European Commission
EUROSTAT

Doc. ENV-EXP/WG/011/03.6 (2003)
Original in FR, available in EN
Point 3.6 of the agenda

Current environmental protection expenditure by the Belgian industry (1999)

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Meeting of the

Working Group "Environment and Sustainable Development"

Sub-Group "Environmental Expenditure Statistics"

Joint Eurostat/EFTA group

Meeting of 6 and 7 March 2003
BECH building – Room Ampère

MINISTRY OF ECONOMIC AFFAIRS

STATISTICS BELGIUM

Environment Office

Current environmental protection expenditure by the Belgian industry (1999)

Pilot survey.

December 2001

ESTAT N°200071700002 Convention, Eurostat/DG-env

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Word of thanks

The structural business survey unit of Statistics Belgium, its call centre, its informatics and printing offices logistically supported this survey. I would like to thank all the anonymous people of these offices for their essential contributions. Anne Van de Voorde and Robert Delée, who are responsible for the different offices involved, also deserve gratitude, as well as the statisticians Olivier Pieret, Jean-Marie Dawagne, and Guy Vekeman.

However, my warmest thanks go to my fellow workers Marina Sampièri and Rita Braekman, the key figures of this project, who have dedicated months of hard work to obtain the best and most complete information from the companies. Finally, the correspondents of the companies are the ones really responsible for the quality of this statistic. We would like to thank them for their reception and their willingness to answer to the best of their ability, sometimes at the cost of tedious research, and for what they have learned us about the ground truth.

This study has been co-financed by the DG-Environment and Eurostat.

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Method

The structural business survey served as the basis for the sub-survey on environmental expenditure. It concerns a stratified sample of +/- 41455 companies from about 700 000 registered companies in Belgium (including self-employed persons). Three environmental questions were only asked to +/- 26596 firms. They concerned environmental taxes, investments destined to abate end of pipe pollution and preventive investments in the form of "integrated technologies". Furthermore, details on investments per environmental domain (air, water + soil, waste, noise) were asked to all (+/- 3373) the large industries and distributors of water and electricity. The whole of the survey was obligatory. The characteristics of this survey are described in detail in NSI-Belgium (2001).

For the data of 1999 a *facultative* supplementary annex asked for the total and the details of *current* environmental expenditures (see annexe 1). This annex was sent to the industries that already received the annex on the details of the investments per environmental domain. Finally, to indicate the facultative character of the pilot survey the corresponding enclosed questionnaire was printed on green paper.

It was sent to all the industries (NACE 1->41) that employ at least 20 persons or have a turnover of at least 200 billion BEF (4,96 billion EUR). About 3373 questionnaires were sent. 3298 (97.8%) of those that were sent back by the companies were retained for the calculations after the verifications and telephone reminders. It was necessary to calculate a weighting coefficient higher than 1 for companies that have certain characteristics to compensate non-responses.

However the annex that interests us was often sent back empty because of its facultative character that was clearly mentioned.

The answers that were received spontaneously for each question are given in figure 1. It shows that the answer rate for the total of the identified companies is 15% and that only 7% of the companies covered have answered to all the questions.

Figure 1: Descriptive statistics (spontaneous answers) (1000 BEF)

	N	Mean	Std. Deviation	Answer rate
TOTAL PAC current expenditures	504	15066	135470	15%
CE01 air	290	1374	12856	09%
CE02 water	328	4368	43839	10%
CE03 waste	379	9656	102272	11%
CE04 soil	278	2111	29856	08%
CE05 noise	266	100	469	08%
CE09 other	287	4695	47688	09%
Valid N (listwise)	225			07%

The second phase of the pilot survey consisted in reminders by telephone or, if necessary, by fax to:
-all the companies that had sent back an empty or crossed out questionnaire;
-all the companies that had answered 0;
-all the companies that had given somehow surprising answers (in view of what could be expected of the company class – often it concerned controlling the units used);
-some companies that had answered correctly, to get an idea of the types of expenditure that had been taken into account.

More than 2500 companies have been contacted by telephone. In general, this corresponded with several telephone calls per company. The purpose was to make the questions more clear in order to receive good answers to future surveys, to examine the feasibility of these questions and, finally, to improve the quality and the quantity of the answers.

Figure 2 shows the statistical characteristics at the end of the second phase, as far as they have been used to calculate the results. This way the answer rate amounted to 46% for the total, as 17% of the respondents had given a precise answer for all the environmental domains.

Figure 2: Descriptive statistics (after renewed telephone contact) (1000 BEF)

	N	Mean	Std. Deviation	Answer rate
TOTAL PAC current expenditures	1507	8551	90541	46%
CE01 air	709	1382	19155	21%
CE02 water	933	3390	39074	28%
CE03 waste	1393	4630	56853	22%
CE04 soil	713	285	2050	22%
CE05 noise	629	131	1790	19%
CE09 other	886	2266	28728	27%
Valid N (listwise)	576			17%

Quality of the answers

Annex II describes a study that was carried out halfway through this survey. According to this study (Kestemont, 2001), by using the two phases survey the answer error can be estimated during the first phase, hence the clearness of the questionnaire. It appears (figure 2 of annex II) that the domains “air”, “soil”, “noise” and “other” are most subject to interpretation by the respondents. Certain companies tend to include the expenditures for energy saving (especially when referring to CO2) for air and “other”. For the domain noise, the exclusion of expenditures for employee protection may pose a problem. On the other hand, current expenditures for the domains waste water and waste seem to be a generally known concept for the companies. For the domain waste though, a certain number of companies forgot to add their contribution to Fost+ or Val-i-pac (which organise the recycling of waste at the end of the consumption line), and even the location of containers, but in general these amounts are not very large.

The quality of the corrected answers (after telephone surveys) may be suffering from interviewer effect or the dishonesty of respondents. The pollster effect is probably weak as the two main pollsters work in the same office and regularly communicate with the statistician. A difference of concept remains between this survey and the working results of the Task-Force of Eurostat (see Eurostat, 2001). This is logical because these two activities have been carried out simultaneously. Although the experience during the survey could offer directions to the Task Force, the opposite was not the case because of the internal coherence of the survey. Finally, a difference resides in the inclusion in our survey of « environmental taxes » and other taxes. As far as according to SEC95, the largest part of taxes for water and waste are considered as payments and not as taxes, this difference has no important repercussions. However certain non-attributed environmental taxes, such as the federal eco-taxes or fixed municipal taxes could be included in the answers.

A linguistic effect is also possible (because each pollster interviews the correspondents of the same mother tongue in his own language) but this is probably negligible because of the quality of the translation of the written documents and the unity of the professional culture of large companies and federal institutions (bilingualism).

In general, we can say that the quality of the answers is good, because of the unremitting telephone exchange and the possibility to omit answering when in doubt. For obligatory surveys though, it is important to verify the quality of the answers of the most reluctant companies, especially the first years.

The classification of companies in accordance with the NACE code is another type of error. The sample is extracted from the register of companies of Statistics Belgium (DBRIS). It is made up and actualised on the basis of administrative documents (VAT, ONSS l’Office national de Sécurité sociale, ONSSAPL l'Office national de sécurité sociale des administrations provinciales et locales, etc.). 700000 companies are listed. An automatic comparison of the activity codes brings out the divergences, which lead to a routine telephone control. Large surveys also indicate classification errors that are communicated to DBRIS. Finally a “statistical” activity code is given

to each company. This code corresponds with the actual activity of the company. By means of the codes of products and activities the structural business survey and in particular Prodcom make it possible to know the percentage of turnover of each activity branch. If necessary, the companies are reclassified according to their principal actual activity. In practice, the largest companies are ultimately best classified even if their classification (mono-hierarchic) is the most vague because their activities are much more diversified.

Despite this continuous work there remain errors in the classification. Our environmental surveys by telephone sometimes indicate that a company is not misclassified because, for instance, it lacks an industrial activity. About ten companies could be reclassified this way. Sometimes a commercial specialisation of certain companies or subsidiaries is observed. This is the case for numerous printing offices or energy supplying companies. However, these corrections have not been taken into account in our survey for practical reasons. They will improve the samples for future surveys of Statistics Belgium.

