The ERICA series:

6. Flexibility in classification options within the statement of cash flow

ERICA (European Records of IFRS Consolidated Accounts) WG

European Committee of Central Balance Sheet Data Offices (ECCBSO)

October 2017

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(Document prepared by Ilse Rubbrecht, Banque Nationale de Belgique)

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Members of the ERICA (European Records of IFRS Consolidated Accounts) WG

Saskia Vennix (chairwoman)
Saskia.Vennix@nbb.be
Banque Nationale de Belgique
Claire Mangin (vice-chairwoman)
Claire.MANGIN-SOUBRET@banque-france.fr *Banque de France*
Riccardo Renzi
riccardo.renzi@bancaditalia.it
Banca d'Italia
Pilar Saura
Pilar.Saura@bde.es
Banco de España
Ana Bárbara Pinto
apinto@bportugal.pt
Banco de Portugal
Olga Lymperopoulou
olimperopoulou@bankofgreece.gr
Bank of Greece
Laurent Carlino
Laurent.CARLINO@banque-france.fr
Banque de France
Ilse Rubbrecht
Ilse.Rubbrecht@nbb.be
Banque Nationale de Belgique

Vincenzo Favale
vincenzo.favale@cervedgroup.com
Centrale dei Bilanci / Cerved Group
Frank Raulf
frank.raulf@bundesbank.de
Deutsche Bundesbank
Lena Leontyeva
olena.leontyeva@bundesbank.de
Deutsche Bundesbank
Sabine Wukovits
Sabine.Wukovits@oenb.at
Oesterreichische Nationalbank
Katarzyna Bankowska
katarzyna.bankowska@ecb.europe.eu
European Central Bank
Bartek Czajka (observer)
bczajka@ifrs.org
IASB
Onur Yilmaz (observer)
IsmailOnur.Yilmaz@tcmb.gov.tr
Central Bank of the Republic of Turkey

IMPORTANT INFORMATION ABOUT THE SOURCE USED (ERICA[1] DATABASE)

The data used in this note are obtained from publicly available financial statements of European non-financial listed groups, having been treated manually, by CBSO statistics and accounting specialists, to be fitted on a standard European format (ERICA format); this manual treatment involves, in some cases, the interpretation of the original data, a constraint that readers of this document should bear in mind.

The database does not represent the total population of European non-financial groups; nevertheless, the coverage attained with ERICA (in the whole dataset of around 1.000 groups, as well as in ERICA+, a subset of around 200 groups with extra accounting details) on the listed European groups is well-attuned to the situation and national composition of the stock markets.

The opinions of the authors of this note do not necessarily reflect those of the national central banks to which they belong or those of the ECCBSO.

The "ERICA series" complement the annual report prepared on the ERICA database, with additional pieces of information and/or analysis on specific issues, using the full database ERICA, or its subset ERICA+. Due to its interest and/or the speciality of the themes treated, these short notes are diffused apart from the annual report, in the ECCBSO webpage (www.eccbso.org).

[1] ERICA (European Records of IFRS Consolidated Accounts) is a database of the European Committee of Central Balance Sheet Data Offices.

FLEXIBILITY IN CLASSIFICATION OPTIONS WITHIN THE STATEMENT OF CASH FLOW

1. INTRODUCTION

The objective of the International Accounting Standards Board (IASB) is that financial information should enable financial statement users to better predict future cash flows. IFRS Conceptual Framework (Chapter 1, OB20) states:

> *"Information about a reporting entity's cash flows during a period helps users to assess the entity's ability to generate future net cash inflows. It indicates how the reporting entity obtains and spends cash, including information about its borrowings and repayment of debt, cash dividends or other cash distributions to investors, and other factors that may affect the entity's liquidity or solvency. Information about cash flows helps users to understand a reporting entity's operations, to evaluate the financing and investing activities, to assess the liquidity or solvency and to interpret other information about financial performance."*

This document examines the impact of the flexibility in classification options within the statement of cash flow. The International Financial Reporting Standards (IFRS) allow managers some flexibility on how to classify certain cash flow items within the statement of cash flow.

According to the International Accounting Standard IAS 7, groups are required to present information about historical changes in cash and cash equivalents. In this way, movements in cash[2] and cash equivalents[3] become visible and anybody can see where the cash was generated and spent during the accounting period concerned. The statement of cash flow shows how much cash results from and is used in operating, investing and financing activities.

Operating activities can be defined as the "main revenue producing" activities of a group, that generate cash receipts from customers and cash payments to suppliers and employees. Investing activities concern the acquisition or disposal of long and short term assets. Financing activities are activities that alter the group's equity capital and its borrowing structure. The interest and dividends received and paid by the group can be classified (according to IAS 7.31) as operating, investing or financing cash flows, provided that they are classified consistently from period to period. More precisely, IAS 7.31 states that interest and dividends paid can be classified either as operating cash flow or as financing cash flow, while interest and dividends received can be filed either as operating or as investing cash flow.

This flexibility under IFRS is in contrast with US GAAP, since the latter requires that groups classify all interest and dividends paid and received as operating cash flows. The option in the cash flow statement, according to IFRS, on how to classify interest and dividends paid and received hampers comparability between groups. The amount of operational cash flow reported by a group may differ

[2] Cash refers to 'cash in hand' and 'demand deposits' such as bank accounts.
[3] Cash equivalents are short-term, highly liquid investments that can be easily converted to known amounts of cash and are subject to an insignificant risk of changes in value.

according to whether the interest paid by the group is considered as an operating cash outflow or as a financial cash outflow. The classification choice can also have an impact on the group's credit risk assessment.

