will be reflected sooner in arrears on mobile telephony debts than in credit arrears.

The key question was therefore whether the study results would confirm these points. It might be possible then for mobile phone arrears to act as a warning light for future problems on the repayment of credit debts, thus forming an additional instrument in combating overindebtedness.

1 Surveys conducted by the Credit and Debt Observatory [Observatoire du Crédit et de l'Endettement], the Debt Mediation Services Advice Centre [Steunpunt voor de Diensten Schuldbemiddeling] of the Brussels Capital Region, and the Flemish Debt Mediation Centre [Vlaams Centrum Schuldbemiddeling].

2 "Annual survey of Belgian households" conducted by Intrum Justitia (2006).

2 Structure of the study

2.1 Research questions

The study of the link between mobile telephony arrears and credit arrears attempts to answer two questions. This report presents the findings on those two questions in two separate sections.

The first section analyses the profile of persons with arrears on both types of debt. More specifically, the debtors in question are compared with a benchmark group of debtors with no mobile telephony arrears. The profile analysis was based on the various types of information available in the data sources used.

The second section focuses on the link between the two types of arrears. It does not only investigate the existence of a significant link, but also examines additional requirements which must be fulfilled so that mobile telephony arrears can act as a warning light for future problems on the repayment of credit, namely the chronology of the two types of arrears and the predictive value of the Preventel registration.

2.2 Research database

2.2.1 Matching the data sources

The study analysed data from the Preventel records – i.e. the records of mobile telephony defaulters – and those of the Central Individual Credit Register (CICR) – i.e. the records of all mortgage loans and consumer credit contracted by individuals and any resulting defaults[3].

Before conducting the actual study it was necessary to match the data from the two sources. In accordance with the recommendation of the Personal Privacy Protection Commission, various measures were taken to respect the privacy of persons in the research database. More specifically, the link between the two databases was established by a third party, and the Microeconomic Analysis service only had access to an anonymised database for its study. That database contained the data present in both sources at the end of June 2008.

It should be noted that the identification of individuals is less certain in the Preventel records than in the CICR records, because the first source does not have the National Registration number, and therefore does not check the identification data against the National Register in the way that the CICR does. Among other things, that implies that changes of address are not automatically recorded, spelling errors in names and/or addresses are not automatically detected and corrected, and missing information (e.g. date of birth) is not automatically supplied.

Very strict criteria were therefore applied in matching the two data sources: only persons for whom there was a unique and completely exact correspondence between the identification data[4] in both databases were accepted as a "match". The postcode from the Preventel records was checked not only for a match with the address in the CICR records as at 30 June 2008, but also against previous addresses available in the CICR data warehouse[5]. Nevertheless, owing to the rather limited historical records in that data warehouse, it may have been impossible to establish links in the case of people who frequently change their address, because the CICR data warehouse only contains data from 2006 onwards, whereas the Preventel data go back to the autumn of 1998, when this defaulters database became operational.

On the basis of the criteria applied, over 480,000 persons were matched[6]. That number corresponds to around 10 % of the persons recorded by the CICR. A manual sample check by the CICR, comparing the full address from both databases for the persons in question, showed that the data were matched correctly.

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3 For more information on the Preventel database and the CICR, see annexes 1 and 2 respectively.

4 The identification data checked for a match concern more specifically the surname (phoneme), first name (initial), gender, date of birth and post code of the place of residence.

5 The CICR data warehouse stores the historical data for statistical purposes.

6 The Preventel database made available for matching comprised 1.5 million records. Since the correct identification of persons in this database is not totally guaranteed, it is not possible to say exactly how many different persons are recorded there.

2.2.2 Samples

Owing to performance problems it was not possible to conduct the study on the total number of linked persons. In order to ensure that the study was nevertheless representative, the actual analysis was conducted on a very large sample. More specifically, 20,000 persons were selected at random from the linked persons who still had credit outstanding at the end of June 2008 and were therefore still entered in the CICR records. That sample is referred to here as the "Preventel group".

Since Preventel is a negative database – in other words, it only includes defaulters – the comparison was based on an equally large sample[7] of persons in the CICR who did not satisfy the criteria for data matching[8] and who still had credit outstanding at the end of June 2008. In the case of the latter sample, referred to here as the "control group", it was therefore assumed that these were persons without any current or past arrears on their mobile telephony payments[9].

Both samples or groups were then divided into two sub-groups on the basis of credit repayment behaviour. The "defaulters" include persons who had a negative entry in the CICR at the end of June 2008, or in other words persons who at that time were still in arrears on at least one of their loans. Persons with a positive entry, who therefore had no arrears on any of their current loans, were classed as "non-defaulters" in both samples.

Finally, apart from the four sub-groups thus defined, a fifth sub-group was identified. Among defaulters in the Preventel group, separate calculations were done for persons who satisfied a stricter definition: the "defaulters – narrow definition" from the Preventel group. According to this narrow definition the persons in question still had an outstanding entry in the Preventel database at the end of June 2008. Their mobile telephony arrears were therefore "visible" to anyone who consulted the Preventel records at that time[10].

Table 1 shows the breakdown among the various groups and sub-groups for persons in the study sample.

Table 1 Composition of the research database

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of whom: narrow definition					
Number of debtors							
in units	7,183	4,640	12,817	20,000	723	19,277	20,000
in % of the group in question	35.9	23.2	64.1	100.0	3.6	96.4	100.0
Pm: % of debtors in the (sub-) group who have ever had a negative entry in the CICR	*100.0*	*100.0*	*16.1*	*46.2*	*100.0*	*1.7*	*5.3*

Sources: CICR, Preventel and own calculations.

7 In view of the size of the two samples, all statistical tests in the study were conducted at a significance level of 1 p.c.

8 Persons for whom the identification data match in the two data sets was only partial and/or non-unique were also eliminated from the control group.

9 Of course, this assumption is not entirely realistic. First, not all GSM-operators are members of Preventel, so that these records do not cover the entire population of defaulters. Second, there is nothing to indicate the extent to which persons in the control group possess GSM; moreover, they may have prepaid telephone cards (instead of a subscription).

10 For a clear understanding: the Preventel group includes persons who have been entered in the Preventel records at some time, regardless of whether their registration was still outstanding at the end of June 2008. If arrears giving rise to entry in the Preventel records have been cleared completely, the registration is "deactivated". From then on the registration is no longer outstanding and is no longer visible to operators consulting the records.

The breakdown shows that non-defaulters make up the majority in both groups. Nonetheless, there is a clear difference between the two groups in the proportion of defaulters (see also section 4.1), namely: 35.9 % in the Preventel group compared to 3.6 % in the control group. It is also noticeable that the percentage of non-defaulting persons who have ever had a negative entry in the CICR differs markedly between the two groups[11], namely 16.1 % in the Preventel group compared to 1.7 % in the control group.

2.3 Study limitations

For a correct interpretation of the research results, it is necessary to draw attention to the limitations of this study. Those limitations are due largely to the non-exhaustivity of the Preventel database, but also to the uncertainty over identification of the persons in those records, owing to the absence of the National Registration number.

As described in section 2.2.1. above, this last point led to the use of very strict criteria for linking the CICR and Preventel data. Since it was also necessary to rely on fairly limited historical records of addresses in the CICR data warehouse, this means that the number of linked persons is probably an underestimate of the true number appearing in both databases. In particular, the figures might be distorted, because in the case of the people who change their address frequently – who are often assumed to represent a higher risk of default [12]- it was not possible to get a match, or only in respect of some of their entries.

The breakdown of persons across the two groups – those with and without arrears on their GSM bills – is also only approximate, since the Preventel database is not exhaustive in a number of respects.

First, Preventel is a negative database which only includes mobile telephony defaulters. It was therefore necessary to adopt a working hypothesis in order to compose a group of persons without mobile telephony arrears.
Moreover, Preventel does not contain an exhaustive record of defaulters, because there is a minimum threshold for recording arrears, and not all operators on the mobile telephony market are members of Preventel[13].

Furthermore, the information recorded in Preventel is very brief; for example, the amounts of the arrears are not recorded, so that it is not possible to distinguish according to the scale of the arrears.

The registration procedures vary from one operator to another, creating uncertainty over the exact date of the default. That may have influenced the results of the second part of the study where the date aspect plays a role.

Owing to the technical limitations it was not possible to take account of the entire - often complex – borrowing and repayment pattern of the persons in the sample. Some aspects of the analysis therefore took account only of the first positive and the first negative credit entries, if any, relating to persons in the sample[14], and their first Preventel registration.

Lastly, the information obtained from statistics on population, credit and telephony available in the research database is obviously not enough to enable *a priori* a precise assessment of private individuals' solvency. In practice, this information is supplemented by other relevant socio-economic data (income, family composition, etc.). A full credit risk assessment of this kind is beyond the scope of this study owing to the lack of data available.

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11 In view of the data deletions prior to the existence of the CICR data warehouse, this percentage certainly underestimates the true percentage of persons who have had a negative entry in the CICR at some time.

12 See also section 3.1.3 Residence: number of known addresses.

13 Although the Preventel data which could be used for the survey go back to the autumn of 1998 – i.e. the time when the defaulters database became operational – they only concern registrations by the four operators still participating at the end of 2008: Base, Mobistar, Proximus and Telenet. In other words, all the data relating to operators who had already left Preventel at that time were deleted.

14 However, the "first" registrations naturally only correspond to the actual first registrations in so far as the full history of the debtor concerned is available in the CICR data warehouse, i.e. if no data were deleted before 2006.

3 Study results relating to the profile analysis of defaulters in the Preventel group

On the basis of the various types of information available in the CICR, namely demographic data, data relating to borrowing and credit repayments, and data relating to collective debt settlements, this section of the report profiles the persons in arrears on credit and mobile telephony payments.
It examines to what extent the characteristics of defaulters registered in Preventel correspond to the rest of the debtors in the CICR, and in particular to CICR defaulters.
Information derived from the Preventel registrations is also used in the profile analysis. In that case, the profile of Preventel defaulters is compared with that of non-defaulters in that group.

3.1 Demographic characteristics

3.1.1 Gender

Among defaulters in the Preventel group, men outnumber women at 57.4 % - or even 58.1 % if the narrow definition is used.

Table 2 Gender of the debtors
(in % of the total number of debtors in the (sub-)group at the end of June 2008)

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
Men	57.4	58.1	55.6	56.3	57.1	50.9	51.1
Women	42.6	41.9	44.4	43.7	42.9	49.1	48.9

Sources: CICR, Preventel and own calculations.

The data for the control group suggest that this is a phenomenon specific to defaulters.

For the control group as a whole, it is possible to state that the male/female distribution is fairly balanced, with respective proportions of 51.1 % and 48.9 % However, that overall picture fully reflects the situation concerning non-defaulters, who form the numerical majority, because there is a significantly higher percentage of men among the defaulters within the control group. More specifically, the men represent 57.1 %, which is virtually the same as the percentage of defaulters in the Preventel group[15].

Within the Preventel group, defaulters differ to some extent from non-defaulters; it can be said that the latter tend to hold an intermediate position between defaulters and non-defaulters in the control group. That intermediate position of the sub-group "non-defaulters- Preventel group" is a characteristic which also appears repeatedly in the following tables relating to the profile analysis. However, this report does not offer any systematic commentary on the results for that sub-group.

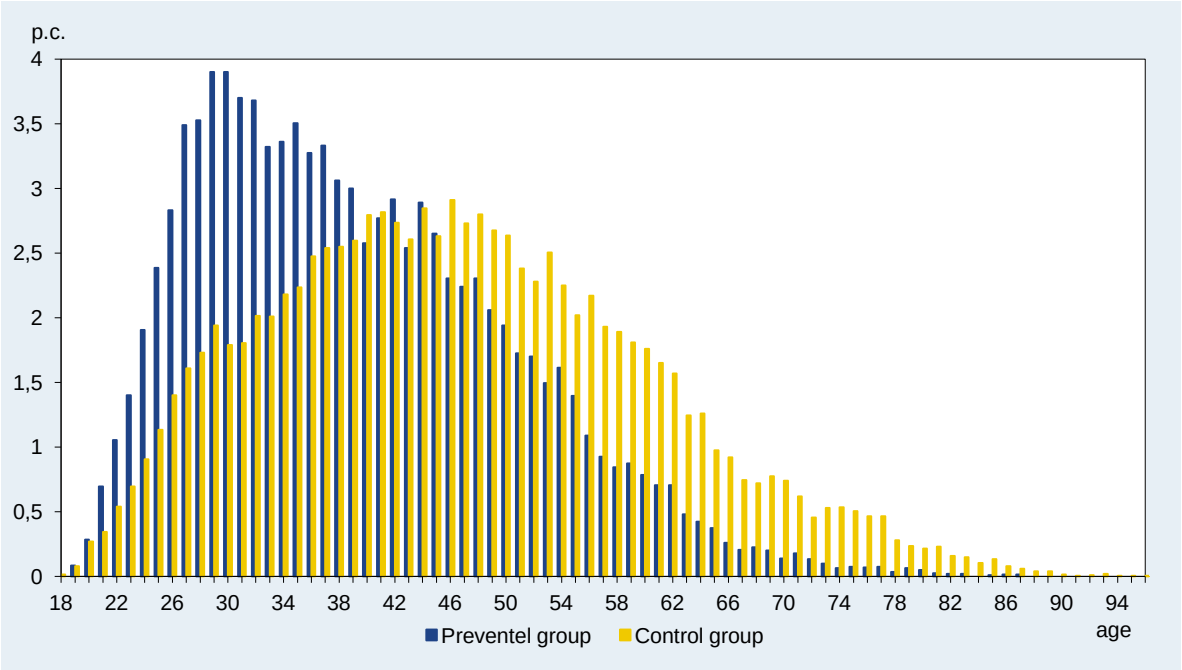
[15] For completeness, it can be said that the figures on the gender breakdown for the control group are representative for the CICR as a whole. At the end of June 2008, men represented 51.5 p.c. of the total persons recorded by the CICR; in the negative registrations, they represented 56.2 p.c.

3.1.2 Age

However, in regard to age - i.e. age at the end of June 2008 - defaulters in the Preventel group differ from defaulters in the control group.

Chart 1 and table 3 reveal that persons in the Preventel group are noticeably younger than those in the control group. It is striking that the "group effect" dominates; within each of the two groups, there is no statistically significant age difference between the sub-groups of defaulters and non-defaulters[16].

Chart 1 Age of debtors: frequency distribution
(end of June 2008)



Sources: CICR, Preventel and own calculations.

At the end of June 2008 the average age in the Preventel group was 39 years, compared to 46 years in the control group. The median values[17] for both groups were very similar to those averages, at 38 and 46 years respectively.

Table 3 Age of debtors: average and median
(in years, end of June 2008)

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
Average age	39	39	39	39	45	46	46
Median age	38	38	37	38	44	46	46

Sources: CICR, Preventel and own calculations.

[16] Variance analysis indicates that there is a statistically significant difference between the four averages. The Bonferroni test for the multiple comparison of averages further indicates that the difference in the averages for the sub-groups of defaulters and non-defaulters in both groups are not statistically significant, whereas the differences between the two groups are significant.

[17] The median value is the value below which 50 p.c. of the data fall. This alternative measure of the central tendency is less sensitive to extreme values than the average.