Finally, there is one source of errors that is linked with the kind of management of the large companies, especially in a small country like Belgium where the economic and environmental legislation is heavily regionalized. The attribution of the investments and expenditure responds to an accountable, logical, functional or fiscal logic. Therefore, expenditure is not necessarily attributed to the place or the production unit where the actual activity or the corresponding equipment is situated. This traceability of expenditure also poses problems for our correspondents in the companies, whether it concerns an accountant, a person responsible for environmental issues, a production director, a personnel manager, a person responsible for purchase, a person responsible for investments, etc. The larger the company, the more people have to be interviewed and the higher the risk of estimations in the answers to our questions. A permanent, obligatory survey that is conceptually in phase with the administrative questionnaires or the managing habits gives companies the possibility to develop an adequate information system and to reduce the risk of answer errors to our surveys. This would require a harmonisation of concepts not only on a statistical level but also between administrations and legislations of regions and different countries. It is the classic paradox of the information, between comparability and precision (see Kestemont et al, 1996).

Correlations

The following graphs (figure 3) show that there is no relation between the total of the current environmental expenditures of a company and its turnover, its energy expenditure or its environmental investments. It is confirmed when the R^2 is calculated for the whole regression curb. In other words, estimation on the basis of these variables is always heavily biased, as is clearly shown for the relation between the energy expenditures (figure 4)[1]. It is thus necessary either to develop more detailed approximation methods, or to compel an important number of companies to calculate the amount of their current environmental expenditure. These considerations are in favour for an obligatory and recurrent survey.

[1] There can be a relation between energy purchases and End Of Pipe investments in industry, but not between energy purchases and integrated investments (see Statistics Belgium, 2001)

Figure 3: Relations between current environmental expenditures, turnover, energy expenditures and e-o-p environmental investments

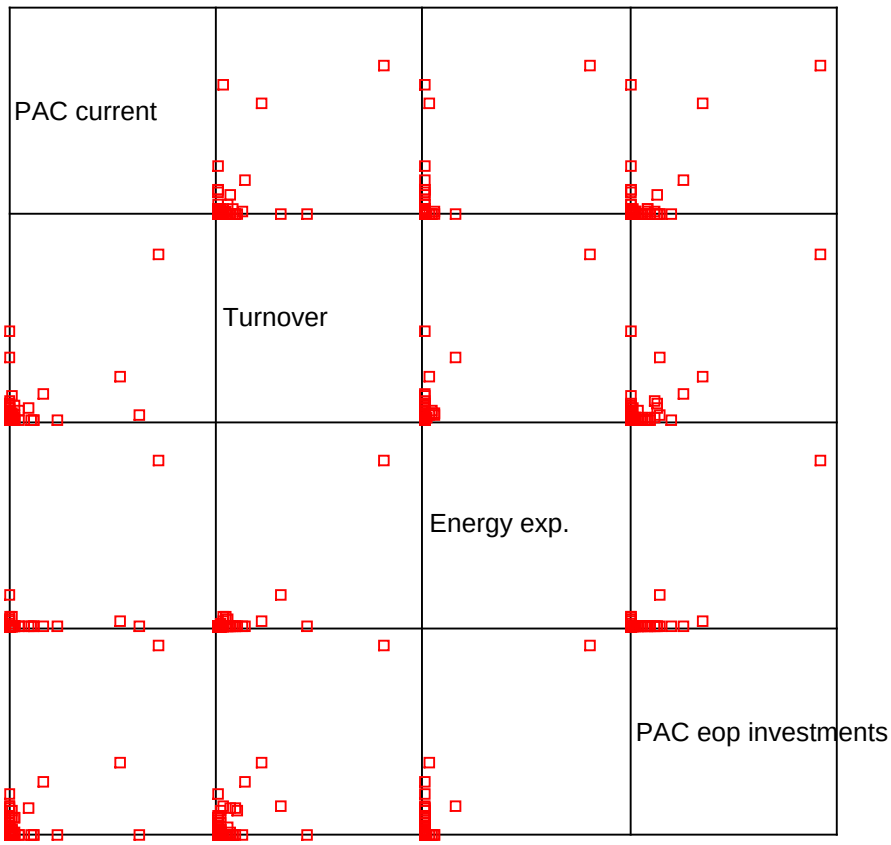
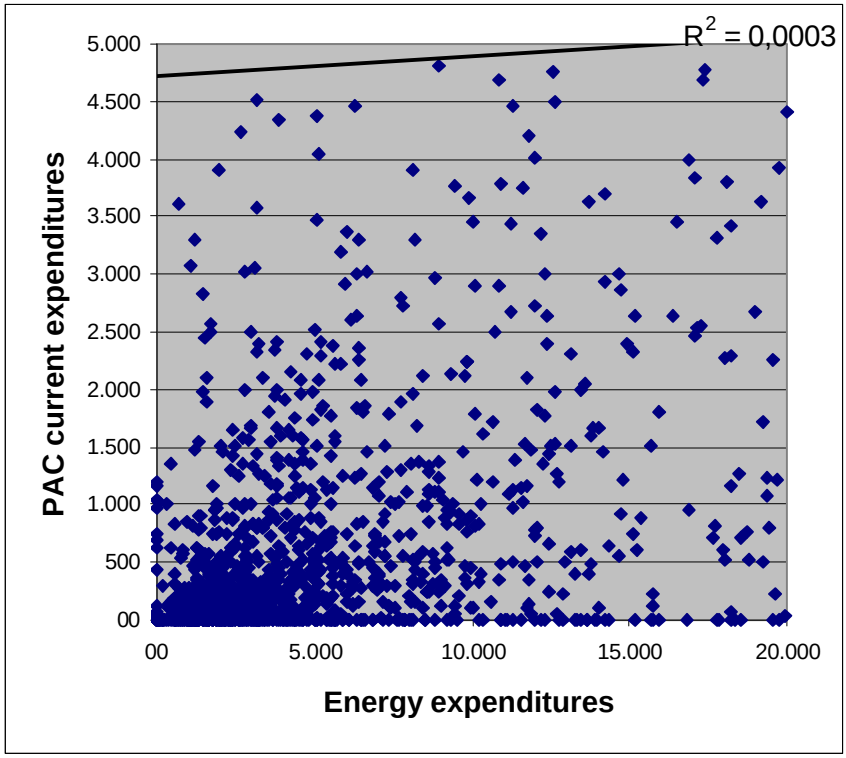


Figure 4: relation between energy expenditures and current environmental expenditures (margin of companies of average importance)(1000 BEF)



Processing of non-response.

In view of these findings, which are confirmed by the inexistence of a curvilinear relation between the variables, the estimation of non-responses becomes problematic, even more so because the non-response rate remains high.

The matrix of correlations between some available obligatory variables (turnover, energy expenditures, PAC end-of-pipe investments, total of taxes, environmental taxes) should not raise false hopes (figure 5). It shows linear correlation coefficients, while we have seen that no linear relation exists. However, for want of anything better, we have used this instrument to select a variable as a starting point to use default factors.

Figure 5 Correlations between a number of variables

Current PAC		12110 Turnover	20110 Energy	21110 PAC eop inv	30110 Taxes	30130 Env. taxes
CE01 air	Pearson Correlation	,519	,431	,663	,316	,558
	N	709	709	709	709	709
CE02 water	Pearson Correlation	,669	,648	,799	,397	,770
	N	933	933	933	933	933
CE03 waste	Pearson Correlation	,253	,229	,265	,128	,238
	N	1393	1393	1393	1393	1393
CE04 soil	Pearson Correlation	,331	,112	,579	,180	,629
	N	713	713	713	713	713
CE05 noise	Pearson Correlation	,346	,133	,676	,758	,473
	N	629	629	629	629	629
CE09 other	Pearson Correlation	,687	,820	,768	,376	,849
	N	886	886	886	886	886

** Correlation is significant at the 0.01th level (2-tailed) for all cells

The variable on environmental investments (21110) gives a first perception of the best correlation. However, the large quantity of zero values, for a given year, makes it a bad basis for estimations of individual values. In the future, this variable can serve as a basis for more subtle correlation studies. The fact that energy was taken into account in the domain “other” of environment could be the cause of the correlation between “other” current expenditures and energy expenditures or “environmental” taxes, but this is not certain.

Default factors

In each NACE default factors are calculated with 2 digits on the basis of the received answers. They make a very rough estimate possible of current environmental expenditures for companies who did not answer[2]. These are companies where we could not reach the correspondent in charge, or which did not want to answer this year because of the non compulsory character of the question or the difficulty to evaluate these amounts a posteriori (many companies have promised to answer in the years to come).
To be perfectly clear, they are expressed in terms of the value of the current expenditure per million units of the explicative variable in the following table.