The next section briefly describes the ERICA data used in this analysis, in terms of different types of cash flows. Section 3 contains an overview of how many groups use which classification option in the cash flow statement. The fourth section considers the impact of the classification choice on a group's risk assessment. The results are summarised in section 5.

2. DESCRIPTION OF THE DATASET

The ERICA Database contains information on the consolidated accounts of non-financial listed groups of 8 participating countries: Austria, Belgium, France, Germany, Greece, Italy, Portugal and Spain. Only the annual accounts – reporting on a period of 12 months - for the year 2015 are considered because that was the only year for which it was possible to collect extra information on the following cash flow fields: interest paid, interest received, dividends paid and dividends received[4].

Initially, 537 IFRS groups were concerned (see table 1): for Austria (44 groups), Belgium (78 groups), Germany (187 groups), Portugal (40 groups) and Spain (108 groups), the information on the more detailed cash flow fields could be collected for all non-financial listed groups available in the ERICA Database, since these additional data fields exist in a national database. For Greece (50 groups) and Italy (30) this information was collected manually, which means only for the ERICA+ cases. For France this data was not collected at the time of the analysis.

TABLE 1 NUMBER OF GROUPS IN THE ANALYSIS POPULATION

COUNTRY	*TOTAL POPULATION*	*POPULATION EXCLUDING MISSING DATA*
Austria	44	38
Belgium	78	74
Germany	187	144
Greece	50	50
Italy	30	28
Portugal	40	39
Spain	108	104
TOTAL	**537**	**477**

Source: ERICA Database

Of those 537 groups, only 477 groups presented one of the cash flow variables concerned in 2015. German groups, in particular, were less consistent in their reporting (missing data in 23% of the

[4] The ERICA fields concerned are: cc_815 (interest paid as operating cash flow), cc_816 (interest received as operating cash flow), cc_817 (dividend paid as operating cash flow), cc_818 (dividend received as operating cash flow), cc_825 (interest paid as investing cash flow), cc_826 (interest received as investing cash flow), cc_828 (dividend received as investing cash flow), cc_835 (interest paid as financing cash flow), cc_836 (interest received as financing cash flow), cc_837 (dividend paid as financing cash flow), cc_838 (dividend received as financing cash flow).

cases). Each group is classified in one of the following sectors, according to the NACE code of the group's main activity:

- Construction (NACE codes 41 to 43) represents 8% of the population considered
- Energy (NACE codes 05, 06, 19, 35 and 36) represents 8% of the population considered
- Industry (NACE codes 07 to 18 and 20 to 33) represents 44% of the population considered
- Services (NACE codes 37 to 39, 45 to 63, 68 to 82, 86 to 96) represents 41% of the groups considered

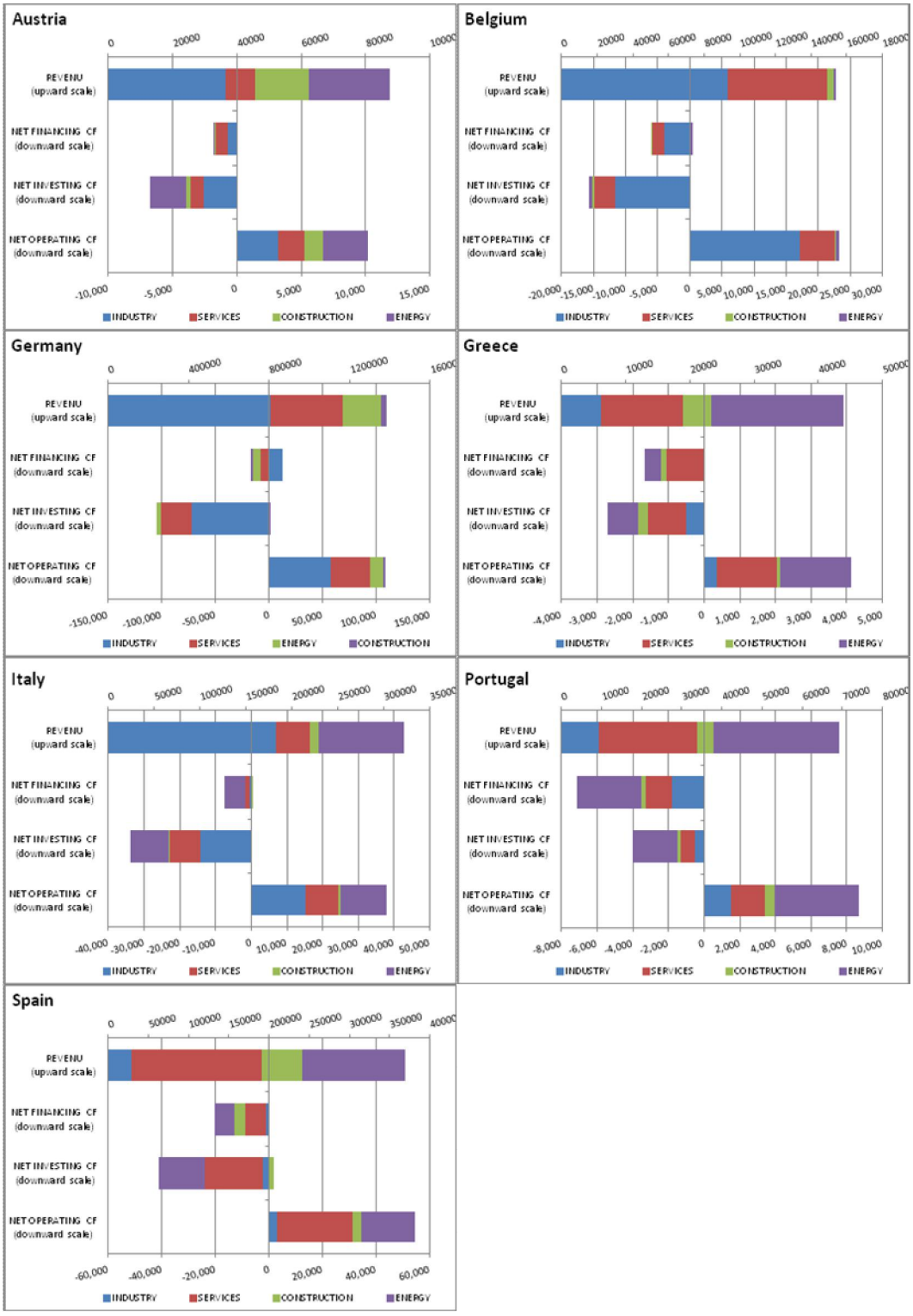
TABLE 2 THE AGGREGATE LEVEL OF THE NET CASH FLOWS FROM OPERATING, INVESTING AND FINANCING ACTIVITIES AT COUNTRY LEVEL FOR THE ACCOUNTING YEAR 2015 ***(in EUR millions)***