3.1.3 Residence

3.1.3.1 Country

The geographical distribution by country varies hardly at all from one sub-group to another: almost all debtors are resident in Belgium. More specifically, debtors whose place of residence is in Belgium represent 98.0 % of the defaulters in the Preventel group, a figure comparable to that for the other (sub-)groups; only in the case of defaulters in the control group is that percentage somewhat lower than for the rest, at 94.1 %

Table 4 Geographical distribution of debtors: breakdown by country
(in % of the total number of debtors in the (sub-) group, end of June 2008)

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
Belgium	98.0	97.6	98.9	98.6	94.1	99.0	98.9
Other country codes	2.0	2.4	1.1	1.4	5.9	1.0	1.1
of which: special status	0.8	1.0	0.3	0.5	2.1	0.3	0.3

Sources: CICR, Preventel and own calculations.

In regard to the “other country codes”, in all sub-groups this partly concerns persons with special status in the National Register - "exempt from registration" or "transferred abroad". The rest are debtors resident in other countries, predominantly neighbouring countries. Both the last two categories – persons resident abroad and those with special status – will be disregarded in the rest of the analysis by place of residence.

3.1.3.2 Region

The geographical distribution of defaulters in the Preventel group across the three regions largely tallies with that of defaulters in the control group. In particular, in both sub-groups of defaulters, Brussels – and especially Wallonia – is over-represented compared to the control group as a whole.

Table 5 Geographical distribution of debtors: breakdown by region
(in % of the total number of debtors in the (sub-)group, end of June 2008)

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
Brussels Region	10.8	11.6	12.2	11.7	13.7	8.2	8.4
Flemish Region	42.7	39.5	47.4	45.7	37.6	57.9	57.2
Walloon Region	46.5	48.9	40.4	42.6	48.7	33.9	34.4

Sources: CICR, Preventel and own calculations.

Wallonia accounts for almost half of the defaulters in the various sub-groups, at between 46.5 and 48.9 %, while representing only 34.4 % of debtors in the control group as a whole. The figure for Brussels ranges from 10.8 % to 13.7 % in the various sub-groups of defaulters, whereas this region accounts for only 8.4 % of the control group as a whole.

Conversely, debtors from the Flemish Region have a clearly less prominent position among defaulters in the Preventel group, namely 42.7 % (39.5 % in the case of the narrow definition), and defaulters in the control group (37.6 %), yet make up the bulk of the control group at 57.2 % Incidentally, in regard to the regional distribution the results for the control group are totally in line with the distribution for the CICR as a whole.

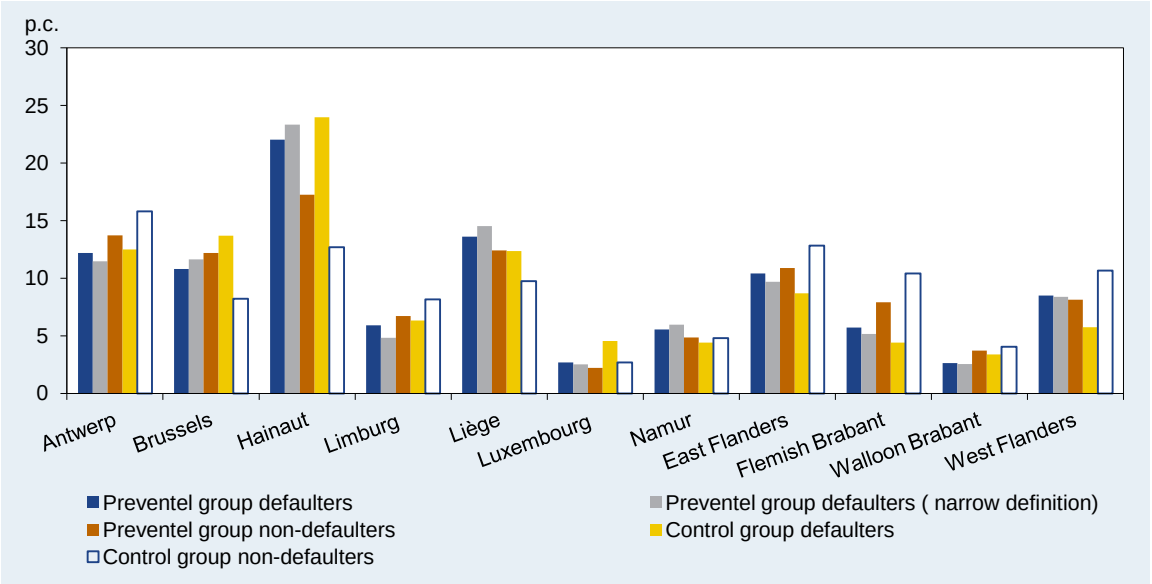
Nevertheless, within the Preventel group there is still a noticeable difference between defaulters and non-defaulters, at least in regard to the percentages for the Flemish and Walloon Regions. Once again, the non-defaulters tend to hold a position between defaulters on the one hand and, on the other hand, non-defaulters in the control group.

3.1.3.3 Provinces and districts

More detailed analysis of the place of residence at the level of the provinces shows that among defaulters in the Preventel group the province of Hainaut is clearly in first place.
The province of Liège, the capital region of Brussels and the provinces of Antwerp and East Flanders also have high percentages, in excess of 10 %

However, that high percentage needs to be qualified in the case of the last two provinces. In contrast to the other provinces mentioned, their share of defaulters in the Preventel group is still always lower than their share of the debtors as a whole, in so far as that can be deduced from the share of the provinces concerned among non-defaulters in the control group.

Chart 2 Geographical distribution of debtors: breakdown by provinces
(in % of the total number of debtors in the (sub-)group, end of June 2008)



Sources: CICR, Preventel and own calculations.

Provinces with a low percentage of defaulters in the Preventel group, namely below 5 %, are Walloon Brabant and Luxembourg. However, these are also provinces which represent a small proportion of debtors as a whole, if non-defaulters in the control group are once again taken as an approximation of that figure.

Overall, it can be said that the geographical distribution pattern of defaulters in the Preventel group tallies with the pattern of defaulters in the control group, as already noted above.

On the one hand, while non-defaulters in the Preventel group mirror the peaks and troughs of that pattern, they also differ less from non-defaulters in the control group.

The breakdown by place of residence at the district level (cf. chart A1 in annex 3) seems to bear out these findings.

3.1.3.4 Number of known addresses

As a result of the establishment of a data warehouse for the CICR data, there is a historical record of debtors' addresses. Use of those historical records in matching the CICR and Preventel data permitted identification of persons occurring with various addresses in the Preventel records. Consequently, it was an interesting exercise to examine on the basis of the number of known debtors' addresses in the two sets of data whether there was any discernible evidence supporting the common view that persons who often change their address are also less reliable payers.

However, since the historical records of addresses in the two databases are incomplete,[18] the results of that exercise must be interpreted with some caution. Nonetheless, it can be said that the results of the analysis of the available series of addresses do not contradict the popular view: the defaulters include a higher percentage of persons with multiple known addresses than the non-defaulters.

The percentage of debtors with multiple known addresses in the CICR seems to be highest in the sub-group of Preventel defaulters, where they actually represent a majority of 52.6 % (55.9 % for the narrow definition). Among defaulters and non-defaulters in the control group, the corresponding figures are 41.6 % and 23.3 % respectively.

Table 6 Debtors according to the number of known addresses in the CICR
(in % of the total number of debtors in the (sub-)group, end of June 2008)

Number of addresses	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
One	47.4	44.1	62.1	56.8	58.4	76.7	76.0
More than one:	52.6	55.9	37.9	43.2	41.6	23.3	24.0
of which							
Two	32.9	33.9	29.0	30.4	28.8	20.4	20.8
More than two	19.7	22.0	8.9	12.8	12.8	2.9	3.2

Sources: CICR, Preventel and own calculations.

If, in the case of persons with more than one address, a further breakdown is effected between "two" and "more than two" addresses – as it is not all that unusual to have two known addresses, especially in the case of a mortgage loan – there is still a difference between defaulters in the Preventel group and the other sub-groups examined. The largest number of addresses recorded for an individual debtor is 7, and that applies incidentally to a defaulter in the Preventel group.

The existence of a significant association between the number of known addresses and a negative CICR registration is indeed confirmed by the contingency table analysis of the above data[19].

[18] See section 2.3. Study limitations.

[19] There is association or dependency between two categoric variables if the distribution of one variable depends on the value of the second variable.

In comparison with the CICR database, the number of known addresses for debtors in the Preventel database is lower. For instance, the maximum number of known addresses for an individual debtor was "only" 5. However, the percentage of persons with more than one known address is also noticeably lower in the Preventel database, at around 10 % for all sub-groups. Nonetheless, it is revealing that, once again, the highest percentage clearly applies to defaulters in the Preventel group (11.2 %), and especially defaulters according to the narrow definition (12.09 %). Here, too, a contingency table analysis shows that there is a significant association between CICR registration status (end of June 2008) and registration in Preventel with one or more than one address.

Table 7 Debtors by number of known addresses in the Preventel database
(in % of the total number of debtors in the (sub-)group, end of June 2008)

Number of addresses	Preventel group			
	Defaulters		Non-defaulters	Total
		of which: narrow definition		
One	88.8	87.1	93.2	91.6
More than one: of which	11.2	12.9	6.8	8.4
Two	10.4	12.0	6.3	7.8
More than two	0.8	0.9	0.5	0.6

Sources: CICR, Preventel and own calculations.

There could be several reasons why the number of known debtors' addresses in the Preventel database is lower than in the CICR database. One is that the identification data in Preventel are not checked/updated on the basis of the National Register; another is that – as will be explained in more detail in section 3.4 – most debtors are registered only once in Preventel, and for a very short period.

Defaulting borrowers from the Preventel group have a very similar demographic profile to that of defaulters from the control group.
In both groups, men are more strongly represented and, in the geographical distribution, Brussels and above all Wallonia are more strongly represented.
An analysis of the historical records of addresses reveals that, among defaulting borrowers, there is a higher percentage of people with several addresses. However, this tendency seems to be even more marked among defaulters from the Preventel group than those from the control group.
In regard to age, defaulters in the Preventel group differ clearly from those in the control group, since the former group - as a whole - comprises younger people.

3.2 Credit characteristics

3.2.1 Borrowing behaviour

3.2.1.1 Credit type

Defaulters, and especially those in the Preventel group, mainly appear to use consumer credit. More specifically, this type of credit is used by around 97.0 % of the defaulters (broad and narrow definition) in the Preventel group, compared to 92.1 % and 73.8 % of defaulters and non-defaulters respectively in the control group. In the case of mortgage loans, the opposite is true: the percentages of debtors with that type of credit are 18.9 % and 23.4 % respectively for defaulters (narrow and broad definition) in the Preventel group, 32.6 % of defaulters in the control group and 59.7 % of non-defaulters in the control group.

Table 8 Debtors by credit type

(in % of the total number of debtors in the (sub-)group, end of June 2008)

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
Consumer credit only	76.6	81.1	59.1	65.4	67.4	40.3	41.3
Mortgage loans only	3.0	2.8	9.4	7.1	7.9	26.2	25.5
Both credit types	20.4	16.1	31.5	27.5	24.7	33.5	33.2
Pm: Total consumer credit	*97.0*	*97.2*	*90.6*	*92.9*	*92.1*	*73.8*	*74.5*
Total mortgage loans	*23.4*	*18.9*	*40.9*	*34.6*	*32.6*	*59.7*	*58.8*

Sources: CICR, Preventel and own calculations.

Once again, non-defaulters in the Preventel group hold an intermediate position. They differ from non-defaulters in the control group, but not to the same degree as defaulters in the Preventel group.

3.2.1.2 Number of loans

Defaulters in the Preventel group are more inclined to take out multiple loans than debtors in the control group. The percentage of persons recorded in the CICR at the end of June 2008 in respect of more than one loan came to 69.9 % for the first group, at more than 8 and 11 percentage points respectively above the corresponding percentage for defaulters and non-defaulters in the control group. The average number of loans contracted is therefore slightly higher in the case of defaulters in the Preventel group: 2.7 loans per person compared to 2.5 and 2.2 loans respectively for defaulters and non-defaulters in the control group.

Table 9 Debtors by number of loans: breakdown by credit type
(in % of the total number of debtors in the(sub-)group, end of June 2008)

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
Total loans							
One loan	30.1	33.3	30.2	30.1	38.3	41.6	41.5
More than one loan	69.9	66.7	69.8	69.9	61.7	58.4	58.5
Consumer loans							
One loan	35.4	37.3	37.5	36.7	46.2	53.6	53.3
More than one loan	64.6	62.7	62.5	63.3	53.8	46.4	46.7
Mortgage loans							
One loan	76.5	80.2	69.6	71.3	75.0	68.5	68.6
More than one loan	23.5	19.8	30.4	28.7	25.0	31.5	31.4
Pm: Average number of loans							
Total loans	*2.7*	*2.5*	*2.6*	*2.7*	*2.5*	*2.2*	*2.2*
Consumer loans[a]	*2.4*	*2.4*	*2.3*	*2.3*	*2.2*	*1.9*	*1.9*
Mortgage loans[a]	*1.3*	*1.4*	*1.3*	*1.3*	*1.4*	*1.4*	*1.4*

Sources: CICR, Preventel and own calculations.

[a] For the calculation of this average, only persons in the(sub-)group who had actually contracted this type of loan were taken into account. Consequently, the sum of the averages for consumer loans and mortgage loans does not correspond to the average for total loans.

The breakdown by credit type shows that the differences in the number of loans contracted between defaulters in the Preventel group and those in the control group concern consumer loans rather than mortgage loans.

The majority of persons in the control group who contract consumer loans, namely 53.3 %, have only one such credit agreement in their name. However, for defaulters in the control group the opposite is true: a majority of 53.8 % are recorded with more than one consumer loan. However, in the case of defaulters in the Preventel group, that tendency towards multiple loans is even more marked: 64.6 % are recorded in respect of more than one consumer loan.
The average number of outstanding consumer loans is therefore slightly higher – at 2.4 - for defaulters in the Preventel group than for defaulters and non-defaulters in the Preventel group, where the figures are 2.2 and 1.9 respectively.

3.2.1.3 Loan portfolio by credit type

Both the above elements, namely the percentage of persons with consumer credit (mortgage loans) that is higher (lower) for defaulters in the Preventel group than for those in the control group, and the average number of consumer loans contracted that is higher in the Preventel group, naturally reinforce one another in the composition of the loan portfolio (on the basis of the number of loans).

Table 10 Loan portfolio by credit type – on the basis of the number of loans
(in % of the total number of debtors in the (sub-)group, end of June 2008)

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
Consumer credit	88.5	90.7	78.0	81.8	81.8	61.5	62.3
Of which:							
Instalment sale	9.3	10.5	6.3	7.4	7.1	5.1	5.2
Instalment loan	31.0	30.4	25.3	27.3	32.8	19.0	19.5
Credit facility	47.8	49.2	46.4	46.9	41.7	37.4	37.6
Financial leasing	0.4	0.6	0.0	0.2	0.2	0.0	0.0
Mortgage loan	11.5	9.3	22.0	18.2	18.2	38.5	37.7

Sources: CICR, Preventel and own calculations.