The calculation method is a weighted average:

$$F_I = \frac{\sum_i C_i}{\sum_i E_i}$$

with F the default factor for the considered NACE
C_i the current environmental expenditure (for the considered domain) declared by company i
E_i the value that is declared by company i for the explicative variable (turnover 12110).

In each NACE, values that lack current environmental expenditures for companies j because they did not answer, are calculated by the formula:

$$C_j = F_I * E_j$$

[2] In fact, the present estimation only concerns companies that have answered to the general questionnaire but not to the facultative questions about current expenditures. The correction for non-response to the whole of the questionnaire, which represents only a few percent, is treated in a global way by applying a correcting factor to the weighing of companies with the same characteristics.

Figure 6: Current environmental expenditure per million turnover

NACE	Air	N1	Water	N2	Waste	N3	Soil	N4	Noise	N5	Other	N9
14	39	8	813	8	437	12	1	8	0	8	461	9
15	105	98	968	164	1493	221	219	100	28	86	260	140
16	367	2	21	2	231	7	59	2	704	2	68	3
17	40	46	1494	77	1686	109	296	46	11	40	335	72
18	156	12	274	20	1159	42	20	13	0	11	39	13
19			3999	2	3526	3					643	1
20	651	28	105	29	5990	48	67	24	275	24	450	30
21	604	18	732	25	2012	42	86	19	90	19	325	25
22	2	58	1128	70	8881	101	33	59	0	56	83	68
23	16	4	104	4	9152	6	13	4	0	2	43	4
24	2017	65	3308	82	2663	109	302	60	230	50	2809	83
25	100	37	179	43	1707	74	95	39	38	32	168	46
26	364	46	6256	58	1511	68	207	48	57	38	519	48
27	349	22	1056	28	2427	38	171	20	227	20	302	25
28	119	82	409	98	1180	155	78	85	8	78	313	99
29	68	61	63	70	567	113	49	65	21	60	208	70
30	0	3	14	4	497	7	0	3	0	3	55	4
31	109	27	56	33	754	42	149	30	37	23	262	29
32	91	9	358	11	591	19	53	9	0	8	4	8
33	0	8	457	12	1335	18	122	9	0	8	237	9
34	24	12	112	17	870	35	67	14	9	11	219	20
35	67	8	458	12	1293	16	94	7	28	7	437	8
36	2013	32	891	40	1062	76	93	28	1	21	258	45
37	581	8	656	10	10268	15	159	9	539	8	480	11
40	418	10	1516	10	948	12	0	8	0	9	1455	12
41	0	5	104	4	1735	5	0	4	0	5	40906	4

Legend: The factors are expressed in the monetary unit of the environmental expenditure per million of the monetary unit of the explicative variable (the turnover corresponds with variable 12110 of the structural survey).
N1, N2, N3, N4, N5, N9 represent the number of companies on the basis of which these factors have been calculated.

Results

The results of the estimations in accordance with the aggregations of the sectors of the Structural Survey (figure 7) show that the current environmental expenditures concern domains varied according to the sectors. They are the highest in the chemical sector and the refining sector, important industries in Belgium. While waste represents more than 98% in the refining sector, the treatment of waste water represents 70% of the current environmental expenditures for the sector of non metallic mineral products (Figure 8). The domains soil and noise protection are negligible while the domain air is less important.

Figure 7: Current expenditures for environmental protection in industries with more than 20 employees or with a turnover of more than 4,96 million EUR. Belgium, estimations (1000 EUR).

Sector	Total	Air	Water	Waste	Soil	Noise	Other
Mining and quarrying (C)	1424	32	661	355	1	0	375
Food products, beverages (DA)	115056	4777	35086	54628	8077	2876	9612
Textiles, clothes, footwear (DB+DC)	45194	776	16966	20810	2901	108	3633
Wood (DD)	19460	1682	272	15460	172	711	1163
Paper, paperboard, printing (DE)	89508	3616	11759	70374	731	542	2486
Coke, refined petroleum products and nuclear fuel (DF)	152025	266	1692	149162	209	0	696
Chemicals, rubber, plastic (DG+DH)	483074	82856	136097	125419	13241	9731	115730
Non-metallic mineral products (DI)	80710	3276	56763	13600	1862	509	4700
Basic metals (27)	81315	6265	18950	43553	3062	4065	5420
Fabricated metal products (28)	19074	1077	3695	10688	709	73	2832
Machinery and equipment (DK+DL+DM+DN)	103847	12164	12776	59710	4664	1383	13150
Electricity, gas (40)	144684	13957	50571	31612	0	0	48544
Water (41)	66729	0	162	2709	0	0	63858

Figure 8: Distribution per domain of current environmental protection expenditures in industries with more than 20 employees or with a turnover of more than 4,96 million EUR. Belgium, estimations (%).

Sector	Total	Air	Water	Waste	Soil	Noise	Other
Mining and quarrying (C)	100%	2%	46%	25%	0%	0%	26%
Food products, beverages (DA)	100%	4%	30%	47%	7%	2%	8%
Textiles, clothes, footwear (DB+DC)	100%	2%	38%	46%	6%	0%	8%
Wood (DD)	100%	9%	1%	79%	1%	4%	6%
Paper, paperboard, printing (DE)	100%	4%	13%	79%	1%	1%	3%
Coke, refined petroleum products and nuclear fuel (DF)	100%	0%	1%	98%	0%	0%	0%
Chemicals, rubber, plastic (DG+DH)	100%	17%	28%	26%	3%	2%	24%
Non-metallic mineral products (DI)	100%	4%	70%	17%	2%	1%	6%
Basic metals (27)	100%	8%	23%	54%	4%	5%	7%
Fabricated metal products (28)	100%	6%	19%	56%	4%	0%	15%
Machinery and equipment (DK+DL+DM+DN)	100%	12%	12%	57%	4%	1%	13%
Electricity, gas (40)	100%	10%	35%	22%	0%	0%	34%
Water (41)	100%	0%	0%	4%	0%	0%	96%

The specification per NACE-2 digits (figure 9) shows that the current expenditures are on average higher than the investments concerning environmental protection, but that there is no systematic relation between these two types of expenditure. The specification per NACE-3 digits can be found in annex III, but these results are to be considered with caution because of the estimation method of the lacking data.

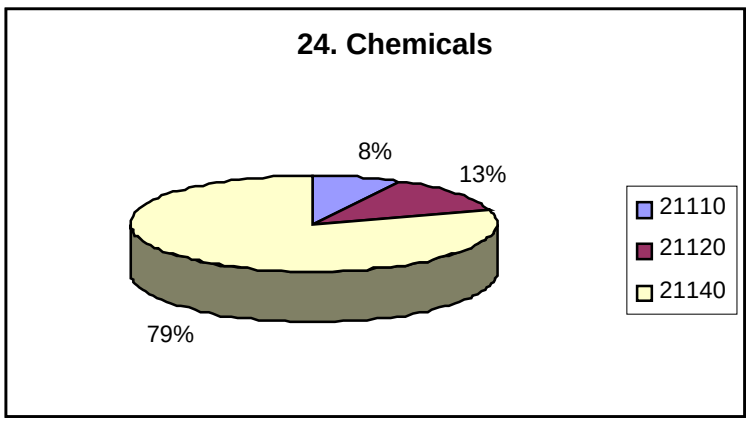
Figure 9: Expenditures for environmental protection and other characteristics of industries with more than 20 employees or with a turnover of more than 4,96 million EUR. Belgium, estimations (1000 EUR).