	Net cash flow from operating activities (1)	*Net cash flow from investing activities (2)*	*Net cash flow from financing activities (3)*	*(1) + (2) + (3)*
Austria	10,164	-6,717	-1,730	+1,718
Belgium	23,292	-15,634	-5,568	+2,090
Germany	108,066	-103,922	-5,054	-909
Greece	4,128	-2,704	-1,656	-232
Italy	37,975	-33,840	-6,986	-2,850
Portugal	8,697	-4,014	-7,139	-2,456
Spain	54,504	-39,236	-20,327	-5,059
TOTAL	**246,826**	**-206,067**	**-48,460**	

Source: own calculations based on ERICA Database

Table 2 illustrates the amounts of the net cash flows from operating, investing and financing activities for all 477 groups, aggregated at country level. The aggregate net operating cash flow for all groups located in the same country is highest for Germany, followed by Spain and Italy. The same is the case for the aggregate net cash flow from investing activities. The biggest groups are Volkswagen and Deutsche Telekom for Germany, Telefonica for Spain and Exor and Enel for Italy. The aggregate net cash inflow from operating activities for all Austrian and Belgian groups is larger than the sum of the aggregate absolute amounts of the net cash outflows to investing and financing activities, which means that, in 2015, ***at aggregate level the Austrian and Belgian groups generated sufficient operational cash inflows to finance their investments, repay their loans, reimburse interest expenses, distribute dividends and increase their cash and cash equivalents***. In the southern countries the aggregate cash inflows from operating activities are slightly lower than the aggregate absolute amounts of the cash outflows linked to investing and financing activities; therefore, the cash and cash equivalents decreased at aggregate level during the accounting year 2015.

CHART 1 **SECTORAL BREAKDOWN OF AGGREGATE NET CASH FLOWS FROM OPERATING, INVESTING AND FINANCING ACTIVITIES AT COUNTRY LEVEL FOR THE ACCOUNTING YEAR 2015, TOGETHER WITH THE SECTORAL BREAKDOWN OF THE AGGREGATE REVENUE PER COUNTRY AS A REFERENCE POINT *(in EUR millions)***



Source: own calculations based on ERICA Database

Chart 1 illustrates the contribution of the four main activity sectors (industry, energy, construction and services) to the aggregate level of the net cash flows from operating, investing and financing activities for each country in the accounting year 2015. For comparison, the chart also shows the sectoral breakdown of the aggregate revenue at country level. The sectoral breakdown of the total revenue earned in a country is similar to the sectoral breakdown of the net cash flows in that country. The observed aggregate revenue in Austria and Italy in 2015, for example, resulted largely from the industry and energy sectors, while the aggregate net operating cash flows in those countries were largely generated in those 2 sectors, as most investments flows were spent on those sectors. A similar exercise can be conducted for all countries.

Some additional observations can be made. In all sectors of all countries, the aggregate net cash flow from financing activities has a negative value except for ***German industry, where the aggregate value is positive due to some big automotive manufacturers (such as Volkswagen, Daimler, Bayerische Motoren Werke AG) which recorded large financing cash inflows*** because of extra financial bank debts and bond issuance. As expected, aggregate amounts of net investment cash flows are negative in all sectors of all countries, apart from the ***Spanish construction sector where disinvestments continued*** as a result of the collapse of the real estate market in Spain during the financial crisis.