On the basis of the data for the control group, it can be said that the proportion of consumer credit is higher for defaulters than for non-defaulters. The ratio of consumer credit to mortgage loans is approximately 80-20 for defaulters, whereas in the case of non-defaulters it comes to around 60-40.
However, in the case of defaulters in the Preventel group the dominance of consumer credit is even more marked: on the basis of the broad definition, the figure is 88.5 %, i.e. almost 90 %; on the basis of the narrow definition it peaks at 90.7 %. The difference between defaulters in the two groups has to be attributable primarily to credit facilities.

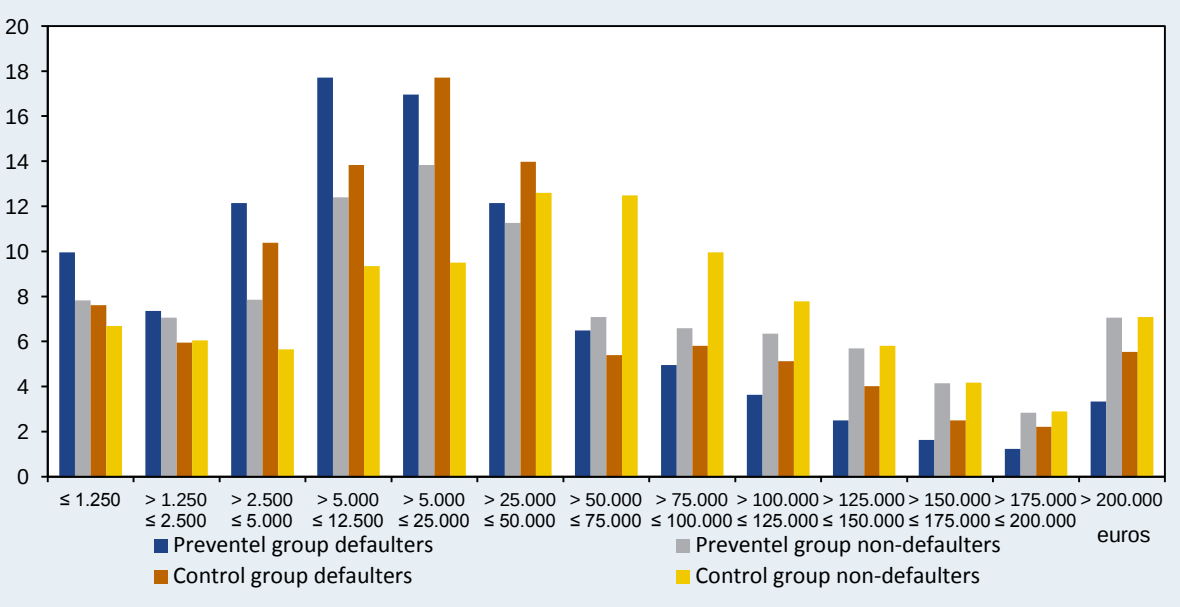
3.2.1.4 Amounts of credit

Although defaulters in the Preventel group are inclined to contract more loans, they have a lower total outstanding credit debt[20,21] . That is clearly apparent in the comparison of the frequency distributions of the total outstanding debts for the four sub-groups in chart 3.

[20] In the case of credit facilities, the amount of the authorized credit facility was taken into account since the CICR does not offer information on the actual amount drawn.

[21] Variance analysis shows that there is a statistically significant difference between the four averages (Welch-ANOVA test). According to the Bonferroni test, the average for defaulters in the Preventel group differs significantly from that for the other sub-groups; however, that same test reveals no demonstrable difference between the average debt of non-defaulters in the Preventel group and that of defaulters in the control group.

Chart 3 Total outstanding credit debt of debtors in euro: frequency distribution
(in % of the total number of debtors in the(sub-)group, end of June 2008)



Sources: CICR, Preventel and own calculations.

It seems obvious to look for the reason for this apparent contrast between the number of loans and the total credit debt in the credit mix: defaulters, and especially those in the Preventel group, have relatively fewer mortgage loans, and that form of credit is generally associated with larger amounts than consumer credit.

However, the credit mix appears to provide only a partial explanation. The average and median values for the outstanding debt per credit type reveal that defaulters in the Preventel group have a lower total amount outstanding in their name for both consumer credit and mortgage loans than defaulters in the control group. While defaulters in the Preventel group are therefore inclined to contract multiple consumer loans (see section 3.2.1.2 above: Number of loans), it appears that the contracts are relatively smaller, on average (see table A4 in annex 3).

Table 11 Outstanding credit debt[a] of debtors by credit type: average and median
(in euros, end of June 2008)

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
Total credit							
Average amount	40,900	33,100	67,100	57,700	61,300	76,300	75,700
Median amount	14,100	11,000	26,300	20,300	19,800	50,600	49,700
Consumer credit[b]							
Average amount	16,500	14,500	16,900	16,700	20,200	14,100	14,400
Median amount	9,700	7,900	11,000	10,400	12,000	8,100	8,300
Mortgage loans[b]							
Average amount	106,800	99,900	126,600	121,800	130,900	110,400	110,800
Median amount	80,600	74,600	103,000	98,600	86,400	85,000	85,000

Sources: CICR, Preventel and own calculations.

[a] The amounts in the table are rounded off to the nearest hundred.

[b] In calculating the averages (and medians), only persons in the sub-group who had actually contracted this type of loan were taken into account. Consequently, the sum of the averages for consumer credit and mortgage loans does not correspond to the average for total credit.

The composition of the credit portfolio on the basis of the credit amounts rather than the number of loans reflects those relatively smaller amounts of consumer credit in the case of defaulters in the Preventel group. Consumer credit represents 88.5 % (90.7 % narrow definition) on the basis of the number of loans, but only 39.1 % (42.7 %) on the basis of the amounts.

Table 12 Loan portfolio by credit type on the basis of the amounts of credit
(in % of the total amounts of credit for the (sub-)group, end of June 2008)

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
Consumer credit	39.1	42.7	22.8	26.9	30.3	13.6	14.1
of which:							
Instalment sale	2.2	2.6	1.6	1.8	1.5	1.3	1.3
Instalment loan	29.4	31.2	16.7	19.9	23.0	8.9	9.3
Financial leasing	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Credit facility	7.4	8.8	4.5	5.2	5.8	3.4	3.5
Mortgage loan	60.9	57.3	77.2	73.1	69.7	86.4	85.9

Sources: CICR, Preventel and own calculations.

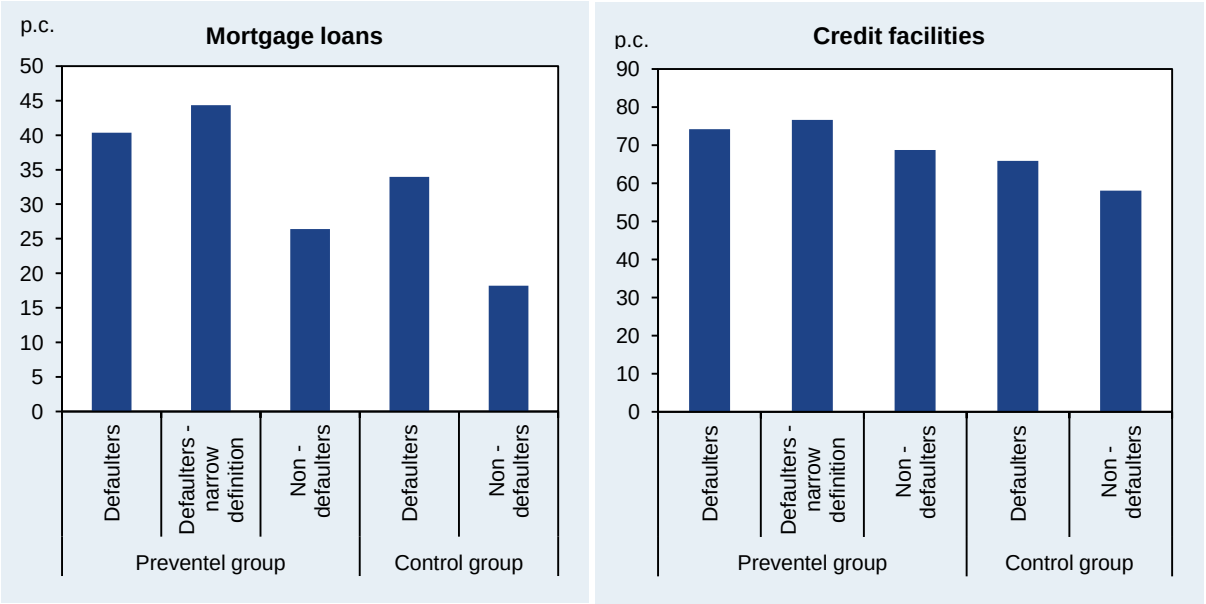
3.2.1.5 Lenders[22]

The CICR Statistical Brochure and a previously published analysis of the CICR data[23] show that the total market shares of the various categories of lenders vary greatly. That finding must be attributed partly to the fact that not all lender categories are present (to the same extent) on all segments of the private credit market.
For instance, the credit institutions category accounts for the bulk of the mortgage loan and instalment loan segments, while the other lenders category[24] predominates in the case of instalment sales and credit facilities.

Analysis of the data from the two samples reveals that this also applies to defaulters in the Preventel group. Just as in the case of the other sub-groups examined, credit institutions are the principal mortgage lenders and providers of instalment loans, while other lenders dominate in the case of the other two types of credit.

However, it can be said that defaulters in the control group make almost systematically greater use of other lenders than non-defaulters in the same group (see table A5 in annex3). That tendency is even more marked among defaulters in the Preventel group; of all sub-groups, they borrow the most from other lenders. The variations in market share of the other lender category for the various sub-groups is particularly evident in the mortgage loan and credit facility segments. Chart 4 illustrates how the percentages recorded in those segments for defaulters in the Preventel group contrast with those for the other sub-groups.

Chart 4 Importance of "other lenders": mortgage loans and credit facilities
(in % of the total number of loans for the type in question contracted by the (sub-)group, end of June 2008)



Sources: CICR, Preventel and own calculations.

3.2.1.6 Codebtors

Regarding the amount borrowed, the study also examined whether or not debtors contract their loans on their own. For each type of loan, the data were therefore broken down between debtors contracting (at least one) loan jointly with another debtor, and those who had not contracted any loan of that type jointly with one or more other debtors.

[22] The analysis is based on the first loan (of each type) for which the person in question was recorded in the CICR; the term lender here refers more specifically to the lender-issuer.
[23] NBB Working Paper Series nr 78.
[24] "Other lenders" therefore include all other categories of issuers who are identified in the CICR alongside credit institutions. Those other categories are: other financial institutions, insurance companies and mortgage loan specialists, sellers and credit card companies.

The figures in table 13 show that the majority of defaulters in the Preventel group conclude all their loans on their own. That is the only sub-group where that applies, because in all other sub-groups examined, the majority of the persons are recorded for at least one loan for which a codebtor is registered in the CICR.

Table 13 Debtors without/with codebtor(s) [a]: breakdown by credit type
(in % of the number of debtors in the (sub-)group, end of June 2008)

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
Total loans							
Debtors without codebtor(s)	58.0	62.8	47.8	51.4	47.0	30.8	31.3
Debtors with codebtor(s)	42.0	37.2	52.2	48.6	53.0	69.2	68.7
Consumer credit							
Debtors without codebtor(s)	63.2	67.6	55.8	58.6	52.9	41.9	42.4
Debtors with codebtor(s)	36.8	32.4	44.2	41.4	47.1	58.1	57.6
Mortgage loans							
Debtors without codebtor(s)	21.0	21.6	22.3	22.0	17.4	18.5	18.5
Debtors with codebtor(s)	79.0	78.4	77.7	78.0	82.6	81.5	81.5

Sources: CICR, Preventel and own calculations.

[a] A distinction is made between debtors contracting at least one loan jointly with one or more other debtors, and debtors not contracting any loans of the type in question jointly with one or more other debtors.

Once again, this could be due to the credit mix: mortgages are a form of loan particularly likely to be contracted with a codebtor.

The data breakdown by credit types shows that the differences between the sub-groups are smallest in the case of mortgage loans. The percentage of persons borrowing jointly with another debtor is 79.0 % for defaulters in the Preventel group, compared to 82.6 % for defaulters in the control group. In the case of consumer loans, 36.8 % (32.4 % for the narrow definition) of defaulters in the Preventel group have at least one loan with a codebtor. That is well below the figure of 44.2 % for non-defaulters in the Preventel group, and 47.1 % and 58.1 % for the two sub-groups in the control group. The difference in the overall percentage for defaulters in the Preventel group in comparison with the rest therefore cannot be attributed solely to the smaller proportion of mortgage loans in the portfolio.

3.2.1.7 Age at the time of the first credit agreement

The data concerning age at the time of the first credit agreement – that age was calculated on the basis of the starting data of the first registered loan[25] [26]- in table 14 and chart 5 indicate that defaulters in the Preventel group take out their first loan at a younger age: on average, around 5 and 6 years earlier respectively than defaulters and non-defaulters in the control group.

Table 14 Age of debtors at the time of the first credit agreement, broken down by credit type: average and median *(in years)*

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
Total credit							
Average age	32	32	33	32	37	38	38
Median age	30	30	30	30	35	36	36
Consumer credit							
Average age	32	32	33	32	38	41	41
Median age	31	30	31	30	36	40	40
Mortgage loans							
Average age	34	34	33	33	37	36	36
Median age	32	32	32	30	35	34	34

Sources: CICR, Preventel and own calculations.

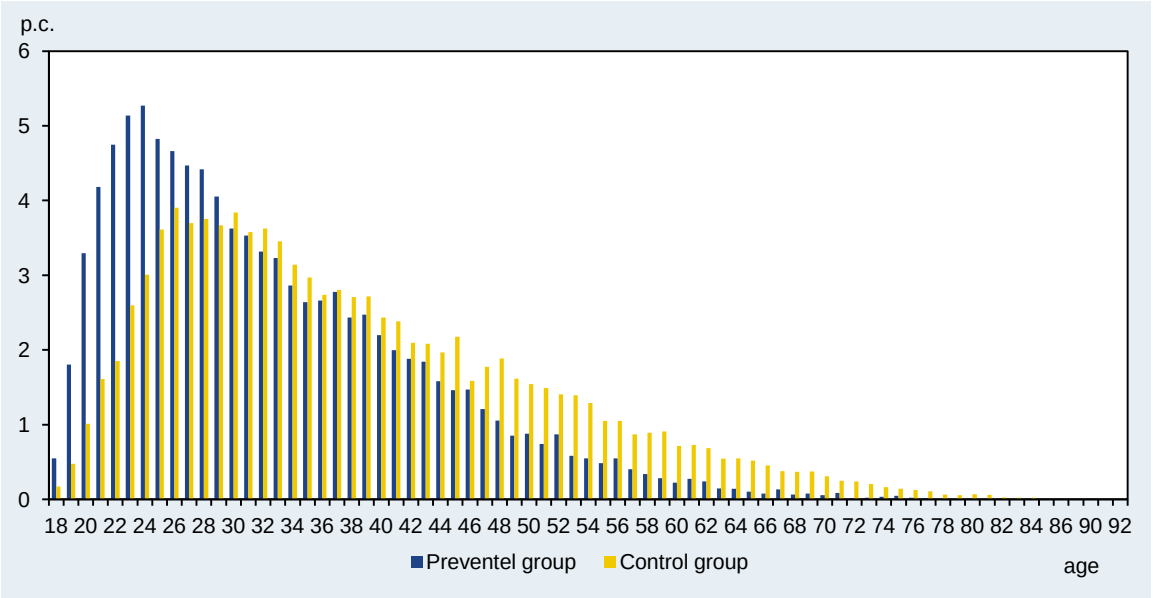
The contracting of loans at a relatively younger age is a characteristic common to everyone in the Preventel group. Statistical tests do indeed confirm that, just as in the case of the previous age variable examined (cf. section 3.1.2), defaulters in the Preventel group are indistinguishable from non-defaulters in the same group. However, there is a difference in relation to non-defaulters in the control group, and especially non-defaulters in that last group[27].