NACE	Turnover	Energy	21110	21120	21140	Air	Water	Waste	Soil	Noise	Other
14	813022	36998	0	312	1424	32	661	355	1	0	375
15	36227929	515779	27370	7266	111242	3812	35030	54021	7923	1024	9432
16	2629597	5756	141	311	3814	965	56	607	154	1852	180
17	9637297	209044	6371	955	37205	389	14374	16256	2850	108	3228
18	2484932	9332	0	0	4087	387	682	2869	51	0	98
19	477618	4099	0	211			1910	1685			307
20	2582615	62057	1276	1009	19460	1682	272	15460	172	711	1163
21	5970688	202392	1880	6170	22980	3603	4369	12015	512	540	1941
22	6563165	52971	671	3979	66528	12	7390	58359	219	2	546
23	16298273	573505	6800	17325	152025	266	1692	149162	209	0	696
24	40615577	1260463	45543	72377	459659	81830	134269	107933	12273	9340	114014
25	10234370	168269	7777	8187	23416	1026	1829	17486	968	391	1716
26	8998092	394920	8818	10077	80710	3276	56763	13600	1862	509	4700
27	17944799	763565	26064	38819	81315	6265	18950	43553	3062	4065	5420
28	9067670	137985	4713	2814	19074	1077	3695	10688	709	73	2832
29	12359751	86625	1413	2348	12072	835	776	7014	610	263	2574
30	232020	1040	7	0	131	0	3	115	0	0	13
31	6356785	47706	6684	6797	8698	690	358	4802	949	235	1664
32	6359230	31302	225	179	6980	576	2276	3767	336	0	25
33	1598966	10233	0	0	3398	0	721	2111	192	0	374
34	26448842	119411	3760	18771	34409	639	2970	23021	1769	226	5784
35	2496720	18082	0	791	5934	168	1142	3227	235	71	1091
36	4287547	38393	1059	1164	18515	8629	3820	4555	400	5	1106
37	1080831	16221	657	1071	13708	628	709	11098	172	582	519
40	33355406	1476422	21484	87690	144684	13957	50571	31612	0	0	48544
41	1561091	40594	128	5231	66729	0	162	2709	0	0	63858

Figure 10: Expenditures for environmental protection and other characteristics of industries with more than 20 employees or with a turnover of more than 4,96 million EUR. Belgium, estimations (1000 EUR et %).

NACE	Turnover	21110	21120	21140	Total PAC	21110%	21120%	21140%	PAC/ Turnover
14	813022	0	312	1424	1736	0%	18%	82%	0,2%
15	36227929	27370	7266	111242	145878	19%	5%	76%	0,4%
16	2629597	141	311	3814	4266	3%	7%	89%	0,2%
17	9637297	6371	955	37205	44531	14%	2%	84%	0,5%
18	2484932	0	0	4087	4087	0%	0%	100%	0,2%
19	477618	0	211	0	211	0%	100%	0%	0,0%
20	2582615	1276	1009	19460	21745	6%	5%	89%	0,8%
21	5970688	1880	6170	22980	31030	6%	20%	74%	0,5%
22	6563165	671	3979	66528	71178	1%	6%	93%	1,1%
23	16298273	6800	17325	152025	176150	4%	10%	86%	1,1%
24	40615577	45543	72377	459659	577579	8%	13%	80%	1,4%
25	10234370	7777	8187	23416	39380	20%	21%	59%	0,4%
26	8998092	8818	10077	80710	99605	9%	10%	81%	1,1%
27	17944799	26064	38819	81315	146198	18%	27%	56%	0,8%
28	9067670	4713	2814	19074	26601	18%	11%	72%	0,3%
29	12359751	1413	2348	12072	15833	9%	15%	76%	0,1%
30	232020	7	0	131	138	5%	0%	95%	0,1%
31	6356785	6684	6797	8698	22179	30%	31%	39%	0,3%
32	6359230	225	179	6980	7384	3%	2%	95%	0,1%
33	1598966	0	0	3398	3398	0%	0%	100%	0,2%
34	26448842	3760	18771	34409	56940	7%	33%	60%	0,2%
35	2496720	0	791	5934	6725	0%	12%	88%	0,3%
36	4287547	1059	1164	18515	20738	5%	6%	89%	0,5%
37	1080831	657	1071	13708	15436	4%	7%	89%	1,4%
40	33355406	21484	87690	144684	253858	8%	35%	57%	0,8%
41	1561091	128	5231	66729	72088	0%	7%	93%	4,6%

Figure 11. Part of the different types of environmental expenditures in a number of sectors



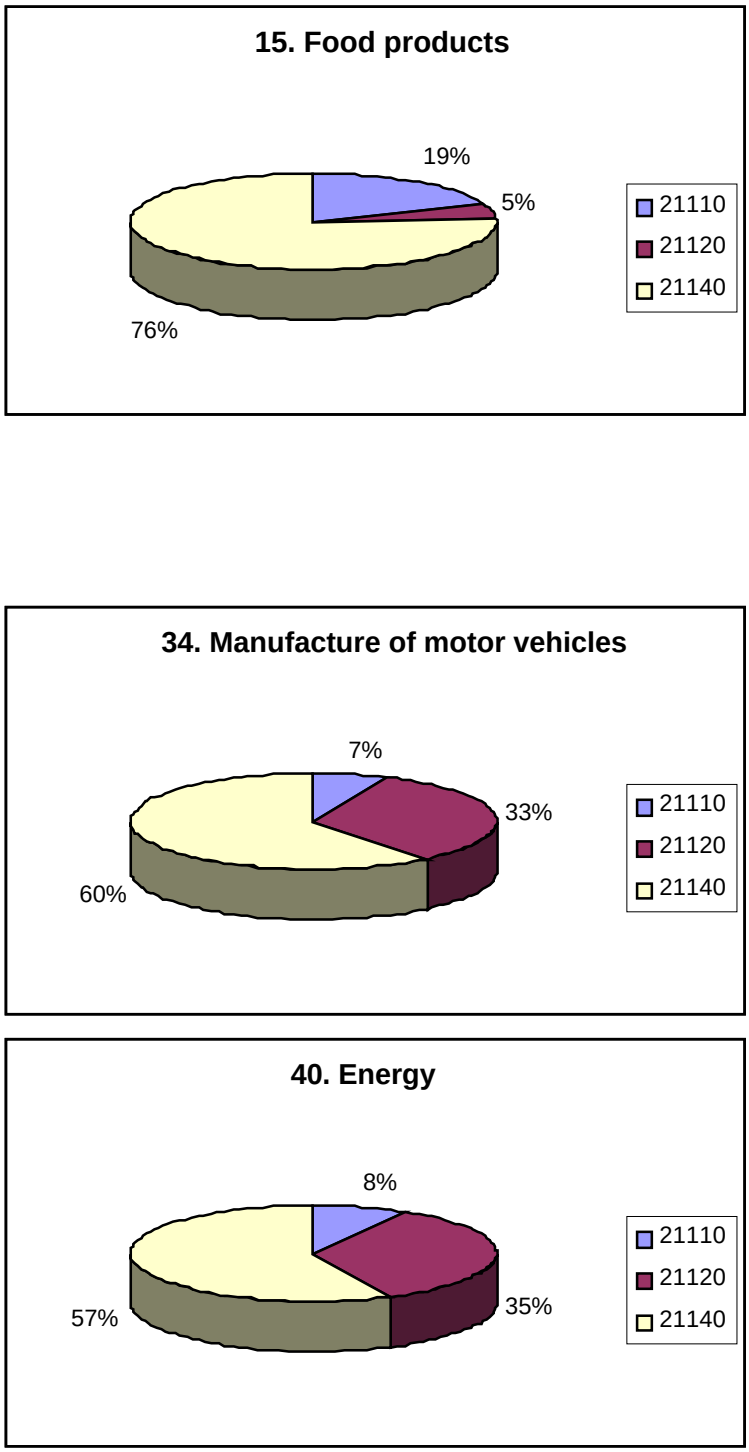
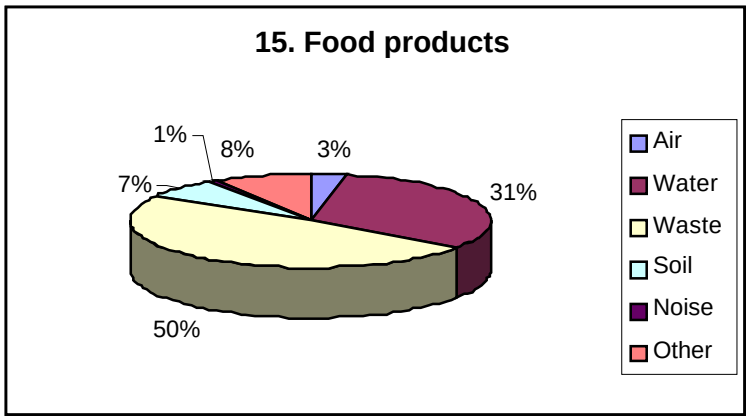
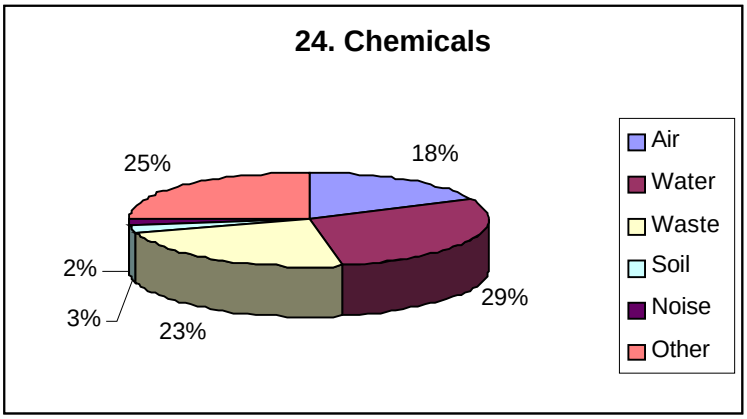
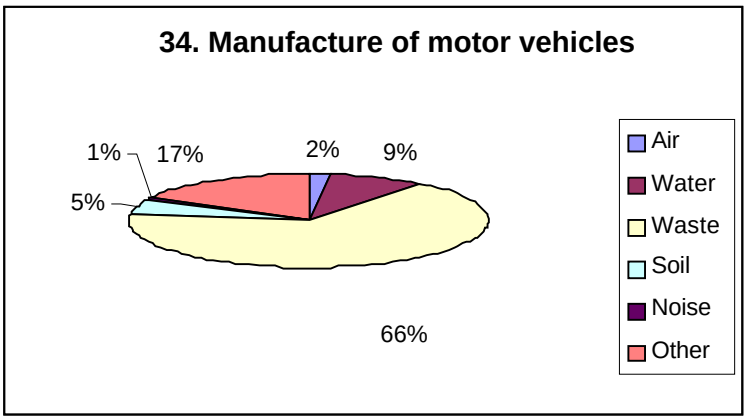
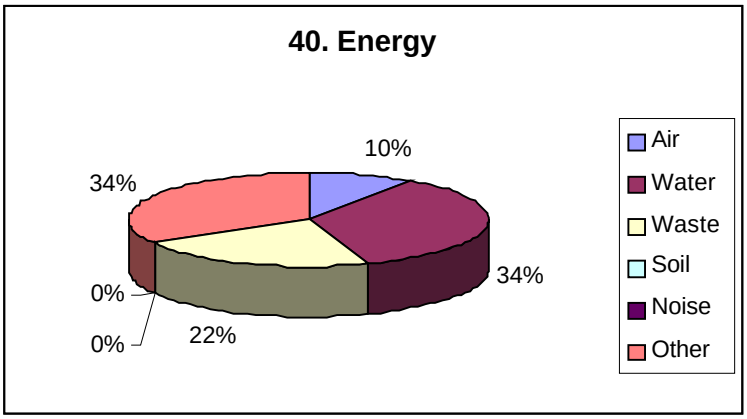