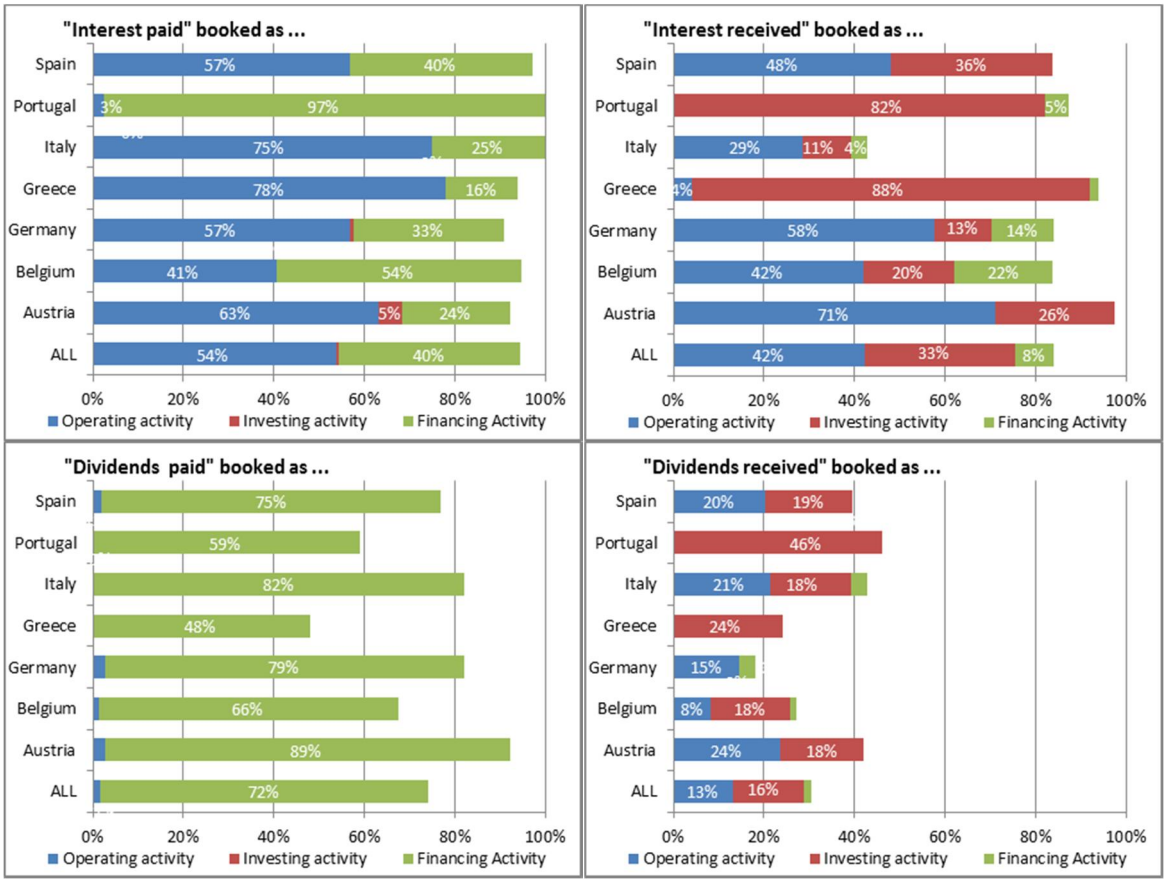
3. CLASSIFICATION OPTIONS UNDER IFRS

The IFRS standards allow some flexibility on how to book the following cash flow fields (interest paid, interest received, dividends paid and dividends received) in the statement of the cash flow. Considering all non-financial listed groups available in the ERICA Database for which at least one of those cash flow items is filled in, we will calculate in this section, what percentage of the groups considered treat "interest paid " as an operating, investing or financing activity. The same calculation will be done for the other cash flow fields as well. The analysis is done at country level and at sectoral level in order to check whether there is a classification option specific to a country or sector.

3.1 At country level

Chart 2 illustrates the percentages of the listed non-financial groups established in one specific country that state their interest paid and received and their dividends paid and received as an operating, investing or financing activity. The upper left part in chart 2 totals 100% for the Italian groups, because Italy is the only country where all listed IFRS groups available in the ERICA+ Database keep separate records in their cash flow statement for "interest paid", while in other countries some groups do not do so. In Germany for example, 90% of the groups state clearly where their interest paid is booked in the cash flow statement, while 10% of the groups do not mention it in a separate field. This explains why the aggregate percentage for Germany differs from 100%. The same is true in the other countries.

CHART 2 PERCENTAGE OF CLASSIFICATION CHOICES IN 2015 PER COUNTRY *(in %)*



Source: own calculations based on ERICA Database (figures are presented in Table 1 of the Annex)

Looking at the classification options for interest and dividends paid and received by country, some initial general remarks can be made. ***Portuguese groups hardly ever consider interest and dividend cash flows as an operating activity***. When interest and dividends are paid, they record it as a financing activity, when interest and dividends are received they book it as an investing cash flow. ***Almost all IFRS groups book 'dividends paid' in the same way,*** , nearly every group regarding it ***as a financing cash outflow***.

***If we consider the IFRS groups (477) in our database for the accounting year 2015, 54% classify "interest paid" as an operating activity and 40% classify it as a financing activity*.** In most countries both approaches are applied, with some preference for the "operating activity" approach. In Greece and Italy, groups are clearly more in favour of booking interest paid as an operating activity. In Portugal, however, groups apply a different approach by regarding interest paid as a financing activity.

If we look at the aggregate amounts of "interest paid" at country level (table 3) we can see that in each country the sum of "interest paid treated as operating activity" is much higher than the sum of "interest paid booked as financing activity", except in Portugal. In Belgium, however, a small majority (54% of the Belgian groups) did recognise interest paid as a financing cash outflow, so that the larger sum of "interest paid as operating activity" in Belgium can be explained by some high figures booked by big Belgian IFRS groups (such as Anheuser-Bush Inbev).