[25] The contract date of credit facilities is recorded in the CICR. In the case of other forms of credit, the first due date (mortgage loans) or the first instalment date (consumer loans repayable by instalments) is taken as an approximation of the loan start date.

[26] A number of corrections had to be made to the research database in order to calculate that age correctly. Those corrections related more specifically to credit facilities for which, failing the exact date, the contract date on entry into force of the positive central records in 2003 was set by default at 1 January 1970. Altogether, 1,856 persons with that type of credit were eliminated from the research database. Over 90 p.c. of these cases occurred in the Preventel group, two-thirds of them among the defaulters.

[27] Results based on the comparison of the averages via the ANOVA survey and the Bonferroni tests with a confidence level of 1 p.c.

Chart 5 Age of debtors at the time of the first credit agreement: frequency distribution



Sources: CICR, Preventel and own calculations.

The difference in the age at which the two groups contracted their first loan is also not entirely attributable to the difference in the credit type borrowed. There is in fact a clear difference between the Preventel group and the control group, not only in regard to mortgage loans but also and above all where consumer credit is concerned. The difference between the two groups in regard to the age of concluding the first consumer credit is still noticeable if the age for each sub-type of consumer credit is calculated separately.

3.2.2 Repayment behaviour

3.2.2.1 Number of negative loans

Defaulters in the Preventel group include a noticeably higher percentage of persons with more than one negative loan than defaulters in the control group.

More specifically, that figure is 42.9 % (44.9 % for the narrow definition) for the Preventel group, compared to 29.9 % for the control group. On average, defaulters in the Preventel group have 1.8 negative loans outstanding (1.9 for the narrow definition) whereas that figure is 1.6 for the control group.

The difference in the percentage of persons with more than one negative loan in the two groups is not so much due to mortgage loans. There is no significant divergence in the mortgage loan percentages between the two groups; moreover, those figures are fairly low: 14.6 % for the Preventel group (12.8 % for the narrow definition) and 11.9 % for the control group. Of course, those low percentages are not really surprising since the majority of persons with mortgage loans have only one loan of that type outstanding.

Conversely, the percentage of persons with more than one negative consumer credit entry, at 40.9 % (43.7 % for the narrow definition), is over 10 percentage points higher for defaulters in the Preventel group than the figure of 29.6 % for defaulters in the control group.

Table 15 Debtors by number of negative loans: breakdown by credit type[28]

(in % of the total number of debtors in the sub-group with negative loans of the type in question, end of June 2008)

	Preventel group		Control group
	Defaulters		Defaulters
		of which: narrow definition	
Total loans			
One negative loan	57.1	55.1	70.1
More than one negative loan	42.9	44.9	29.9
Consumer loans			
One negative loan	59.1	56.3	70.4
More than one negative loan	40.9	43.7	29.6
Mortgage loans			
One negative loan	85.4	87.2	88.1
More than one negative loan	14.6	12.8	11.9
Pm: Average number of negative loans			
Total loans	1.8	1.9	1.6
Consumer negative loans[a]	1.8	1.9	1.6
Mortgage negative loans[a]	1.2	1.1	1.2

Sources: CICR, Preventel and own calculations.

[a] In calculating this average, only persons in the sub-group who were actually in arrears on a loan of this type were taken into account. Consequently, the sum of the averages for consumer loans and mortgage loans does not correspond to the average for total loans.

3.2.2.2 Loan portfolio by credit status

The higher percentage of defaulters with more than one negative loan in the Preventel group is a factor which is naturally also reflected in the composition of the loan portfolio by credit status. Thus, the percentage of outstanding loans with a negative entry is highest in the Preventel group, namely 69.4 % and 75.0 % respectively for defaulters according to the broad and the narrow definition. In the control group this concerns “only” 64.0 % of defaulters’ loans.

[28] See tables a6-A8 in annex 3.

Table 16 Loan portfolio by credit agreement status

(in % of the total loans of the (sub-)group, end of June 2008)

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
Number of loans							
Positive	30.6	25.0	100.0	75.0	36.0	100.0	97.4
Negative	69.4	75.0	0	25.0	64.0	0	2.6
of which:							
Non-regularised	59.1	66.9	0	21.3	49.4	0	2.0
Regularised	10.3	8.1	0	3.7	14.6	0	0.6
Loan amounts							
Positive	34.8	1.7	100.0	83.4	42.6	100.0	98.3
Negative	65.2	98.3	0	16.6	57.4	0	1.7

Sources: CICR, Preventel and own calculations.

Not only is the percentage of negative loans somewhat higher for the Preventel group than for the control group, but the Preventel group also has a relatively smaller proportion of those loans which have (already) been regularised.

The loan portfolio on the basis of the amount of the loans provides a picture that tallies closely with the portfolio based on number of loans. It is noticeable that in the case of defaulters (narrow definition) in the Preventel group, almost all the loan amounts contracted relate to negative loans. Apparently defaulters in this sub-group are only in a position to repay their smaller loans (consumer credit).

3.2.2.3 Amount of arrears

In regard to the average level of arrears, there were no clear differences between defaulters in the Preventel group and those in the control group.

However, since – as described above in section 3.2.1.4 "Loan amounts" – the loan amounts are lower on average for defaulters in the Preventel group, this does imply that in this sub-group the amount of arrears represents a bigger percentage of the loan amounts of contracts with a negative entry. For defaulters in the Preventel group, the average figure is indeed 40 to 45 %, whereas for defaulters in the control group it is 33 %

Table 17 Amounts of arrears owed by debtors, broken down by credit type: average and median
(in % of the loan amount of contracts with a negative entry in the (sub-)group, end of June 2008)

	Preventel group		Control group
	Defaulters		Defaulters
		of which: narrow definition	
Total loans			
Average	39.5	44.8	32.7
Median	35.5	43.7	21.7
Consumer credit			
Average	42.1	47.2	36.6
Median	40.4	47.6	32.5
Mortgage loans			
Average	18.9	21.3	16.7
Median	2.5	3.5	0.9
Pm: % of persons in the sub-group whose arrears exceed 100 % of the loan amount			
Total loans	*17.6*	*21.5*	*14.5*
Consumer credit	*18.2*	*22.2*	*15.2*
Mortgage loans	*10.5*	*11.9*	*9.9*

Sources: CICR, Preventel and own calculations.

Moreover, the percentage of persons whose arrears exceed 100 % of the loan amount[29] is highest in the case of defaulters in the Preventel group.

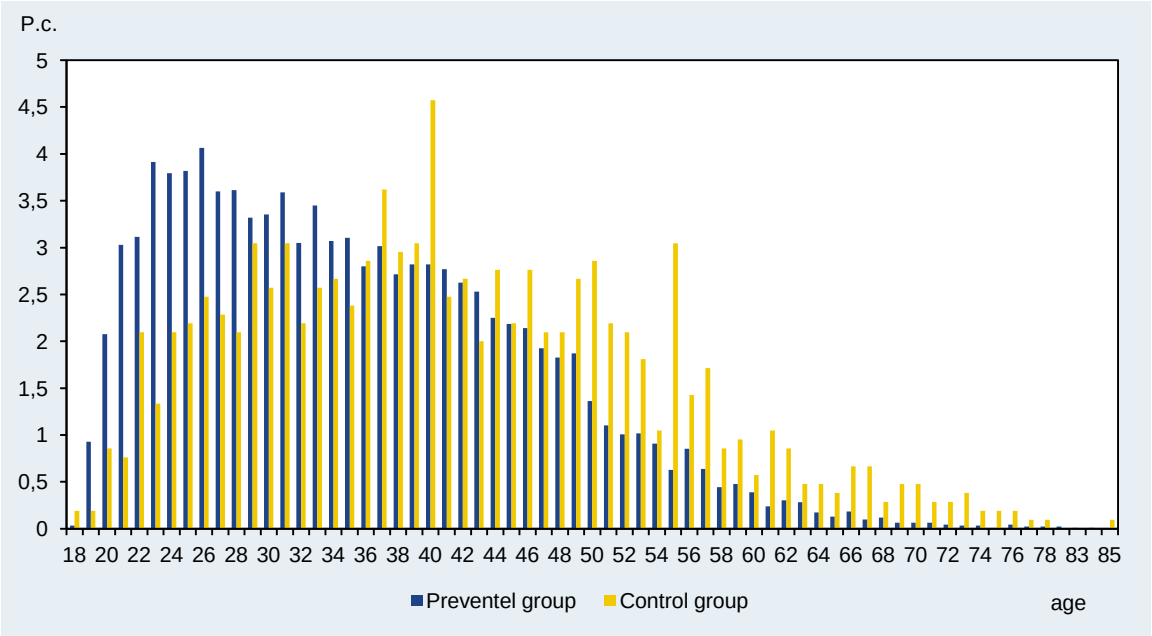
In the case of consumer credit, the arrears as a percentage of the loan agreement amount are twice as high as for mortgage loans. The percentage of persons whose arrears significantly exceed the original loan amount also seems to be highest for the first type of loan mentioned.

3.2.2.4 Age at the time of the first default

Like the age at the time of the first loan agreement, the age of the debtors at the time of the first default was also calculated. However, that although that first registered default does not necessarily relate to the first positive loan recorded in the CICR.

[29] Payment arrears can exceed 100% of the loan agreement amount because the total cost of the outstanding and unpaid loan is included.

Chart 6 Age of the debtors at the time of the first default: frequency distribution



Sources: CICR, Preventel and own calculations.

For this age aspect, too, the Preventel group differs from the control group; the average age at the time of default is 35 years for the Preventel group, compared to 41 years for the control group. So not only do defaulters in the Preventel group take out their first loan 5 sooner, on average, but they also become defaulters 6 years earlier (6 and 7 years earlier respectively for the narrow definition)

This is again a characteristic of the Preventel group as a whole. Statistical tests confirm that there is no evidence of any difference in the age at default within a single group, though there is a difference between the two groups[30].

Table 18 Age of debtors at the time of the first default, broken down by credit type: average and median
(in years)

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
Total loans							
Average age	35	34	35	35	41	41	41
Median age	34	33	34	34	40	40	40
Consumer credit							
Average age	35	34	34	35	41	40	41
Median age	34	33	33	34	40	39	40
Mortgage loans							
Average age	38	37	39	38	43	43	43
Median age	37	37	39	38	43	43	43

Sources: CICR, Preventel and own calculations.

The breakdown by credit type or sub-type shows that the difference in default age between the Preventel group and the control group is a general phenomenon: the differences once again occur at the level of the

[30] Results based on comparison of the averages via Anova and Bonferroni tests.

two groups as a whole. However, the breakdown by credit type shows that the default age is higher for mortgage loans than for consumer credit, a result which tallies completely with earlier findings[31].

The credit profile of defaulters in the Preventel group closely matches that of defaulters from the control group.
As far as borrowing behaviour is concerned, defaulters tend to make greater use of other lenders than credit institutions, are less inclined to take out (consumer) loans with a codebtor, and their portfolio consequently has a more sizeable proportion of consumer loans. This latter element is just as much due to the higher percentage of people that have contracted this type of loan as to the higher percentage of persons contracting more than one loan of this type.
These trends appear to be more pronounced among defaulters in the Preventel group than those from the control group.
Defaulting borrowers from the Preventel group nevertheless tend to enter into consumer credit contracts for relatively lower amounts, so that the higher average number of loans that they contract is not reflected in a higher overall outstanding (consumer) loan balance.
As regards loan repayment, the negative results are also more marked among Preventel group defaulters. They tend more often to have more than one negative loan, which is reflected in the higher share of negative loans in their portfolio. Furthermore, a smaller proportion of these loans has been regularized, and arrears are proportionally higher, too.
The two groups of defaulting borrowers are nevertheless set clearly apart for all age-related aspects of the credit profile. Defaulters from the Preventel group not only get their first loan at a younger age, but they also tend to face their first default earlier on in life.

3.3 Collective debt settlements

Since 1 January 1999, notifications of collective debt settlements (CDS) have also been recorded in the CICR. These records show that, on the one hand, the problem of excessive debt is not confined to credit: a growing number of persons resort to the CDS procedure without being registered in the CICR on account of a loan agreement in arrears.
However, on the other hand there is also a clear link between the number of loans on which a debtor is in arrears and the extent to which the CDS procedure is used[32].

The percentages of debtors with CDS in the sub-groups in this analysis are entirely in line with those general findings.
Thus, the data in table 19 show that among non-defaulters – or in other words, persons without arrears on a loan – there are also persons who resort to the CDS procedure, namely 1.2 % in the case of the Preventel group and 0.1 % in the control group.
However, the percentages recorded for defaulters in both groups are noticeably higher and also reveal a difference between defaulters with and without Preventel registration. More specifically, the percentage of debtors with CDS is 15.7 % (17.9 % narrow definition) for the Preventel group and 11.8 % for the control group.
Defaulters with CDS also seem to have a larger number of negative loans outstanding in their name than the average defaulter in both sub-groups, namely 2.6 to 2.8 loans, as the corresponding figures for loans in arrears range between 1.6 in the control group and 1.8 (1.9 – narrow definition) in the Preventel group. (cf. table 15).

[31] NBB Working Paper Series no 78.
[32] CICR Statistical Brochure (2009) p. 12.

Table 19 Debtors with collective debt settlement (CDS): percentage, number of negative loans, and age

	Preventel group				Control group		
	Defaulters	of which: defaulters - narrow definition	Non-defaulters	Total	Defaulters	Non-defaulters	Total
Debtors with CDS (in % of the total number of debtors in the group/sub-group	15.7	17.9	1.2	6.4	11.8	0.1	0.5
Number of negative loans in the case of debtors with CDS (averages)	2.7	2.6			2.8		
Age at the time of the decision to authorise CDS (years)							
Average age	38	37	40	38	45	47	45
Median age	36	35	38	37	45	48	46

Sources: CICR, Preventel and own calculations.

In regard to the age at which the CDS application is declared admissible[33], major differences were found between debtors in the two samples – just as there were in regard to the age variables discussed earlier. The average age is 38 years for the Preventel group as a whole, and 45 years for the control group as a whole. Within the two groups there was again no evidence of significant differences between defaulters and non-defaulters[34]. The median values for the CDS age are very similar to the average values.

The percentage of borrowers with collective debt settlements is higher among Preventel group defaulters, while the age at the time of the decision to authorize CDS is lower here than among defaulters from the control group.