Figure 12: Current environmental expenditures per domain for a number of sectors









Comparison with other surveys.

The distribution between the environmental domains and the results published by the federation of chemical companies (Fedichem, 1997) shows that the data are comparable. The figures of Fedichem seem to indicate that the domain « other » includes, in the answer to our survey also, taxes on the motive power, which is considered in this sector as relevant for the environment.

It is very likely that there is a cultural contagion within companies who are accustomed to surveys about this question. A certain period of time to level the concepts will be necessary to prevent biases between sectors, particularly concerning the perception of what belongs to environment and what does not. Special attention has to be given to everything concerning energy. It could be useful to ask explicitly for the amounts regarding energy economies to try and prevent that they are included into other sections (notably « air » or « other »).

The federation of food companies also holds surveys about environmental expenditures (Fevia, 1999). They made the extrapolations to the whole of the sector on the basis of the 87 companies that had answered the questionnaire and that represented 34% of the turnover of the sector[3]. These results cover the whole of the sector (without company size threshold) and their presentation does not facilitate the comparison with our numbers. By reconstituting definitions that are comparable to ours and using their figures that are more detailed, we obtain comparable orders of magnitude but the proportions of environmental domains differ (figure 11). The comparison of results suggests that companies include the tax on motive force, which is explicitly part of the environment in the survey of the federation, into our section « other ». This was probably also due to « cultural contagion » between different surveys. FEVIA makes an interesting distinction between the different types of expenditures linked to waste (waste operating costs, packaging operating costs, waste elimination, contribution to organisms of selective collection and recycling, taxes and levies on waste).

[3]Only middle and large companies have been taken into account in our survey. Our result has to be smaller than that of the survey of Fevia. The number of companies that answered varies between 88 and 228 according to the questions.

Figure 11: Current environmental expenditures of food industries

Source of the data:	According to FEVIA	According to FEVIA	According to FEVIA	INS	INS
Coverage	Whole sector	Whole sector	Whole sector	>20 employees or >5mio EUR	
	1000 EUR	% without motive force	% without motive force	1000 EUR	%
	1998	1998	1998	1999	1999
Operating costs, waste	10957	9%			
Operating costs, air	2256	2%			
Operating costs, water	45761	39%			
Operating costs, packaging	3223	3%			
Operating costs, other	2256	2%			
Elimination waste	13138	11%			
Contributions waste	23054	20%			
Taxes waste	2975	3%			
Taxes water	11899	10%			
Taxes soil	744	1%			
Taxes water de surface	1239	1%			
Taxes motive force	7437				
Taxes other	496	0%			
Total	**125434**		**100%**	**115056**	
Total without "motive force"	**117997**	**100%**			
Air	2256	2%	2%	4777	4%
Water	58900	50%	47%	35086	30%
Waste	53347	45%	43%	54628	47%
Soil	744	1%	1%	8077	7%
Noise				2876	2%
Other	10189		8%	9612	8%
Other without « motive force »	2752	2%			

Conclusion

The pilot survey served the purpose of many objectives. The comprehension and the feasibility of the questions on current environmental expenditures could be tested within companies. It has also familiarised companies with the standardised definitions that are more and more used on an international level.

The correlation tests show that the considered variables cannot be deduced from other current statistical variables. Question 21140 on current environmental expenditures should be part of the Structural Business Regulation.

Methodologically, it is necessary to interview a large number of companies because situations vary heavily from one company to another. The facultative character of the survey generates important costs for Statistics Belgium. Even after an important number of telephone contacts, many companies do not answer due to the work that this may cost. Current expenditures are indeed more difficult to evaluate than, for example, investments because the amounts are divided over many little invoices that are difficult to identify. Using a repeated and obligatory survey, would diminish the costs importantly, make results faster available and adapt the information system of the companies structurally. However, considering that we risk receiving an answer of lesser quality from reluctant companies, it is important that the chosen defining system corresponds as good as possible to a « cultural » optimum and that the administrative services also take this as a starting point for their requirements of companies. It is important to have exchanges between statisticians and administrations, particularly on the level of the Commission, before defining information systems.

For future surveys we have to improve our questionnaire to clearly draw attention to the treatment of specific posts such as the domain of energy economies, the tax on motive force etc. For pedagogic reasons, it would probably be good to explicitly list important typical posts that have to be included in or excluded from the answers, by adapting this list or the questionnaires to the economic sectors. Experience shows that some concrete examples added between brackets after the question can improve the quality of the answers, while the more theoretical footnotes have less impact. For waste, for instance, operating costs for waste for the concerned industries can be mentioned and the recuperations of packaging, the elimination of waste, the contribution Fost+ and Val-i-Pac, and the levies. For « other », it should also be explicitly mentioned what is included and what is excluded (such as energy, taxes on motive force, non attributed taxes, …).

This study was limited to the first results to the methodological questions. Its results can now be analysed more in detail. They can, for instance, be given per size class from the considered threshold on. To obtain an estimation of current environmental expenditures for the whole of the companies, it will undoubtedly be necessary to proceed to a sample of the smaller companies. But such an approach would certainly pose new problems.

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ANNEXE I: Questionnaire

Numéro d'identification INS de l'entreprise :
Nom de la personne à contacter pour ce cadre :
Mme/M ..... Téléphone: ..... Fax: .....

La réponse aux questions de ce cadre est facultative.