TABLE 3 AGGREGATE AMOUNTS OF CLASSIFICATION CHOICES IN 2015 PER COUNTRY ***(in EUR millions)***

	Interest Paid as			Interest Received as			Dividend Paid as		Dividend Received as		
	Operating activity	Investing activity	Financing activity	Operating activity	Investing activity	Financing activity	Operating activity	Financing activity	Operating activity	Investing activity	Financing activity
Austria	-602	-5	-229	265	30	0	-101	-1,867	120	17	0
Belgium	-2,635	0	-712	99	40	17	-2	-9,937	63	183	0
Germany	-9,740	-2	-3,309	2,394	610	545	-595	-26,541	923	0	117
Greece	-619	0	-437	52	132	0	0	-697	0	48	0
Italy	-13,589	0	-867	6,739	15	418	0	-5,564	237	46	3
Portugal	-31	0	-2,088	0	183	1	0	-2,796	0	191	0
Spain	-8,432	0	-4,445	1,107	494	0	-5	-10,437	1,545	250	0
TOTAL	-35,648	-7	-12,087	10,956	1,504	981	-703	-57,839	2,888	735	120

Source: own calculations based on ERICA Database

While "interest paid" is in most IFRS cases classified as an operating or financing activity, most groups record **"interest received" as operating (42%) or investing (33%) activity.** It is clear that Portuguese and Greek groups usually regard "interest received" as an investing cash inflow. In the other countries, both approaches are applied, with some preference for the "operating activity" approach. Some of the Belgian and German groups (22% and 14% respectively) consider "interest received" as a **financing** cash inflow as well.

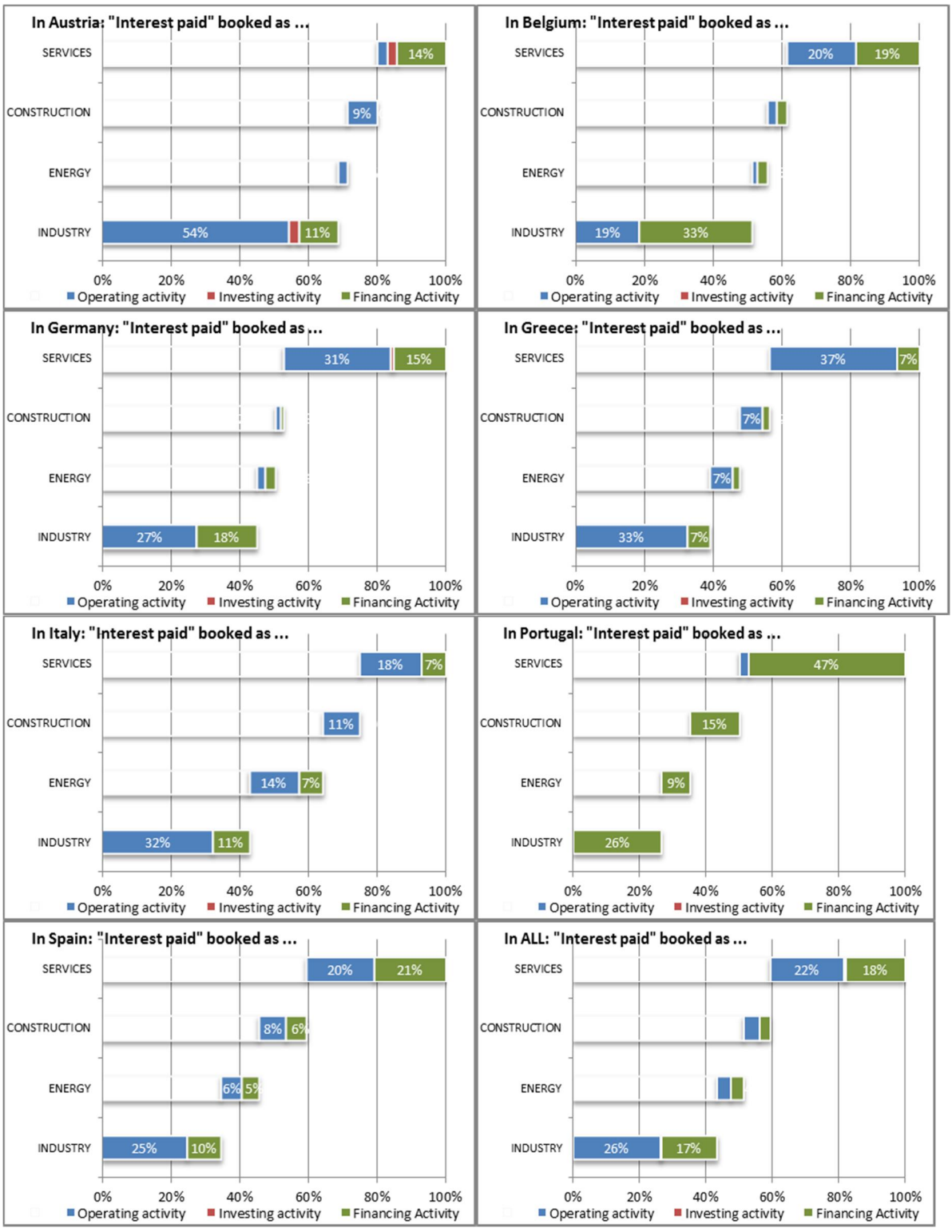
74% of all IFRS groups considered distribute a dividend. Almost all of them regard this payment as a financing cash outflow, while ***"dividends received" are booked as an operating or investing cash inflow***. In some countries (such as Austria, Italy and Spain) both approaches are equally common,, while in other countries a certain preference is apparent. Belgian, Greek and Portuguese groups prefer to treat "dividends received" as investing inflows, while German groups consider these as operating inflows.

Some country-specific approaches do exist, especially in Portugal and Greece. The classification behaviour of Portuguese IFRS groups is influenced by the guidelines of the Portuguese National Accounting Plan, which was applied in national GAAP for 30 years until 2009. In Greece, there is no specific guideline for IFRS groups on how to report interest and dividends received and paid, neither was there (prior to 2015) an obligation of having a cash flow statement in the national GAAP. It seems that the majority of Greek groups consider the interest and dividends received as a return of investment, while the interest paid are considered as a part of the operating activity.