3.4 Preventel characteristics

Finally, in the profile analysis the scant information obtained from the Preventel records was also analysed. Of course, that information is only available for debtors in the Preventel group, so that it was only possible to investigate whether there are any differences here between defaulters and non-defaulters in that group.

The Preventel characteristics analysed concern the number of entries for the debtor, the number of operators registering the debtor, the duration of those registrations and whether or not they remain outstanding. In the absence of data on the amounts of arrears in Preventel (cf. annex 1), these variables can be seen as indications of the seriousness of the mobile telephony arrears of the debtor in question. The age at which borrowers are registered in Preventel for the first time was also analyzed.

3.4.1 Number of registrations

The maximum number of registrations recorded for the same debtor in the sample was 12. However, it is noticeable that the great majority of debtors in the Preventel group, namely no less than 71.8 %, have only one registration in their name. The percentage of debtors with two entries was 19.3 %, whereas fewer than 10 % had three or more entries.

However, the breakdown into defaulters and non-defaulters reveals marked differences between those percentages. At 65.6 % (63.9 % for the narrow definition), the proportion of debtors with only one negative entry is significantly lower for defaulters than for non-defaulters, namely 75.2 %. In other words, defaulters include a significantly higher percentage of persons registered more than once in Preventel, namely 34.4 %

[33] This age is calculated on the basis of the date of the decision to authorise CDS. In principle, that decision is notified to the CICR within 24 hours.

[34] Results based on ANOVA and Bonferroni tests.

compared to 24.8 % for non-defaulters. The percentage of debtors with multiple registrations is slightly higher still, at 36.1 %, if only defaulters according to the narrow definition are considered.

Table 20 Debtors by number of Preventel registrations
(in % of the total debtors in the sub-group, end of June 2008)

	Preventel group			
	Defaulters		Non-defaulters	Total
		of which: narrow definition		
One registration	65.6	63.9	75.2	71.8
Multiple registrations	34.4	36.1	24.8	28.2
of which:				
Two	22.6	23.8	17.5	19.3
Three	7.6	7.9	4.9	5.8
Four	2.7	2.7	1.5	2.0
Five or more	1.5	1.5	0.9	1.1

Sources: CICR, Preventel and own calculations.

3.4.2 Number of reporting operators

The number of different operators reporting the debtor in Preventel is, of course, a variable which closely mirrors the number of registrations. Nevertheless, 84.2 % of those registered are reported by only one operator, while – as is evident from table 20 - 71.8 % of those entered in Preventel have only one registration. Naturally, the reason is that a number of debtors with multiple Preventel entries are reported more than once by the same operator. That is true of 44 % of persons with more than one registration.

The breakdown into defaulters and non-defaulters reveals variations in the percentages of debtors reported by one operator: for defaulters, the figure is 79.0 % (76.9 % for the narrow definition), but for non-defaulters it is 87.0 %

Table 21 Debtors by number of reporting operators
(in % of the total number of debtors in the sub-group, end of June 2008)

	Preventel group			
	Defaulters		Non-defaulters	Total
		of which: narrow definition		
One operator	79.0	76.9	87.0	84.2
Multiple operators	21.0	23.1	13.0	15.8
of which:				
Two	18.7	20.5	11.9	14.3
Three	2.2	2.4	1.1	1.5
Four	0.1	0.1	0.0	0.0

Sources: CICR, Preventel and own calculations.

3.4.3 Registration period

The total period of the Preventel registrations, calculated on the basis of the sample data relating to the situation as at the end of June 2008, averages 32 months. However, the total registration period is a variable

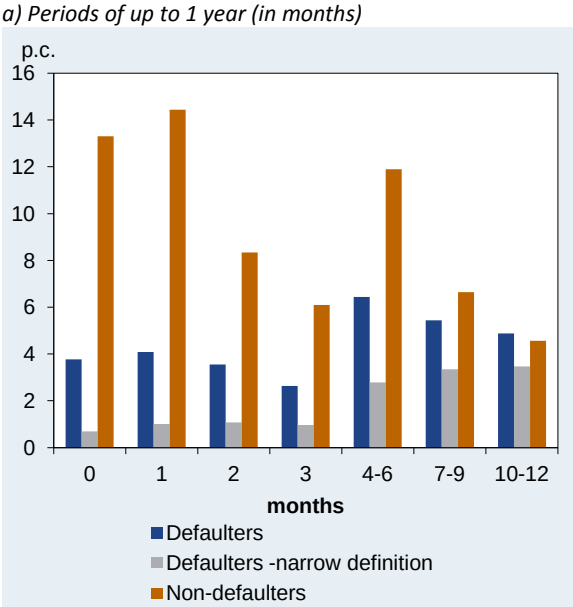
with a very uneven distribution: on the one hand, the mode is barely one month and the median value is 11 months, while the maximum is over 400 months.

In other words, over half of the Preventel registrations are deactivated within one year. For no less than 30 %, deactivation actually occurs within three months.
The reason for such a surprisingly short registration period is not entirely clear.
It seems unlikely that it is due solely to registrations being challenged A consumer survey conducted in 2008 by the debt collection agency Intrum Justitia[35] recorded carelessness as one of the main reasons for unpaid invoices, especially in the younger age groups. The finding that many people appear to pay their GSM bills shortly after being reported to Preventel[36] –appears to bear that out.

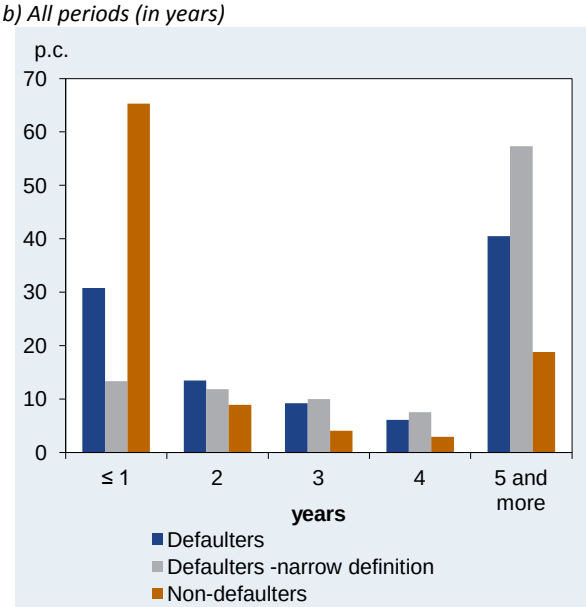
Incidentally, there are significant variations in the registration period between the sub-groups of defaulters and non-defaulters. The frequency distribution of the registration period clearly shows how defaulters have higher frequencies for longer periods, while non-defaulters have the highest frequencies for shorter periods. In the case of non-defaulters, 65.3 % have already been deleted from Preventel after one year, while for defaulters the figure is only 30.8 % (13.3 % for the narrow definition). The corresponding percentages for 3 months are 42.1 % for non-defaulters and 14.1 % for defaulters (below 4 % for the narrow definition) (cf. table A9 in annex 3).

Chart 7 Total duration of Preventel registrations: frequency distribution

a) Periods of up to 1 year (in months)



b) All periods (in years)



Sources: CICR, Preventel and own calculations.

The total (cumulative) registration period is, of course, influenced by the number of times that a debtor is registered in Preventel. However, following adjustment for that – more specifically, once the average period per registration had been calculated – there were still significant differences between the sub-groups: while the Preventel registration was deactivated within three months for almost half of the non-defaulters, namely 46.6 %, in the case of defaulters according to the broad and the narrow definition the figures were 17.5 % and 5.7 %. respectively (cf. table A10 in annex 3).

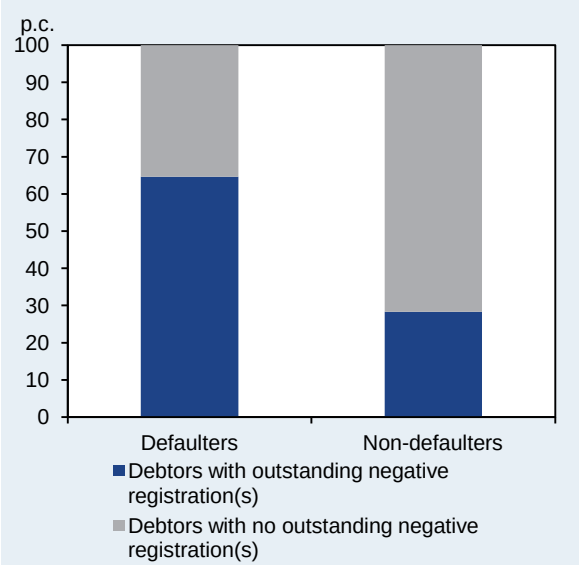
It is therefore not surprising that the percentage of persons with an outstanding Preventel registration at the end of June 2008, in other words those who had not cleared their arrears, was almost twice as high for defaulters (64.6 %) compared to non-defaulters (28.3 %).

[35] Press release dated 4 September 2008, available on the website www.intrum.be

[36] Defaulting borrowers are notified in writing of their registration in Preventel. After that, they may only have a minimum service; in the event of persistent default, they are eventually excluded from the network altogether. Many debtors with payment arrears very probably do not want things to come to that.

Chart 8 Debtors by Preventel registration status

(in % of the total number of debtors in the sub-group, end of June 2008)



Sources: CICR, Preventel and own calculations.

3.4.4 Preventel age

The age at which debtors were first entered in the Preventel database is totally in line with the earlier findings regarding the "age" aspect (see section 3.1 "Demographic characteristics" and 3.2 "Credit characteristics") with no noticeable differences between the two sub-groups. Both defaulters (broad and narrow definition) and non-defaulters run up arrears with telecom operators for the first time at an average age of 34 years; in both cases, the median age is 32 years.

Within the Preventel group, loan defaulters and non-defaulters also differ from one another in their telephony characteristics.
Defaulters make up a higher percentage of persons who have been registered several times – by different operators or not –, and remain on the Register for a much longer period. Consequently, the percentage of persons that still had a registration open in Preventel at the end of June 2008 was higher among loan defaulters than non-defaulters. The average age at which borrowers are first registered in the Preventel database does not vary much from one sub-group to the other.

4 Study results regarding the possible role of Preventel registration as a warning light

The existence of a significant link between arrears with telecom operators and arrears with lenders is an essential condition if the Preventel registration is to act as a warning light indicating potential problems relating to credit repayments. Although the existence of such a link is naturally a necessary condition, it is still not sufficient in itself: the first additional requirement is that the chronology of the two payment incidents must be "correct", or in other words the mobile telephony arrears must generally occur before the credit arrears. A second additional requirement is that the Preventel registration must contain sufficient information to permit better prediction of the credit risk.

The second part of this report will discuss the study in relation to these three conditions.

4.1 The link between mobile telephony arrears and credit arrears

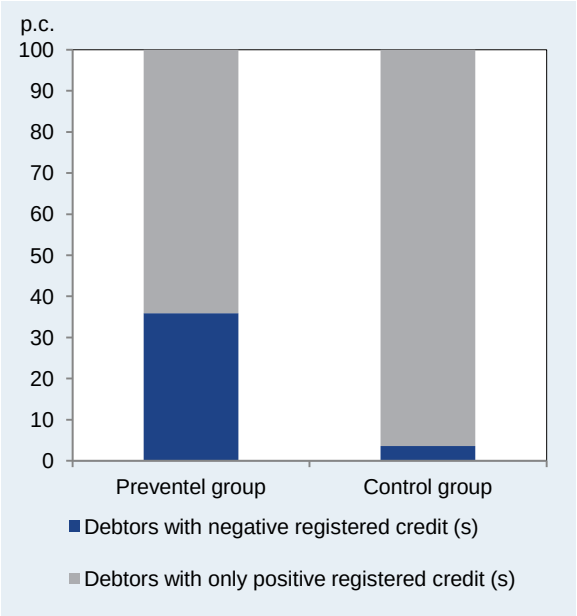
In order to investigate the existence of a statistical link between Preventel defaulters and those in the CICR, a cross-table analysis was conducted on the data from the two samples.

For the contingency table analysis it was again assumed that persons in the control group, unlike those in the Preventel group, have no current or previous mobile telephony arrears[37]. The credit arrears were also defined in the same way as in the previous part of the study. More specifically, the registration status of the CICR debtor -"positive " or " negative"- at the end of June 2008 was therefore taken as the reference point.

Various tests for association and measures of association offered by the SAS software package were then calculated for the 2x2 table thus defined.

Chart 9 Debtors by CICR status

(in % of the total number of debtors in the group, end of June 2008)



Sources: CICR, Preventel and own calculations.

Notwithstanding non defaulters make up the majority in both groups, a clear link between mobile telephony defaults and credit defaults can also be observed. That link was already apparent in table 1, and re-emerges in chart 9: the percentage of debtors with a negative CICR registration varies considerably between the two samples, at 35.9 % for the Preventel group against 3.6 % for the control group.

[37] NB: Preventel is a negative database; in other words, it only records defaulters. The control group comprises persons in the CICR who do not meet (some of) the matching criteria for Preventel.

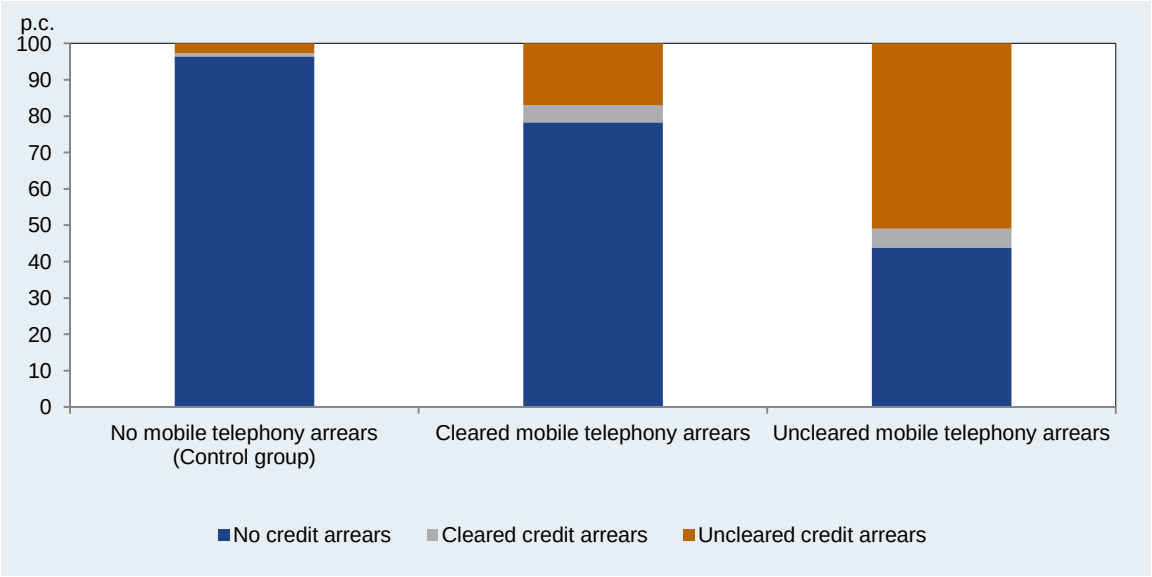
Formal statistical tests indeed confirm the existence of a very significant association between mobile telephony defaults and credit defaults[38].
The strength of the link can be expressed numerically as a relative risk of 10, i.e. the risk of being registered on account of arrears due to lenders can be estimated as 10 times higher for persons who have (had) mobile telephony arrears than for persons who have (had) no such arrears[39].