Ce questionnaire pilote vise à améliorer et étendre le cadre IE (investissements liés à la pollution). Il sert à tester la nomenclature européenne CEPA et la question complémentaire sur les dépenses courantes. Vos suggestions sont donc particulièrement bienvenues.
Nous recommandons une concertation entre le service environnement et le service financier de l'entreprise.
Si vous n'êtes pas en mesure de chiffrer exactement vos montants, veuillez les estimer avec le plus de précision possible.

*** Veuillez utiliser l'unité monétaire choisie pour le questionnaire détaillé (GD)**

Domaine de pollution	**Code CEPA**	**Valeur (1000 BEF / 1 EUR)***
	1 EPACD	**2 VALCE**
Total des dépenses courantes consacrées à la protection de l'environnement [(a)]		....
dont:		
• Protection de l'air ambiant et du climat [(b)]	CE.01.00.00	....
• Gestion des eaux usées [(c)]	CE.02.00.00	....
• Gestion des déchets [(d)]	CE.03.00.00	....
• Protection des sols et des eaux souterraines [(e)]	CE.04.00.00	....
• Réduction du bruit et des vibrations [(f)]	CE.05.00.00	....
• Autres [(g)]	CE.09.00.00	....

Vos remarques:

(a) Celles-ci comprennent les dépenses internes (salaires et autres), et externes comme les taxes (rubrique 024 dans la partie 8 du questionnaire détaillé) et les autres payements à des tiers.
(b) Prévention, traitement ou contrôle de la pollution de l'air, sous forme gazeuse, liquide ou solide (particules).
(c) Collecte et transport des eaux usées. Prévention, traitement ou contrôle de la pollution de l'eau, y compris le traitement des eaux de refroidissement. Autres mesures tendant à restaurer ou à préserver la qualité et la quantité des eaux de surface.
(d) Prévention et réduction de la production de déchets; collecte, transport, traitement et élimination des déchets; contrôle des déchets, activités de recyclage si elles visent principalement à la réduction et au traitement des déchets.
(e) Prévention des infiltrations de polluants, décontamination des sols, contrôles, etc.
(f) Prévention des bruits et des vibrations à leur source (à l' exclusion de la protection sur les lieux de travail), mesures tendant à isoler les récepteurs des bruits et vibrations, et contrôle des niveaux d'émissions sonores.

ANNEXE II: Estimation de l'erreur initiale de réponse

International Conference on Quality in Official Statistics, Stockholm, May 14-15, 2001.

Factors affecting quality of statistics on environmental expenditures by companies in Belgium.

Bruno Kestemont, Statistics Belgium

Summary

The paper analyses the effect of the different enquiry phases on the quality of statistics for a limited number of pilot economic environmental variables. 3,000 Belgian companies were interviewed on these variables within the framework of the Structural Business Surveys. The status and underlying methods of these surveys varied according to the used parameters and the company types: mandatory or facultative, simplified or detailed, census or sample, variables with high or low occurrence, paper questionnaire with or without a follow up by telephone.

The sampling error is high for environmental investments, mainly due to the sampling method and the low occurrence rate. The response ("measurement") error is high for new concepts like "current environmental expenditures" or "investments in integrated technologies". Telephone calls to firms having declared odd values or no values at all for current environmental expenditure resulted in an important rate of corrections of the original paper responses.

Introduction

Sustainable development policy needs a new generation of statistics in the interface between disciplines like economy, sociology and environment.

In this context, data on environmental expenditure are regarded as indicators of environmental commitment. In Europe, governments, industries and households are increasingly prompted to respond directly to the environmental impact they cause, according to the polluter-pay principle. Both at international and national level statistics on the related expenditures are in great demand. This is important for two reasons, namely (UN, 2000):

(a) To be aware of the *costs* of environmental regulations and the repercussions on competitiveness and economic performances.
(b) To be aware of the *opportunities* for the environmental protection sector which is widely said to become one of the fastest-growing business sectors in coming years.

However, due to the emergence of new "interdisciplinary" or "horizontal" concepts in statistics the quality of responses has become more important than the sampling quality of the surveys needed. In the case of classical surveys, specialists try to find a common jargon to communicate with specialists in other fields (accountants responding to economical statisticians, or technicians responding to environmental statisticians). In the case of horizontal surveys, accountants are not specialized in environmental concepts nor are those in charge of environmental issues specialized in economical concepts. The respondent will try to answer the question to the best of

his/her ability including an interpretation based on his/her own "culture". If we ask for "environmental expenditure", the respondent must know "what is meant by environment" and "what is meant by expenditure". Ideally, accountants and environmental specialists of companies should consult each other before answering, and carefully read the extensive documentation and footnotes of the questionnaire. But in practice, this is not the most common attitude. We have to determine how to quantify the resulting response error.

Background

Structural Business Surveys make use of a stratified sample of 40,000 units out of 700,000 Belgian enterprises (including self-employed persons). The first survey was held in 1996 using data from 1995. Response is mandatory. There is a simplified questionnaire for small enterprises. The largest companies receive additional questions and annexes depending on the kind of sector they belong to. The following environmental questions are asked to a sample of 25,000 companies: total "end-of-pipe" investments to fight pollution, total investments to prevent pollution (additional costs of cleaner technology), and total environmental taxes. About 3,000 enterprises in the industry sector must also complete a table containing a breakdown of environmental investments in four fields: atmospheric emissions, waste, water protection, and "noise and vibrations".

Method

A pilot survey on *current* environmental expenditures started in 2000 (data 1999). A simple one-page non-mandatory questionnaire, on a green support, was added to the general "business structure" questionnaire sent to the 3000 units mentioned above. This questionnaire only contained the following questions and related explanatory footnotes: "total current expenditure for environmental protection", including "protection of ambient air and climate", "wastewater management", "waste management", "protection of soil and groundwater", "noise and vibration abatement", "others". Each question was defined by a footnote of about 2 lines. The breakdown in environmental domains followed the CEPA classification (based on UN-ECE, 1994) and used definitions similar to those in the usual "environmental investments" annexe of the Business survey. The only new concept was "current expenditures for environmental protection", which was specified in the first footnote as "including internal expenditures (salaries and others), and external expenditures such as environmental taxes and other payments to third parties". This is a large definition. The respondent had the possibility to contact a specific environmental help desk mentioned in the document. He/she could also put down remarks in an additional blank box. No additional information was enclosed.

The second phase of the survey was a telephone interview, not only to enhance the response rate and to accustom companies to this new parameter, but more specifically to estimate the response error of the first phase. All companies that had responded, "zero", or had crossed the questionnaire were interviewed by telephone. Many companies having responded nothing and several companies having sent a detailed answer were contacted as well. After discussion, new answers were collected by fax.

This provisional study is limited to a range of 496 initial responses (zero or positive). The initial non-responses and the crossed questionnaires are not considered here. After a manual check, the 96 most "doubtful" answers were selected and checked by telephone. This was the case for almost all questionnaires with a "zero" response, and for a number of questionnaires where the relative amount appeared to be higher or lower than normal for the related sector. The phone call consisted of open and closed questions, explanations and examples in order to verify and correct the figures given. Further contacts by fax or telephone resulted in a "corrected response". These couples of values (initial response, corrected response) are the basis of the calculations presented here.

Strecker et al. (2000) describe a model of response variability in repeated surveys using the same working system. In the present study, we have 2 responses for the same variable (unknown real value), but we are using different working systems and a rational repeated survey. However, this model can be used to identify the main sources of errors within the context of a pilot survey. The "response variability " between 2 repeated surveys, focused on “doubtful” respondents, is used to rank variables from the most distinct ones to those generating the most errors. It is estimated as follows:

y_{i1} = initial response on paper questionnaire

y_{i2} = "corrected" response after telephone interview

$d_i = y_{i2} - y_{i1}$ = deviation of individual responses

d_i is actually the individual cultural or perception difference between the paper survey and the interview process. We make the hypothesis that it is an estimation of the individual response error due to the system of paper survey. The residual response error (as compared to the real value) is neglected here.