3.2 At sectoral level

This section aims to identify whether a classification choice is linked to the sectoral activity of the IFRS group. For this assessment, chart 3 was set up. The chart considers only the IFRS groups in the ERICA Database for which the cash flow statement includes a separate field for "interest paid". A breakdown by sector (industry, energy, construction, services) is made per country and for all countries together (ALL) in order to check whether a particular sector displays a clear classification choice. This seems not to be the case.

CHART 3 SECTORAL BREAKDOWN OF THE CLASSIFICATION CHOICES FOR "INTEREST PAID" IN 2015 PER COUNTRY *(in %)*



Source: own calculations based on ERICA Database

Taking the population as a whole (ALL), chart 3 shows that regardless of the sector's activity, some of the groups classify "interest paid" as an operating cash outflow while others consider it as a financing cash outflow. The German, Greek, Italian and Spanish IFRS groups have a greater preference for

classifying “interest paid” as an operating cash outflow, regardless of the group's sectoral activity. Conversely, Portuguese groups have an obvious preference for regarding “interest paid” as a financing cash outflow (as already mentioned in the previous section) regardless of the activity of the IFRS group. Belgian groups apply both classification choices (as operating or financing activity) equally, irrespective of the activity. In Austria, industrial groups tend to favour the operating cash outflow approach, while services groups prefer the financing cash outflow approach.

Considering the classification choices for “interest received”, “dividends paid” and “dividends received” per country, broken down at sectoral level, there is again no classification preference according to the group's sector of activity. Overall, ***there is no sign of any clear sector-specific classification choices***.

4. IMPACT OF THE CLASSIFICATION OPTIONS ON CREDIT RISK ASSESSMENT

The flexibility in the classification choices within the statement of cash flows hampers comparability between groups. According to IAS 7.31, “interest and dividends paid” can be classified either as operating or as financing cash flows while “interest and dividends received” can be filed either as operating or as investing cash flows. The amount of operational cash flow reported by a group may therefore differ according to whether the interest paid by the group is considered as an operating cash outflow or as a financial cash outflow. The classification option will thus have an impact on the level of the cash flow ratio, which may affect the group's credit risk assessment. As part of this credit risk assessment process, we also examine whether there are specific incentives to enhance the reported net operating cash flow.

4.1 Size of cash flow ratio is influenced by the classification choice

Since the Eurosystem demands high credit standards for eligible collateral in order to be protected against incurring losses in its monetary policy operations, the in-house credit assessment system of the national central banks (NCBs) offers a way of assessing eligible assets used by the Eurosystem. This credit assessment system estimates the probability of default for IFRS consolidated financial statements by using a statistical model as the starting point for the analysis. One of the model ratios used in the statistical model may be a cash flow ratio, such as the “continued operating cash flow to revenue”. This is the cash flow originating from continued operating activities in relation to the revenue generated. The ratio gives an indication of the percentage of revenue that can be transposed into liquid funds (or, if the figure is negative, cash outflows) available for investments, debt redemption, interest payments on debts, dividend distribution and extra cash. A high ratio implies that the group has a high operating profitability and hence substantial internal financing capacity.

This section analyses whether “having a classification choice for cash flow variables” has an impact on the size of the cash flow ratio and hence on the credit risk assessment for the IFRS group concerned

Under IAS 7, the operational cash flow definition may differ from group to group because of the classification options. Interest expense, for example, can be reported as an operating or as a financing cash outflow. If group A considers its interest expense as an operating cash outflow, the group will have a lower net operating cash flow from continued operations compared to group B that reports its interest expense as a financing cash outflow. It is expected that group A will have a higher credit risk compared to group B, assuming that all other credit risk factors are the same. IFRS groups will have similar differences in the measurement of their credit risk depending on the classification options applied for interest and dividend receipts.

BOX 1 FORMULAS FOR THE CASH FLOW RATIO AND ITS 3 VARIATIONS

Cash flow ratio:

$$CF = \frac{cc81 - cc814}{cc10} * 100 \qquad \textit{(Equation 1)}$$

with cc81 the net cash flow from operating activities, cc814 the operating cash flow from discontinued operations and cc10 the revenue

Variation 1:

If an IFRS group did not record its interest expense as an operating cash outflow, but as an investing or financing cash outflow, the cash flow ratio will be corrected by increasing the nominator by this negative amount.

$$CF\ var1 = \frac{cc81 - cc814 + cc825 + cc835}{cc10} * 100 \qquad \textit{(Equation 2)}$$

with cc825 the interest paid recorded as investing cash outflow (negative value) and cc835 the interest paid recorded as financing cash outflow (negative value).

Variation 2

In a second variant, a group's cash flow ratio will be adjusted not only for interest expense but also for interest received that is not initially booked as an operating cash flow.

$$CF\ var2 = \frac{cc81 - cc814 + cc825 + cc835 + cc826 + cc836}{cc10} * 100 \qquad \textit{(Equation 3)}$$

With cc826 the interest received registered as investing cash inflow (positive value) and cc836 the interest received registered as financing cash inflow (positive value)

Variation 3

In the last variation on the cash flow ratio, an extra adjustment will be made to the nominator if the IFRS group does not register its dividends received as an operating cash inflow.

$$CF\ var3 = \frac{cc81 - cc814 + cc825 + cc835 + cc826 + cc836 + cc828 + cc838}{cc10} * 100 \qquad \textit{(Equation 4)}$$

With cc828 the dividends received booked as investing cash inflow (positive value) and cc838 the dividends received registered as financing cash inflow (positive value)

A cash flow ratio (see box 1) can be calculated for each IFRS group. The ratio (CF) reflects the original “continued operating cash flow to revenue” respecting the classification choices of each IFRS group. Three variations are computed simultaneously. The first variation (CF var1) calculates the same cash flow ratio on the assumption that each group records its interest expense as an operating activity. The second variation (CF var2) of the ratio supposes that all groups record their interest paid and received as an operating activity, while the third variation (CF var3) makes the extra assumption

that all dividends received are registered as operating cash inflows as well. The formulas are described in box 1.