Although that figure naturally applies only to arrears as defined in this study, there seems to be little fundamental change in the conclusion if alternative negative definitions are used in the contingency table.
On the one hand, if the analysis considers not just credit arrears existing at a particular time – more specifically the end of June 2008 – but is extended to include any arrears which have ever led to a negative CICR registration[40], the relative risk for GSM defaulters comes to roughly 9[41].
On the other hand, if the measure of association is calculated on the basis of the narrow definition of mobile telephony arrears, namely one which refers only to the situation at the end of June 2008, then the estimated value for the relative risk still comes to 5.5[42].

The contingency table was then expanded into a 3x3 table by considering three possible categories for the status variable for both types of arrears. Apart from the persons with no arrears, a further distinction was made between persons with arrears which had been cleared and those with arrears still outstanding[43]. This meant that the status variables could be regarded as ordinals, so that appropriate statistical tests were then used.
The results of those tests point to a significant positive linear correlation between the two types of default[44]; the measure of agreement[45] for the status of the two types of debt is also different from a random result.

[38] The P value for the Chi-square test is < .0001 .
[39] The associated 99 p.c. confidence interval is (9.0; 10.9).
[40] Of course, for this alternative negative definition it was only possible to take account of negative CICR registrations in the past in so far as that information was still available in the data warehouse for the CICR data.
[41] The estimated point value is 8.8; the associated 99 p.c. confidence interval is (8.1;9.5).
[42] The associated 99 p.c. confidence interval is (5.2; 5.7).
[43] For a clear understanding: in Preventel this last distinction corresponds respectively to persons whose registrations were deactivated at the end of June 2008 (no more outstanding registrations) and persons who still had outstanding registrations on that date.
[44] The P value for the Mantel-Haenzel Chi-square test is <.0001. The value for the various degrees of correlation shown in the SAS output ranges between 0.30 and 0.80.
[45] Agreement is in fact a special instance of association. There is agreement between the status of the two types of debt if they come under the same category. The kappa measure which measures the agreement is significantly different from zero here.

Chart 10 Debtors by credit status: breakdown by mobile telephony status
(in %, end of June 2008)



Sources: CICR, Preventel and own calculations.

The profile description in the previous section of the study results contained a number of striking findings relating to Preventel registrations: credit defaulters and non-defaulters also seem to differ in terms of a number of telephony characteristics. Those characteristics concern more specifically the number of Preventel registrations for the person in question, the number of different operators reporting the person, whether or not the person has been regularised in Preventel, and the person's (overall) registration period.

On the basis of additional association tests between those Preventel characteristics and arrears due to lenders, the following findings emerged specifically in relation to the Preventel group:

- there is a significant link between the number of negative entries (one versus more than one) in Preventel and the CICR status of the debtor at the end of June 2008. Persons recorded more than once in Preventel have a 33 %[46] higher risk of a negative entry in the CICR;

- similarly, the risk that a person had a negative entry in the CICR at the end of June 2008 can be estimated at approximately 41 %[47] higher for someone who was registered in Preventel by more than one operator compared to someone registered by only one operator;

- for persons who had not cleared the arrears on their GSM bills at the end of June 2008, the risk of a negative entry in the CICR is 2.6 times greater than for persons who had cleared their GSM arrears[48];

- the strongest link was found between the duration of the Preventel registration and the loan arrears. In the case of a defaulter registered in Preventel for more than three months, the risk of also having a negative entry in the CICR is around 3 times[49] higher than in the case of a person registered for no more than three months.

4.2 Chronology of the arrears

The study of the link between arrears due to telecom operators and those due to lenders took no account of the time aspect, as the association tests were based on snapshots in time. However, it is evident that mobile telephony arrears generally have to occur before loan arrears if the Preventel registration is to act as a warning signal.

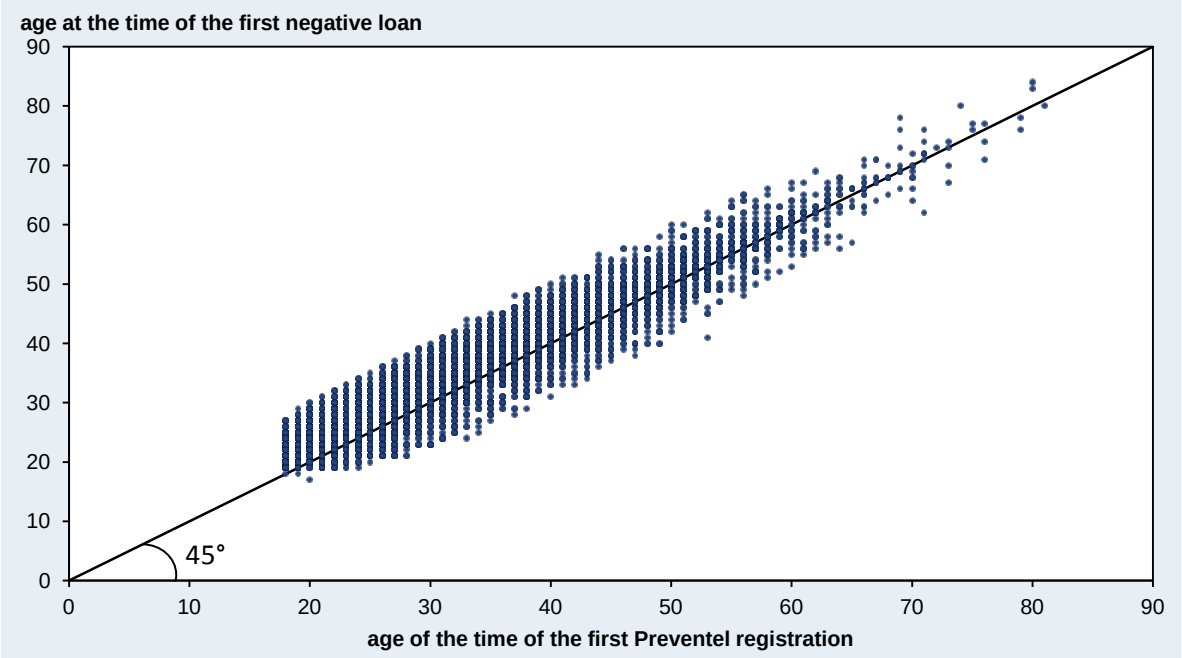
[46] The associated 99 p.c. confidence interval is (1.27;1.40)
[47] The associated 99 p.c. confidence interval is (1.34;1.49)
[48] The associated 99 p.c. confidence interval is (2.5; 2.7)
[49] More specifically, the point estimate is 2.9. The associated 99 p.c. confidence interval is (2.7;3.1).

The profile analysis in the previous section of the study in fact already offers an initial indication regarding the chronology of both payment incidents. The average age at which persons with arrears for both types of debts, or with other words the sub-group "Preventel group: defaulters", are registered in Preventel for the first time is 34 years, whereas the average age for the first registration of a negative loan is 35 years.

If these two age variables are compared at the level of the individual defaulters in the Preventel group, it is possible to see a very strong linear correlation between the two: the Pearson correlation coefficient is at least 0.96. On the chart this is reflected in a very high concentration of points around the 45-degree line. The data on the age of the defaulters at the time of the two payment incidents therefore show that, on average, the incidents follow one another in quick succession. The bulk of the points are situated above the 45-degree line, suggesting that the arrears due to telecom operators occur first.

Chart 11 Age at the time of the first Preventel registration and age at the time of the first negative loan for defaulters in the Preventel group

(in years)



Sources: CICR, Preventel and own calculations.

On the basis of the exact dates of the two types of arrears [50] it is of course possible to investigate more accurately to what extent there is a “direction” in the link between arrears due to telecom operators and arrears due to lenders.

The exercise was carried out for all persons in the Preventel group for whom the CICR data warehouse had recorded a loan default date[51]. The two dates were compared on the basis of the first Preventel registration and the first default in the CICR for the debtor in question. The first negative record in the CICR had be later than the date on which Preventel became operational, i.e. the end of October 1998, in order to be included in this examination of the chronology. There were 8,448 persons in the Preventel group who met that requirement.[52]

[50] The CICR records both the date to which the arrears relate and the date on which those arrears were recorded by the Central Register. In Preventel, only the arrears registration date is available, so that the calculations have to be based on that date.

[51] We would point out that the negative definition for loans used here differs from the negative definition used previously in the survey. This section relating to the chronology of the arrears is based on the information recorded in the CICR data warehouse concerning the first negative entry in the CICR. In practice, this means that this section of the analysis also includes debtors who had a positive registration at the end of June 2008, because their negative registration had already been deleted on expiry of the data preservation periods applicable.

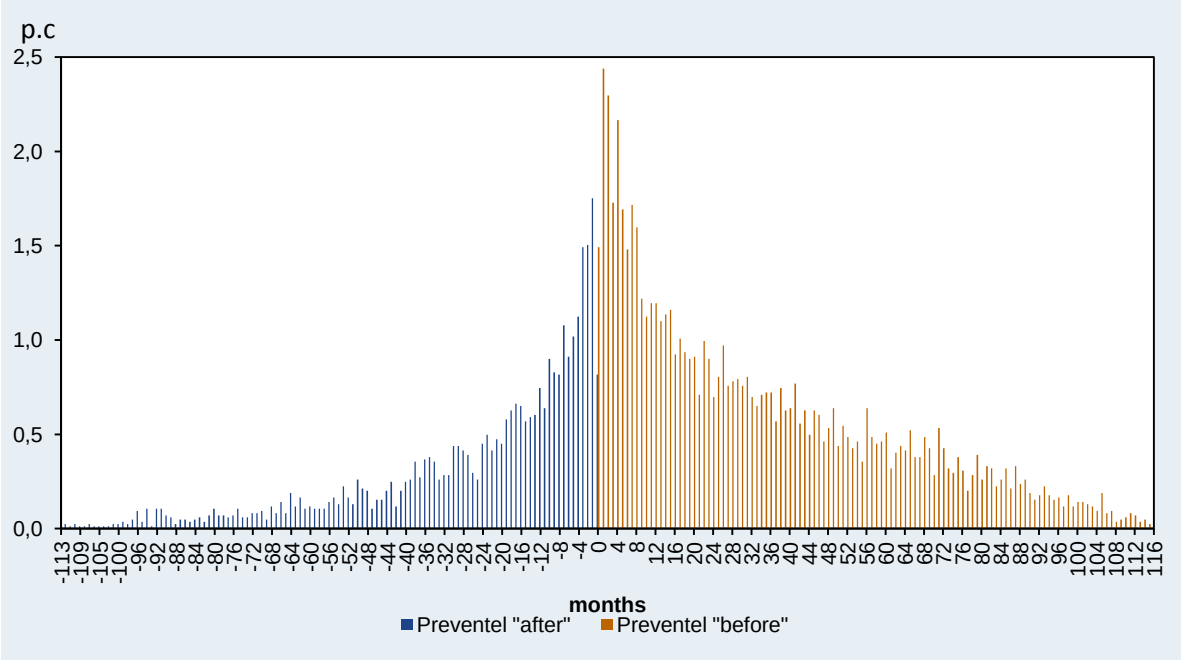
[52] Table A11 in annex 3 contains data on the impact of these adjustments on the composition of the Preventel sample.

The comparison of the two dates shows that in no less than 68 % or over 2/3 of cases the Preventel registration preceded the arrears recorded in the CICR (Preventel "BEFORE")[53].

That percentage can be regarded as a minimum level since the calculation of the time elapsing between the two payment incidents is not entirely accurate. In contrast to the CICR, where the exact date relating to the arrears must be stated within 8 working days, the rules for Preventel registration were far less strict. Defaulters could generally be entered in the defaulters database as soon as their arrears amounted to 50 euros and at least one reminder had been issued. In practice, all the operators appeared to follow their own procedures, and it is said that some of them would not proceed with registration in the defaulters database until they had sent out two or even three reminders. Of course, this immediately implies a number of extra weeks or months elapsing between the default incident itself and its registration in the Preventel database. Consequently, the date of Preventel registration on which the above estimate is based does not always accurately reflect the date on which the arrears actually occurred.

[53] In 64 p.c. of the Preventel "before" cases, the person in question still had a negative registration in Preventel at the time when the loan default actually occurred.

Chart 12 Time elapsing between the first Preventel registration and the first default in the CICR in the case of debtors in the Preventel group[a]: frequency distribution



Sources: CICR, Preventel and own calculations.
[a] on the basis of the modified sample

Chart 12 shows the frequency distribution of the number of months elapsing between the first Preventel registration and the first creditdefault. Consequently, the time elapsing between the two payment incidents has a positive sign if the Preventel registration preceded the CICR default ("Preventel BEFORE"), and a negative sign if the Preventel registration came after the creditdefault ("Preventel AFTER").

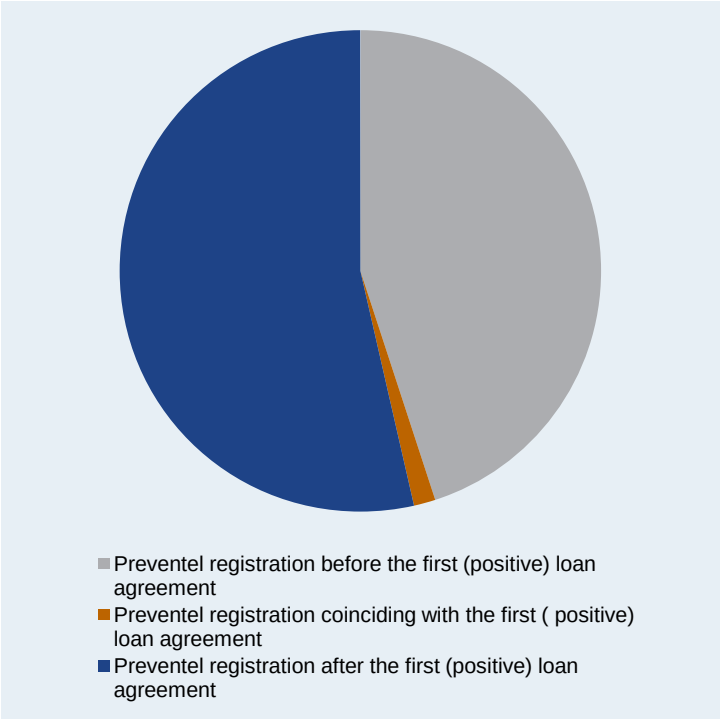
On the one hand, that frequency distribution confirms that the two types of arrears often occur within a very short space of time: for 14 % of the defaulters they actually occurred within 3 months. However, the fact that the Preventel registration frequently comes soon or very soon after the CICR arrears in the case of "Preventel AFTER" could also be due to the less strict procedures for the Preventel registration, as already mentioned. It is therefore possible that in some of the "Preventel AFTER" cases the telephony arrears may actually have occurred before the loan arrears, but were placed in the wrong category because the analysis inevitably had to be based on the date on which the payment incident was registered in Preventel.