$S_{R_i}^2 = \frac{d_i^2}{2}$ = estimator of variance of individual responses

$S_R^2 = \sum_{i=1}^{N} S_{R_i}^2$ = estimator of the variance of responses

$V_R = \frac{S_R^2}{2N}$ = estimator of variability of responses (with 2 repeated surveys)

$Y_1 = \sum_{i=1}^{N} y_{i1}$; $Y_2 = \sum_{i=1}^{N} y_{i2}$

$V_R^{1/2}(\%) = \frac{\frac{S_R}{\sqrt{2N}}}{\frac{Y_1 + Y_2}{2N}}(\%)$ = estimator of relative variability of responses

The relative variability of responses gives an estimation of the effect of a phone call compared to a simple paper survey. The calculation is based on a stratified sample: all the "doubtful" initial responses, not selected at random but "rationally" selected, form the first stratum. This gives of course a higher contrast in the results (higher variability). The second stratum is a sample of the remaining “credible” answers (rate

22/401). In practice, we had no estimation effect for the latest, because the variability was null (all of the 22 respondents confirmed their initial answer), but the formulas above can easily be adapted to stratified samples and grossing over problems, in the case we would find a variability of responses by the “credible” respondents. The overall result points out the parameters for which the "cultural difference" between the interviewers and the respondents is the highest. The same focus is given within the only stratum of “doubtful respondents”, but with a higher contrast. From the interviewer’s point of view, the parameters with the highest variability of responses are the parameters with higher expected "response error". From the point of view of the respondents, the parameters with the highest variability of responses are the parameters for which questions are clear or not relevant.

Results

The telephone calls resulted in a higher response rate (not studied here) and in the correction of a range of initial responses.

After various explanations and call-backs, 24% of the "doubtful respondents" confirmed their initial response for total expenditure. 8% reduced the total value and 67% updated it with a higher value.

	% of doubtful respondents			
Parameter	**confirming paper response**	**Correcting response: reduced value**	**Correcting response: bigger value**	**Variability of responses of doubtful respondents**
Total current expenditures for environmental protection	**24%**	**8%**	**67%**	**10%**
of which				
-protection of ambiant air and climate	90%	3%	7%	**4%**
-wastewater management	67%	1%	32%	**3%**
-waste management	34%	2%	64%	**4%**
-protection of soil and groundwater	89%	1%	10%	**82%**
-noise and vibration abatement	97%	0%	3%	**24%**
-others	80%	2%	18%	**48%**

Table 1: Variability of responses following 2 survey systems for 96 doubtful respondents

* Denominator is initial (paper) value.

The variability of responses of doubtful respondents is calculated between the initial and corrected responses. This variability is higher for the subtotals "protection of soil and groundwater", "others" and "noise and vibration abatement". It rounds 10% in the total expenditure. This may indicate a lower understanding or clarity of those concepts in our questionnaire. Actually, it is a proxy of the cultural misunderstanding between the various people involved in the measurement: the author of the questionnaire and the interviewer on the one hand, and the respondent on the other hand. The best "standard" concepts are those where the overall share of expenditure is the highest (air, wastewater, waste), which is not surprising: these are also the

domains in which companies have most expertise, having to deal with various legislations since several years.

We telephoned a sample (22/401) of the “credible”, respondents. None of them corrected their response. As a first approximation, we then estimated that the variability of responses by the “credible respondents” is 0%.

The calculation of variability on the 496 respondents considered is shown in the table below. This gives a (provisional) estimation of the response error for this part of the survey.

Table 2: Estimation of response error (variability of responses) by 496 respondents

Parameter	% of respondents: confirming paper response	% of respondents: Correcting response: reduced value	% of respondents: Correcting response: bigger value	Variability of responses	Effect on total result*
Total current expenditures for environmental protection	**85,0%**	**2,0%**	**13,0%**	**2,2%**	-3,0%
of which					
-protection of ambiant air and climate	98,0%	0,6%	1,4%	**2,4%**	0,0%
-wastewater management	93,8%	0,2%	6,0%	**0,9%**	0,3%
-waste management	87,3%	0,4%	12,3%	**0,4%**	2,5%
-protection of soil and groundwater	98,0%	0,2%	1,8%	**47,5%**	-63,6%
-noise and vibration abatement	99,4%	0,0%	0,6%	**5,7%**	12,4%
-others	96,2%	0,4%	3,4%	**4,1%**	5,0%

* Denominator is initial (paper) result

The "rational" phone calls affect the results (hopefully to a better estimate). In the case of the questionnaires considered here, a reduction of 3% of the estimation of total expenditure was achieved. It gives an idea of the error on paper answer, which ranges from –64% to +12% following the variable considered. The impact of a unique erroneous answer to the question “protection of soil and groundwater” was important (the respondent initially included the value of a provision for future soil protection, which actually falls out of the definition). As shown in the tables, when we phoned “doubtful” respondents, they more often reported bigger amounts than smaller ones. Most of the time, an initial underestimation of expenditures was due to the fact that the respondent did not believe to be concerned with environmental protection: “what we do is only to respect external constraints, but our goal is to make profit, not to protect the environment”. However, our questionnaire did not make any distinction between mandatory or voluntary environmental expenditure. The effect of interviewers here is that in some cases we perfectly know that “zero” is not probable for several kinds of industries affected by environmental regulations. Another type of easy to identify error appears when the current environmental protection expenditure is higher than a certain percentage of the turn over (in this case, it could be an error of units, or the inclusion of other types of expenditures like security or investments). Other kinds of errors are not so evident to identify in a first year survey.

The results should also be compared to the relative importance of each domain in current environmental expenditures. The provisional results (for 496 enterprises) is shown below (based on corrected responses):

Table 3: Share of current environmental expenditures according to domain

-Protection of ambient air and climate:	9 % of total
-Wastewater management:	25 %
-Waste management:	48 %
-Protection of soil and groundwater:	2.4 %
-Noise and vibration abatement:	0.4%
-Other:	15 %

A comparison of this table with the previous one shows that the parameters where the estimated response error is the highest are also of minor importance on the total. The

cost of getting a good quality response for those parameters is high for a limited impact on the quality of the total. On the other hand, the formulation used to ask about current expenditure for wastewater or waste seems to be good. A simple paper questionnaire, without any intervention of interviewers, gives satisfactory results for the parameters "air", "wastewater" and "waste" at low cost (or at a higher sampling size). The item "Other" should be examined more thoroughly. The items "soils & groundwater" and "noise & vibration" should be removed from the questionnaire and included in "Other".

Discussion

Various survey methods are in competition, characterized by various costs and various expected errors. When designing a survey - at a fixed budget - the question is to minimize the total error. Quantifying the different types of errors (mainly sampling errors and measurement errors) can help to optimise a survey.

For the traditional question on environmental protection investments, the sampling error is high as compared to the response error due to the fact that the variability of environmental investment in a given year is high (NSI-Belgium, 2001). For budgetary reasons, small enterprises are surveyed with a small sample rate, which makes the yearly results sensitive to chance. In the case of "end-of-pipe" investments, expenditure is easy to identify, and answers are generally precise.

Current environmental expenditures occur more often than investments, and the sampling error is lower. From one year or enterprise to another, results vary less but the response error is here higher for the following reasons:

-The question is new for the enterprises.
-An economical definition ("current" expenditure) is crossed with a functional definition ("environmental protection"). The accountant best understands the first one; the environmental technician understands the latter. The latter is moreover in competition with other possible functions.
-The amounts are low, which makes not all related expenditures easily identifiable. An estimate is often necessary (for example to identify the share of employees dealing with environmental protection).

In the case of integrated investments (environmental part in a cleaner technology), both sampling and response (measurement) errors are important (NSI-Belgium 2001).

The variability of responses (even estimated) is a practical tool for pilot surveys. The method of selecting “rationally” the strata (doubtful and credible respondents) is close to the day-to-day work of the statisticians. It is useful to phone to all respondents with suspect responses, not only to allow them to clarify their meaning and correct the response, but also for the interviewers in order to identify special cases or difficulties in their questionnaires. However, a phone call to a sample of supposed “credible” answers is also useful. It allows the calculation of an estimated response error, but also, it could help to identify possible non-expected problems. The coverage of the stratum "doubtful respondents" depends of the ability of the survey system (surveyors + automatic verification tools) to identify them. It has an impact on the precision of

the estimation of the response error, but not on the estimation itself, providing good statistical formulas and sample method within the remaining strata is applied.

Further work consists of deepening the methods of estimating response errors for the all survey, and to extend this exercise to other variables. We intend also to calculate the sampling error for the same variables in order to compare the different types of errors for each type of parameter.