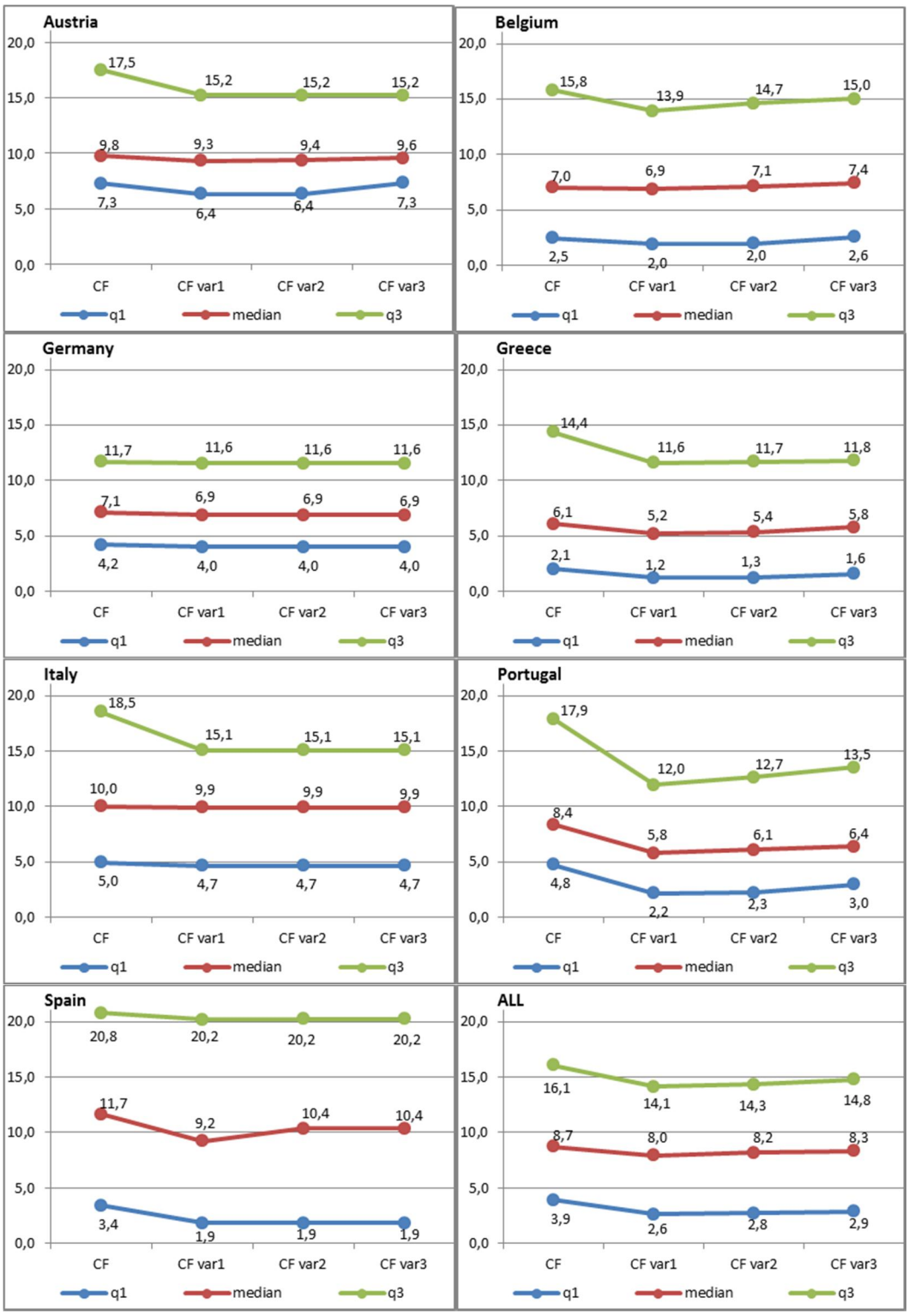
For each country the median value, the first quartile and the third quartile are computed for the original cash flow ratio and its three variations for the year 2015, all displayed in Chart 4.

Chart 4 provides some evidence of "operating cash flow enhancing classification behaviour" especially by IFRS groups with a higher cash flow ratio (q3). At country level, the following observations can be made: (1) German groups do not display any operating cash flow enhancing classification behaviour. (2) In Portugal, all IFRS groups have a CFvar1 ratio that is smaller than the original CF ratio. This is no surprise, since in Portugal it is customary to register[5] interest payments as part of the financial activity. (3) In the other countries, the first variation (CFvar1) is lower than the original cash flow ratio.

In general, IFRS groups with a higher cash flow ratio – especially groups with a level higher than q3 - have a tendency to apply an operating cash flow enhancing classification behaviour, which will decrease their estimated probability of a credit default within a year. Nevertheless, the adjusted cash flow ratios are still high, so there is no urgent reason to worry about the quality of the estimated probability of default.

[5] The way Portuguese IFRS groups classify their 'interest paid' and 'interest and dividends received', is influenced by the guidelines of the Portuguese National Accounting Plan (POC). Although the POC was revoked and replaced in 2009 by the Accounting Standardisation System (SNC), Portuguese IFRS groups still apply classification options similar to those used in the former national GAAP.