On the other hand, the frequency distribution also reveals that for a significant proportion of debtors the time elapsing is still considerable[54]. In the case of "Preventel BEFORE", the average time lapse between the two payment incidents is 33 months, and the corresponding median value is 26 months.

The fact that the average time lapse is nevertheless fairly long can probably be attributed largely to the following remarkable finding: in no less than 45 % - i.e. almost half – of the cases in which the first payment incident concerns mobile telephony ("Preventel BEFORE"), it seems that the person in question is not actually known to the CICR at the time of the Preventel registration. In other words, this means that the person in question is already in arrears on his GSM bills before contracting his first loan.

[54] The reader should be reminded that the calculations are based on the first Preventel registration. A number of debtors have already been registered in Preventel more than once before their first negative registration in the CICR.

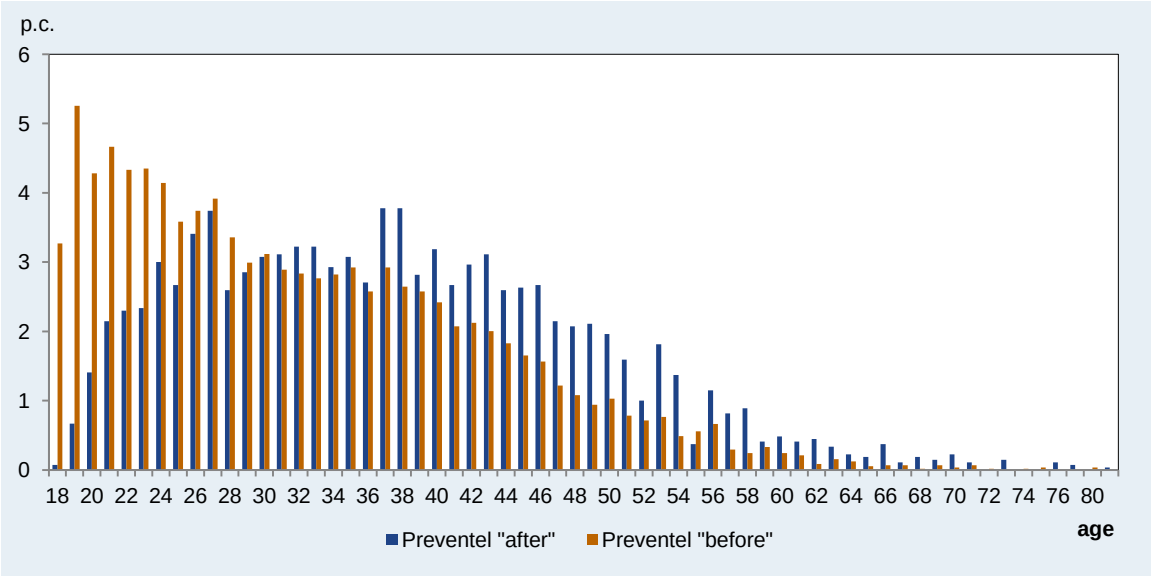
Chart 13 "Preventel BEFORE" debtors by the date of the first (positive) loan agreement
(in %)



Sources: CICR, Preventel and own calculations.

This could perhaps be connected with age. As demonstrated by chart 14, persons in the "Preventel BEFORE" group are recorded as defaulting on their mobile telephone bills at a considerably younger age than persons in the "Preventel AFTER" group. The average age for the two groups of defaulters is 32 and 37 years respectively, and the median values are exactly the same.

Chart 14 Age of debtors at the time of the first Preventel registration: frequency distribution



Sources: CICR, Preventel and own calculations.

4.3 Predictive value of Preventel registration

In order to act as a warning light, the Preventel registration needs to offer added value for credit risk prediction, quite apart from its anticipatory character. In other words, the variable must therefore contain predictive information not yet offered by other variables which are available at the time of the prediction.

The predictive value of the Preventel registration could easily be assessed in a credit scoring environment by adding a dummy variable for the Preventel registration to the model. However, the CICR does not have a scoring model; this study therefore simulated such a model by means of a rudimentary regression.
More specifically, it investigated whether the prediction - over a one-year horizon - of loan arrears by means of a model with only demographic and credit information in the CICR as predictors (model 1) could be improved by adding a Preventel variable (model 2).

The variable predicted by that regression is the CICR registration status - negative or positive – at the end of June 2008[55]. Since this is a binary response variable, logistic regression was applied[56].

The predictive variables in the regression concern the information available at the time of the prediction, i.e. the end of June 2007. Those predictive demographic and credit variables were selected on the basis of the profile analysis findings in the previous part of the study and of the findings of previous analyses of CICR data[57]. Thus, the debtor's age and the type of credit (consumer credit and/or mortgage loan) for which the debtor was registered in the CICR at the end of June 2007 were included in the regression as independent variables. The Preventel variable in model 2 indicates more specifically whether the debtor in question had a Preventel registration in the preceding 18-month period, i.e. December 2005- June 2007[58].

The results of the two logistic regressions, model 1 and model 2, are set out in table 22[59].

The influence of the Preventel variable is evident in the regression coefficient for that variable (model 2) and the c-value[60] for both models.

In regard to the parameter estimates (column A), the Wald test shows that the Preventel variable in model 2, like the other variables in the model, is significant. The positive sign of the parameter estimate for this Preventel dummy suggests that the odds or probability of "arrears versus no arrears" will be higher for a debtor with a Preventel registration.
Moreover, the use of consumer credit is a factor which increases the risk, whereas, conversely, age and the existence of a mortgage loan are factors which reduce the risk.

The significant contribution of the Preventel variable to the predictive power of model 2 is reflected in the change in the model's predictive accuracy, indicated by the c-value. The addition of the Preventel variable raises the c-value of model 2 by over 7 % compared to model 1.

The profile analysis in the previous section of the study showed that, within the Preventel group, non-defaulters differ from defaulters in the shorter duration of their Preventel registration. If an additional dummy variable for the period of registration in Preventel (over 3 months or not) is inserted in model 2 (model 3), the regression results indicate that this variable is indeed significant, and that it is a risk-increasing factor. The addition of this dummy for the period of registration in Preventel therefore further improves the prediction capability of the model, as is evident from the c-value of 0.80 for model 3.

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55 Of course, that regression only uses the data on debtors from the two groups who had a positive CICR registration at the end of June 2007. They numbered 32,711.

56 This type of regression describes the log it or *log odds* of credit arrears as a linear combination of the predictive variables. The parameter estimates in table 22 therefore show the estimated effects on the log odds, i.e. the natural logarithm of the relative probability "arrears versus no arrears".

57 See Working Paper n°78 for the link between defaults, age and credit type.

58 This variable could be deduced from a binary monthly series compiled specifically for the regression analysis. The value "1" in that series stands for an outstanding Preventel registration during the month in question, while the value "0" indicates the absence of any Preventel registration during that month. Of course, for persons in the control group all the values in that monthly series are zero.

59 These results relate to a non-calibrated model. Consequently, the model estimates cannot be used without adjustment as formulas for the probability of credit arrears, as they are not correct for the population. However, that does not affect the significance of the predictors.
(See in this context, among others, Bardos M (2007),"What is at stake when estimating the probability of default using a scoring function ", in Working Group on Risk Assessment- European Committee of Central Balance Sheet Data Offices, *Credit Risk Assessment Revisited- Methodological Issues and Practical Implications*, 95-117.)

60 The c-value in fact reflects the area below the ROC (Receiver Operating Characteristics) curve – i.e. a graphic measure of the predictive accuracy of a logistic model – and the value ranges between 0 and 1 (complete predictability).

The subsequent interpretation of the regression results for the two Preventel variables in this last model can be based on the odds ratios to be derived from the parameter estimates (column B).
In the rudimentary model specification used here, which controls for age and credit type, this gives an odds ratio of 3.34 for the Preventel registration, and 2.34 for the registration period, i.e. the probability of having accrued loan arrears at the end of June 2008 increases - ceteris paribus – by a factor of 3.34 for debtors who had a Preventel registration in the period December 2005 – June 2007, compared to debtors with no Preventel registration, and by a factor of 2.34 for debtors registered in Preventel for a total period of more than 3 months (end of June 2007), compared to those for whom that was not the case.

The findings from the model estimates therefore suggest that registrations in Preventel as well as their duration contain predictive information for future credit arrears. However, the relevance of the information on mobile telephony arrears for future problems repaying credit arrears could only be demonstrated convincingly through a further study taking account of all available socio-economic information.

Table 22 Results of the logistic regression models for a negative CICR registration at the end of June 2008
(N=32,711)

	Model 1		Model 2		Model 3		
	column A: parameter estimates	(estimated) odds ratios and associated confidence intervals (99 %)	column A: parameter estimates	column B: (estimated) odds ratios and associated confidence intervals (99 %)	column A: parameter estimates	column B: (estimated) odds ratios and associated confidenceintervals (99 %)	
intercept	-2.09***		-2.97***		-3.24***		
age	-0.04***	0.96 [0.95 ; 0.96]	-0.03***	0.97 [0.96 ; 0.98]	-0.03***	0.97	[0.97 ; 0.98]
mortgage loan	-0.69***	0.50 [0.43 ; 0.58]	-0.48***	0.62 [0.53 ; 0.72]	-0.38***	0.68	[0.56 ; 0.79]
consumer credit	1.28***	3.59 [2.86 ; 4.50]	1.16***	3.2 [2.55 ; 4.02]	1.09***	2.99	[2.38 ; 3.76]
Preventel registration			1.7***	4.35 [3.77 ; 5.01]	1.21***	3.34	[2.88 ; 3.88]
Preventel registration period (>3 months)					0.85***	2.34	[2.02 ; 2.72]
Chi ^{2}	888.56*** (df=3)		1558.8*** (df=4)		1775.79*** (df=5)		
c-value	0.71		0.77		0.80		

Sources: CICR, Preventel and own calculations.
*** P-value <0.0001

5 Conclusion

The study investigating the link between mobile telephony arrears and credit arrears shows that defaulters with a Preventel registration form a specific group among CICR defaulters. Persons with arrears on both types of debt ("*Defaulters Preventel group"*) exhibit a profile which closely matches that of persons who are only in arrears on a loan (*"Defaulters Control group"*), yet differences were nevertheless found between the two sub-groups of defaulters in several respects.

Regarding the demographic characteristics "gender" and "place of residence", there is no appreciable difference between defaulters in the two groups. In both groups, men are more strongly represented; in the geographical distribution, Brussels - and especially Wallonia - are more strongly represented.

The profile of the two sub-groups of defaulters was also very similar in regard to credit characteristics, as the tendencies apparent in the borrowing behaviour of defaulters in the control group (type of credit, number of loans, lender category, codebtor or not, etc.) also appeared in the case of defaulters in the Preventel group. Nevertheless, it is also clear that those tendencies are more marked among defaulters with a Preventel registration, especially if that group is more strictly defined. As regards loan repayment (number of negative loans, collective debt settlements, etc.), it might also be said that the behaviour of defaulters in the Preventel group is more marked, as they perform worse in that respect than defaulters in the control group.

Compared to defaulters in the control group, defaulters in the Preventel group:

- have a loan portfolio comprising a larger proportion of consumer loans. That is due both to the higher percentage of persons concluding that type of credit and the higher percentage of persons concluding more than one consumer loan;

- have a lower total amount of borrowings. That is due not only to the smaller proportion of mortgage loans, but also to their relatively smaller consumer loans;

- are less likely to conclude loans with a codebtor, especially where consumer credit is concerned;

- make greater use of lenders other than credit institutions;

- are more likely to have more than one negative loan. Consequently, negative loans represent a higher proportion of their loan portfolio; moreover, they pay off a smaller proportion of these loans;

- have proportionately higher arrears (arrears in % of the loan agreement amount);

- include a higher percentage of persons with a collective debt settlement.

For completeness, it should be noted that, in contrast, the profile of non-defaulters in the Preventel group cannot be said to match that of non-defaulters in the control group. In terms of demographic and credit characteristics those in the first group tend to be in an intermediate position between defaulters and non-defaulters in the control group.

However, viewed as a whole, the Preventel group differs clearly from the control group in regard to the "age" aspect. Not only does the Preventel group comprise younger persons, but also – regardless of the type of credit – they take out loans and run up arrears 5 to 6 years earlier, on average.

Another notable finding is that within the Preventel group, loan defaulters and non-defaulters also differ from one another in their telephony characteristics. At the end of June 2008, defaulters in the Preventel group comprised a higher percentage of persons with an outstanding Preventel registration and a higher percentage of persons registered more than once – whether by one or more than one operator. Furthermore, defaulters continue to be registered in Preventel for a significantly longer period than non-defaulters, most of whom clear their arrears within the year.

Cross-table analysis shows that there is a statistically significant link between mobile telephony arrears and credit arrears. On the basis of the definitions used in the study, the probability that a debtor with a Preventel registration will have a negative registration in the CICR can be estimated at around 10 times higher than for a debtor who has never had any mobile telephony arrears. The risk is 5.5 times higher if only outstanding Preventel registrations are considered as mobile telephony arrears.

If the time aspect is incorporated in the analysis, it emerges that in the bulk of the cases where both types of arrears occur mobile telephony arrears usually precede credit arrears. Comparison of the dates of the first Preventel registration and the first loan default shows that in 68 % of cases the initial arrears concerned mobile telephony. In view of the absence of any strict, uniform rules of procedure for Preventel registration among the various operators, that percentage could be merely a lower limit.
It is noteworthy that in almost half of those cases the Preventel registration also preceded the first positive loan agreement, or in other words, the person in question only took out his first loan at a moment when he was already registered in Preventel for arrears on his GSM bills.

If the Preventel registration is to act as a warning light, there has to be a link between the two types of arrears, and the chronology of the arrears needs to be right, but that is still not sufficient in itself. In addition, the Preventel registration must have a predictive value. The study examined the predictive value of the Preventel registration on the basis of a simple logistic regression model which controlled for the debtor's age and the type of borrowing. The regression results show that mobile telephony arrears are a significant predictive variable for the relative probability of a negative CICR registration. The inclusion of a dummy variable for the period of the Preventel registration (more than three months or not) leads to a further improvement in the model's predictive accuracy.

The significant link between mobile telephony arrears and credit arrears, the chronology of the two payment incidents and the predictive information contained in the Preventel registration (period) according to the results of a simple model suggest that information on arrears due to telecom operators could offer added value in the assessment of the credit risk of individuals. The actual solvency of the individual is assessed by lenders on the basis of a wide range of socio-economic variables, which can include mobile telephony arrears.

Annex 1: Preventel

Preventel was a private organisation set up in 1998 on the initiative of various telecom operators, including the three traditional operators with their own network (Base, Mobistar and Proximus). The organisation managed the negative databank of the same name, which listed consumers who failed to pay their mobile telephony bills (GSM subscriptions).

Two conditions had to be met for registration as a defaulter:
- the arrears must total at least 50 euros;
- a reminder must have been sent, warning the customer of the risk of registration in Preventel.

Preventel itself notified the person concerned in writing of his registration in the records. The registration meant that the customer could only access the minimum service (emergency numbers + receiving non-paying calls), and that an application for a subscription to one of the member operators could be refused.