Conclusion

In order to get an optimal quality of results for a given budget, the statisticians must always balance the largest sources of errors: measurement (or response) errors and sampling errors. On the one hand, a small number of heavy questionnaires accompanied with telephone calls, provide better quality responses but also unacceptable sampling errors. On the other hand, simplified questionnaires, sent to a large sample provide low sampling errors but also a lower quality of responses. Even for apparently popular concepts like “environment” or “waste”, a period of "popularisation" of their meaning in statistics is necessary to reach a satisfying quality.

In the case of environmental investments, the sampling errors are the most problematic. In the case of current environmental expenditures, the response error can be problematic for marginal domains like soil protection or noise abatement. In the case of integrated investments in cleaner technologies, both types of errors are problematic.

The major sources of response errors can be identified and reduced by using a rational repeated survey and then calculating the variability of responses.

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Acknowledgments:

The European Commission (DG-ENV/Eurostat) financed this project. I am grateful to R. Braekman and M. Sampieri for their essential contribution, and to J-M Museux for his useful comments.

ANNEXE III : Résultats détaillés (1000 EUR)

Belgium, 1000 EUR, estimates

NACE	12110	20110	21110	21120	21140	Air	Water	Waste	Soil	Noise	Other
151	5966627	82808	649	1446	17227	770	5857	7266	1343	156	1835
152	603613	4515	0	83	2214	63	850	987	132	17	165
153	2817192	80147	6712	2625	9086	272	2937	3903	567	99	1308
154	3493800	23317	82	266	9056	365	3323	4015	765	98	490
155	4477964	54005	4777	487	14597	559	4318	6958	1182	166	1414
156	1731314	35922	2538	34	4410	112	2834	1053	178	38	195
157	3286952	31890	638	228	7290	389	2406	3156	584	81	674
158	9094504	136149	6968	1594	27794	973	8349	13452	2458	218	2344
159	4755964	67025	5006	504	19569	309	4156	13230	715	152	1007
160	2629597	5756	141	311	3814	965	56	607	154	1852	180
171	858212	28141	18	0	2857	30	1115	1232	222	8	250
172	2195594	62129	854	72	7770	126	3213	2961	662	25	783
173	633320	25997	3314	4	4028	43	1720	1516	412	6	331
174	1228612	7365	942	0	5033	40	1744	2621	352	26	250
175	4542828	82099	1243	880	17151	144	6428	7779	1170	42	1588
176	114938	2418	0	0	262	4	110	109	23	1	15
177	63793	895	0	0	103	1	44	38	9	0	11
181	19825	17	0	0	0	0	0	0	0	0	0
182	2429506	8141	0	0	3967	382	627	2818	50	0	90
183	35602	1175	0	0	121	6	55	51	1	0	8
191	56446	893	0	211			226	184			36
192	361452	2035	0	0			1445	1275			232
193	59721	1171	0	0			239	227			38
201	386879	6192	82	69	5093	131	23	4777	13	55	94
202	1367655	45324	714	333	9596	1115	176	6950	113	466	776
203	513274	7331	480	507	2989	268	46	2350	29	119	177
204	242841	2258	0	11	1568	142	23	1230	15	60	98
205	71966	952	0	88	215	26	4	153	3	11	18
211	3012412	158623	267	3388	9894	1546	1835	5206	220	232	855
212	2958276	43768	1614	2782	13086	2057	2534	6809	292	308	1086
221	3464501	13090	0	101	18402	5	2984	15027	95	1	290
222	3098664	39881	671	3877	48127	7	4406	43333	124	1	256
231	163992	5230	58	478	1536	3	17	1482	27	0	7
232	15316862	563810	6659	16508	70109	250	1590	67443	172	0	654
233	817420	4464	83	339	80380	13	85	80237	10	0	35
241	19202807	1015039	29962	35795	267495	49717	81850	51367	6914	5163	72484
242	1610001	26819	2536	606	1147	157	60	320	23	370	217
243	2527378	16123	60	709	24260	4356	6316	5668	623	600	6697
244	8251816	62626	10452	3087	74869	12329	19063	26841	2314	1346	12976
245	2903652	28281	410	30055	26964	4023	7015	8304	701	566	6355
246	4619292	58351	1250	1651	51725	8770	15845	12938	1327	1012	11833
247	1500630	53223	873	475	13198	2478	4120	2494	371	283	3452
251	2023950	19605	5576	146	4663	190	340	3564	179	72	318
252	8210419	148664	2201	8041	18753	836	1489	13922	789	318	1399
261	3262728	136298	1614	4198	21696	960	14739	4113	505	135	1244
262	341801	10862	64	141	2376	367	1097	733	40	12	127
264	520863	49619	0	13	3429	139	2304	655	100	22	209
265	1716381	131473	6930	3785	14307	629	9826	2509	355	97	891
266	2498344	45902	211	1595	33760	962	25507	4397	735	211	1948

267	305980	4922	0	0	2354	106	1570	451	71	16	140
268	351996	15843	0	345	2787	113	1721	741	56	15	141
271	8147423	512543	21587	33183	36127	2711	8441	19545	1325	1759	2346
272	210158	3724	3	11	605	41	94	365	17	22	66
273	2226473	62416	2864	1239	11089	648	2580	5941	514	576	830
274	6572787	160429	1010	3169	28716	2432	7079	14844	1082	1387	1892
275	787957	24453	599	1217	4778	433	757	2858	124	321	285
281	3109074	31375	3	112	5730	305	1036	3368	209	23	789
282	1148849	14558	105	790	2285	110	406	1293	151	11	314
283	358248	3526	0	0	578	36	105	329	22	2	84
284	197005	3176	0	0	382	22	75	213	14	1	57
285	2120906	52859	4380	962	4977	225	1170	2908	151	16	507
286	456427	6151	84	853	693	100	155	286	27	2	123
287	1677160	26339	141	97	4429	279	749	2292	134	17	958
291	3064194	15267	442	163	2749	180	171	1620	127	55	596
292	2821430	20787	129	605	2975	168	156	1678	173	56	744
293	1064500	5667	0	997	997	70	65	582	51	22	207
294	474263	3491	0	0	289	18	21	175	13	6	56
295	4353823	35207	318	583	4280	364	310	2420	227	83	876
296	348518	4227	523	0	300	16	15	202	12	5	50
297	233022	1980	0	0	481	18	39	336	6	36	46
300	232020	1040	7	0	131	0	3	115	0	0	13
311	866393	6299	110	29	1614	74	60	805	253	30	392
312	2422681	11931	3389	750	2161	128	79	1371	183	44	356
313	191969	1747	0	0	227	21	12	126	29	7	32
314	906153	5510	715	5708	1315	98	51	760	135	34	237
315	1213846	13058	775	252	1750	128	77	978	214	44	309
316	755744	9162	1695	57	1629	240	78	762	135	77	337
321	1217670	11959	216	141	1383	95	465	749	69	0	5
322	2162782	11272	0	0	2316	211	746	1241	110	0	8
323	2978778	8071	9	38	3281	270	1065	1777	157	0	12
331	693233	5389	0	0	1497	0	313	917	105	0	162
332	449436	2506	0	0	1103	0	196	717	50	0	140
333	287515	1059	0	0	349	0	72	221	19	0	37
334	139829	931	0	0	425	0	137	241	16	0	31
335	28953	349	0	0	24	0	4	14	2	0	4
341	21570720	81454	2	17175	28030	516	2408	18832	1434	183	4657
342	1811377	11813	65	462	2468	48	194	1703	133	14	376
343	3066745	26143	3693	1134	3912	75	368	2487	202	29	751
351	158752	2456	0	530	308	27	42	181	10	3	45
352	400467	3669	0	120	920	26	179	496	37	11	171
353	1836495	11112	0	141	4531	108	883	2471	180	54	835
354	101006	844	0	0	175	6	38	79	9	3	40
361	2930150	33732	818	992	13496	6665	2325	3385	302	4	815
362	1021560	772	0	0	2889	1354	592	695	69	1	178
364	11618	130	0	0	48	23	10	11	1	0	3
365	126376	1669	80	172	1176	189	749	171	9	0	58
366	197843	2090	161	0	906	398	144	293	19	0	52
371	617215	9863	476	805	10335	332	465	8664	101	464	309
372	463616	6357	182	266	3374	295	244	2434	72	118	211
401	29356230	1220861	21484	87690	127338	12284	44508	27822	0	0	42724

402	3999176	2555611	0	0	17346	1673	6063	3790	0	0	5820
410	1561091	40594	128	5231	66729	0	162	2709	0	0	63858