The information recorded comprised, on the one hand, the identification data of the person concerned (surname, first name, gender, date of birth and address). The information on the arrears concerned the date of registration, the date of deactivation, if applicable, and the operator's code (no name); however, the amounts of the arrears were not recorded.

Once all the arrears had been cleared, the registrations were immediately deactivated so that there was no longer any visible historical record. However, if the arrears were not paid off in full, the registration remained in place for ten years.

Preventel became operational in the autumn of 1998. However, not all operators active in Belgium joined the organisation, so that the common data did not provide an exhaustive record. On 1 April 2010, Preventel ceased its activities and the former members deleted all their customer data from the records.

Annex 2: The Central Individual Credit Register (CICR) of the National Bank of Belgium[61]

Since 1 June 2003 the CICR has recorded data on mortgage loans and consumer credit (credit facilities, instalment loans, instalment sales and financial leasing) contracted by individuals in Belgium for private purposes (positive registration)[62]. The Central Register also records any defaults arising in respect of these borrowings (negative registration)[63].

The CICR is one of the instruments set up by the Belgian government to combat household over indebtedness. To that end, lenders must supply information on loan agreements and the identity of debtors to the Central Register, and are obliged to consult the Central Register before granting credit to individuals.

Those lenders include not only credit institutions but also other institutions approved by the FPS Economy for the provision of consumer credit and/or approved by the Banking, Finance and Insurance Commission for the granting of mortgage loans, e.g. instalment sale vendors, finance companies and insurance companies.

The data recorded in the CICR make it possible to identify both debtors and loan agreements. In the case of debtors (including codebtors), those data concern more particularly the National Registration number, surname, first name, gender, date of birth and address. The information on the loan agreement includes the lender's membership code, the contract number and the type of credit. In the case of instalment transactions (i.e. consumer loans other than credit facilities) and mortgage loans, the contract sum and details of the payment dates or due dates are also recorded (amount, number of instalments/due dates, initial frequency of instalments, dates of first and last instalments/expiry date). In the case of credit facilities, the contract sum is also recorded, though this is the authorised credit limit and not the actual amount taken up, as well as the date of conclusion of the contract and the contract expiry date, if applicable.

Defaults are registered as soon as they meet the criteria specified per credit type. Contracts on which the arrears have been cleared are recorded as well as those on which the arrears are still outstanding.

The periods for which the data are preserved depend on the type of data. In the case of loan agreements without default, that period is set at three months and eight days, whereas in the case of default the period is normally twelve months for regularised contracts and ten years for non-regularised contracts.

Since 1 January 1999, the Central Register has also recorded collective debt settlement notifications[64]. If an application for collective debt settlement is declared admissible, the labour court registry has to report the fact to the Central Register. Once an amicable or judicial settlement has been agreed, the relevant particulars must also be reported.

[61] The current legal basis of the Central Register is formed mainly by the Law of 10 August 2001 on the Central Individual Credit Register (BS 25.09.2001) and the Royal Decree of 7 July 2002 laying down rules on the Central Individual Credit Register (BS 19.07.2002). Further information on the Central Register may be found in those legal texts and on the NBB's website.

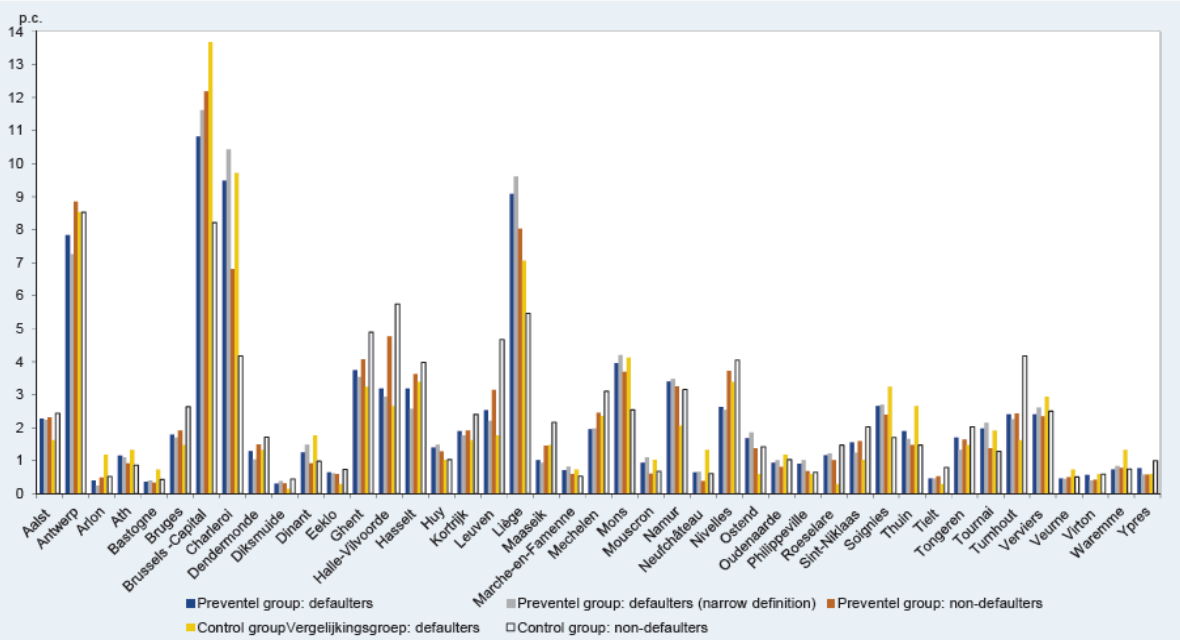
[62] The CICR data do not cover the entire individual credit market; credit facilities for a sum of less than 1,250 euros, repayable within three months, are not covered by the Consumer Credit law and therefore do not have to be reported to the CICR.

[63] In fact, the Central Register already began operating in 1987; in accordance with the law applicable at the time, the registration only concerned defaults on instalment sales, instalment loans, and personal loans repayable by instalments.

[64] Law of 5 July 1998 (BS 31.07.98) and Royal Decree of 22 April 99 (BS 19.5.99).

Annex 3: Additional chart and tables

Chart B1 Geographical distribution of debtors: breakdown by arrondissements
(in % of the total number of debtors in the(sub-)group, end of June 2008)



Sources: CICR, Preventel and own calculations.

Table B 1 Debtors by number of loans: total loans
(in % of the total number of debtors in the group/sub-group, end of June 2008)

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
One loan	30.1	33.3	30.2	30.1	38.3	41.6	41.5
More than one loan	69.9	66.7	69.8	69.9	61.7	58.4	58.5
of which:							
Two	27.5	27.4	26.1	26.6	24.3	26.3	26.3
Three	18.2	17.4	18.1	18.1	16.9	15.3	15.3
Four	11.4	10.5	12.2	11.9	7.6	8.3	8.3
Five or more	12.9	11.4	13.4	13.2	12.9	8.4	8.6
Pm: Average number of loans per person	*2.7*	*2.5*	*2.6*	*2.7*	*2.5*	*2.2*	*2.2*

Sources: CICR, Preventel and own calculations.

Table B 2 Debtors by number of loans: consumer loans[a]

(in % of the total n umber of debtors in the (sub-)group, end of June 2008)

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
One loan	35.4	37.3	37.5	36.7	46.2	53.6	53.3
More than one loan	64.6	62.7	62.5	63.3	53.8	46.4	46.7
of which:							
Two	28.2	28.0	28.1	28.1	23.1	24.6	24.5
Three	17.1	16.5	16.9	17.0	14.6	11.8	11.9
Four	9.2	8.8	9.3	9.3	6.6	5.5	5.5
Five or more	10.0	9.4	8.2	8.9	9.5	4.5	4.7
Pm: Average number of loans per person	*2.4*	*2.4*	*2.3*	*2.3*	*2.2*	*1.9*	*1.9*

Sources: CICR, Preventel and own calculations.

[a] The table only takes account of persons in the (sub-)group having contracted this type of loan.

Table B 3 Debtors by number of loans: mortgage loans[a]

(in % of the total number of debtors in the (sub-)group, end of June 2008)

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
One loan	76.5	80.2	69.6	71.3	75.0	68.5	68.6
More than one loan	23.5	19.8	30.4	28.7	25.0	31.5	31.4
of which:							
Two	18.6	16.7	22.2	21.3	17.4	22.8	22.7
Three or more	4.9	3.1	8.2	7.4	7.6	8.7	8.7
Pm: Average number of loans per person	*1.3*	*1.4*	*1.3*	*1.3*	*1.4*	*1.4*	*1.4*

Sources: CICR, Preventel and own calculations.

[a] The table only takes account of persons in the (sub-)group having contracted this type of loan.

Table B 4 Average outstanding debt per contract[a]

(in euros, end of June 2008)

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
Total loans							
Average	14,700	12,400	26,039	22,000	23,200	37,900	37,400
Median	6,100	4,900	11,400	8,600	10,100	23,100	22,300
Consumer loans							
Average	7,000	6,200	7,600	7,400	10,300	7,800	7,900
Median	4,400	3,800	5,000	4,800	5,700	5,000	5,000
Mortgage loans							
Average	83,400	81,200	94,600	91,900	89,000	81,100	81,300
Median	69,000	66,200	80,400	76,700	69,600	64,500	64,500

Sources: CICR, Preventel and own calculations.

[a] The amounts in the table are rounded off to the nearest hundred.

Table B 5 Type of loan by lender[a]

(in % of the total number of loans of the type in question contracted by the (sub-)group, end of June 2008)

	Preventel group				Control group		
	Defaulters		Non-defaulters	Total	Defaulters	Non-defaulters	Total
		of which: narrow definition					
Mortgage loans							
Credit institutions	59.7	55.6	73.6	70.0	66.0	81.8	81.5
Other lenders	40.3	44.4	26.4	30.0	34.0	18.2	18.5
Instalment sales							
Credit institutions	24.7	25.0	25.5	25.2	28.1	22.0	22.3
Other lenders	75.3	75.0	74.5	74.8	71.9	78.0	77.7
Instalment loans							
Credit institutions	72.3	71.8	77.4	75.5	73.4	85.2	84.5
Other lenders	27.7	28.2	22.6	24.5	26.6	14.8	15.5
Credit facilities							
Credit institutions	25.8	23.4	31.3	29.4	34.2	42.0	41.7
Other lenders	74.2	76.6	68.7	70.6	65.8	58.0	58.3

Sources: CICR, Preventel and own calculations.

[a] The data concern the issuer of the first registered contract of the credit type in question.

Table B 6 Debtors by number of negative loans: total loans
(in % of the total number of debtors in the (sub-)group, end of June 2008)

	Preventel group		Control group
	Defaulters		Defaulters
		of which: narrow definition	
One loan	57.1	55.1	70.1
More than one loan	42.9	44.9	29.9
of which:			
Two	23.4	23.6	16.2
Three	10.0	10.7	7.7
Four	4.3	4.6	2.5
Five or more	5.2	5.9	3.5
Pm: Average number of negative loans per person	*1.8*	*1.9*	*1.6*

Sources: CICR, Preventel and own calculations.

Table B 7 Debtors by number of negative loans: consumer loans[a]
(in % of the total number of debtors in the (sub-)group, end of June 2008)

	Preventel group		Control group
	Defaulters		Defaulters
		of which: narrow definition	
One loan	59.1	56.3	70.4
More than one loan	40.9	43.7	29.6
of which:			
Two	22.5	23.0	17.0
Three	9.5	10.6	6.5
Four	4.0	4.4	2.9
Five or more	5.0	5.6	3.2
Pm: Average number of negative loans per person	*1.8*	*1.9*	*1.6*

Sources: CICR, Preventel and own calculations.
[a] The table only takes account of persons with negative loans of this type outstanding.

Table B 8 Debtors by number of negative loans: mortgage loans[a]
(in % of the total number of debtors in the (sub-)group, end of June 2008)

	Preventel group		Control group
	Defaulters		Defaulters
		of which: narrow definition	
One loan	85.4	87.2	88.1
More than one loan	14.6	12.8	11.9
of which:	12.4	11.7	9.3
Two	1.7	0.9	2.0
Three	0.5	0.2	0.0
Four	0.0	0.0	0.7
Five or more	0.6	0.6	0.6
Pm: Average number of negative loans per person	*1.2*	*1.1*	*1.2*

Sources: CICR, Preventel and own calculations.
[a] The table only takes account of persons with negative loans of this type outstanding.

Table B 9 Total registration period of the debtors' (cumulative) Preventel registrations
(in % of the total number of debtors in the (sub)-group, end of June 2008)

	Preventel group			
	Defaulters		Non-defaulters	Total
		of which: narrow definition		
Up to one year	30.8	13.3	65.3	52.9
of which:				
0 months	3.8	0.7	13.3	9.9
0-1 month	4.1	1.0	14.4	10.7
1-2 months	3.6	1.1	8.3	6.6
2-3 months	2.6	1.0	6.1	4.9
3-6 months	6.4	2.8	11.9	9.9
Two years	13.4	11.8	8.9	10.6
Three years	9.2	10.0	4.1	5.9
Four years	6.1	7.5	2.9	4.1
Five years or more	40.5	57.3	18.8	26.6

Sources: CICR, Preventel and own calculations.

Table B 10 Average duration per Preventel registration

(in % of the total number of debtors in the(sub-)group, end of June 2008)

	Preventel group			
	Defaulters		Non-defaulters	Total
		of which: narrow definition		
Up to one year	38.5	20.3	70.0	58.7
of which				
0 months	3.8	0.7	13.3	9.9
1 month	4.9	1.3	17.0	12.6
2 months	4.9	1.7	9.5	7.9
3 months	3.9	2.0	6.8	5.8
4-6 months	8.5	4.6	12.5	11.1
Two years	14.6	15.2	7.9	10.3
Three years	8.7	10.8	3.5	5.4
Four years	5.8	7.8	2.8	3.9
Five years or more	32.4	46.0	15.9	21.8

Sources: CICR, Preventel and own calculations.

Table B 11 Composition of the Preventel sample

(in number of persons unless otherwise stated)

Original sample			Modified sample		
	number of persons	Pm: in % of the sample total		number of persons	Pm: in % of the sample total
Total	20,000		Total	19,200	
Negative in CICR at some time	9,248	46.2	Negative in CICR at some time	8,448	44.0
of which: first negative registration before end October 1998	800	4.0	of which: negative registration at end of June		
of which: negative registration end of June 2008	7,183	35.9			
Never negative in CICR	10,752	53.8	Never negative in CICR	10,752	56.0

Table B 12 Time elapsing[a] between first Preventel registration and first default in the CICR: frequency distribution
(number of months between the first and last of the two payment incidents)

	Preventel "AFTER"		Preventel "BEFORE"	
	%	cumulative %	%	cumulative %
Under 1 month	0.8	0.8	1.5	1.5
1 month	1.8	2.6	2.4	3.9
2 months	1.5	4.1	2.3	6.2
3 months	1.5	5.6	1.7	8.0
Between 3 and 6 months	3.1	8.6	5.3	13.3
Between 6 and 12 months	5.0	13.6	8.0	21.3
Between 12 and 18 months	3.7	17.3	6.3	27.6
Between 18 and 24 months	2.9	20.2	5.1	32.7
Over 24 months	11.8	32.0	35.3	68.0

Sources: CICR, Preventel and own calculations.

[a] Number of months between the first and last of the two payment incidents.

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