CHART 4 THE MEDIAN VALUE, THE FIRST AND THIRD QUARTILE OF THE 4 CASH FLOW VARIABLES, PER COUNTRY, IN THE ACCOUNTING YEAR 2015 *(in %)*



Source: own calculations based on ERICA Database

4.2 Determinants of firms' cash flow classification options

In a second stage, it is interesting to test whether IFRS groups with specific credit risk related features differ from other groups in terms of the incentive to inflate their reported operational cash flow. This section will examine whether IFRS groups with a higher financial indebtedness or lower profitability display an "operating cash flow enhancing behaviour".
To measure whether an IFRS group applies an operating cash flow enhancing behaviour, a dummy variable, called OCF_enhancing, is calculated. The dummy variable gets a value of 1 if the original cash flow ratio is higher than each of the three variants of the cash flow ratio (CFratio > max(CFvar1, CFvar2, CFvar3)), otherwise the dummy variable gets a value of 0. This is the dependent variable.

The following financial ratios - telling something about a group's financial indebtedness and profitability - are considered: the financial debt ratio, the capital interest burden, the self-financing ability, the net indebtedness ratio and the EBIT ratio. These are possible independent explanatory variables. The *financial debt ratio* measures a group's financial liabilities as a percentage of its total assets. The nominator is the sum of all current and non-current interest-bearing borrowings defined as borrowings from financial institutions, bonds issued, financial leases and other interest-bearing borrowings such as financial liabilities against related parties, commercial paper or factoring. *The capital interest burden* represents the average interest rate paid for external financing. A groups' *self-financing ability* shows the extent to which the group is able to fund itself internally out of retained earnings. The *net indebtedness ratio* is calculated as the sum of all current and non-current interest-bearing financial liabilities less cash and cash equivalents over the total assets. The *EBIT ratio* reflects the percentage that a group earns in terms of operational profit (Earnings Before Interest and Tax) for every euro of revenue. The formula for each ratio is specified in annex 1.

A correlation matrix was set up in order to identify colinearity between the different independent variables. The matrix (see table 4) shows a clear colinearity between the financial debt ratio, the capital interest burden, the financial indebtedness and the self-financing ability, since all four variables are solvency indicators.

TABLE 4 CORRELATION MATRIX BETWEEN THE DIFFERENT EXPLANATORY VARIABLES

	Financial debt ratio	*Capital interest burden*	*EBIT ratio*	*Self-financing ability*	*Net indebtedness ratio*
Financial debt ratio	+1.000	+0.513	-0.004	-0.568	+0.943
Capital interest burden	+0.513	+1.000	-0.089	-0.392	+0.516
EBIT ratio	-0.004	-0.089	+1.000	+0.153	+0.096
Self-financing ability	-0.568	-0.392	+0.153	+1.000	-0.491
Net indebtedness ratio	+0.943	+0.516	+0.096	-0.491	+1.000

Source: own calculations based on ERICA Database

Since the dependent variable (OCF_enhancing) is a dummy variable, a logistic regression will be set up. Considering the strong correlation between the solvency indicators, the logistic regression will record just one solvency indicator as an independent variable. The EBIT ratio will be used as a second independent explanatory variable. To measure a possible country-related impact, country dummies are created and included in the regression as well. Although the dataset contains data for 7 countries, 6 country dummies are included, so the constant variable in the logistic regression model represents the situation of Austrian groups, and all countries are compared with Austria as the reference point.

Two logistic regressions are calculated. In the first regression the independent solvency variable is the financial debt ratio. In the second one, the independent solvency variable included is the net indebtedness ratio.

Logistic regression 1:

$$OCF_{enhancing} = a_0 + a_1 financial\ debt\ ratio + a_2 EBITratio + a_3 Belgium + a_4 Germany + a_5 Greece + a_6 Italy + a_7 Portugal + a_8 Spain$$ *(Equation 5)*

Logistic regression 2:

$$OCF_{enhancing} = a_0 + a_1 net\ indebtedness\ ratio + a_2 EBITratio + a_3 Belgium + a_4 Germany + a_5 Greece + a_6 Italy + a_7 Portugal + a_8 Spain$$ *(Equation 6)*

For each of the explanatory variables, a ***check for outlier values*** was done and a correction by winsorization was applied if needed. For more information, see annex 2.

In each of the logistic regressions, a ***test for endogeneity*** between the independent variables was done. There was no evidence for endogeneity, so the value of one independent variable is not dependent on the value of the other predictor variable.

The results of the logistic regressions are shown in box 2.

Explanation on some test scores:

- *The ROC test measures discriminatory power. The test assesses whether the logistic model is good at predicting whether or not the IFRS group will apply an "operating cash flow enhancing behaviour" (i.e. OCF_enhancing=1).*
- *The Hosmer Lemeshow test is a "goodness of fit" test for logistic regressions. The test tells us how well the data fit the model. The test measures whether the estimated probability is close to the true probability that an IFRS group applies an "operating cash flow enhancing behaviour" (i.e. OCF_enhancing=1). It thus quantifies the calibration power.*
- *AIC (Akaike information criterion) is useful for model selection. AIC is a "goodness of fit" measure that favours a smaller residual error in the model and penalises for the inclusion of further predictors, to avoid overfitting. The lower the AIC score the better.*

The first logistic regression (equation 5) is the preferred model to work with, given the lower AIC score and the higher Hosmer Lemeshow test score.

BOX 2 THE RESULTS OF THE LOGISTIC REGRESSIONS

Regression 1

$OCF_{increasing} = a_0 + a_1$financial debt ratio + a_2EBITratio + a_3 Austria + a_4Belgium + a_5Germany + a_7Greece + a_8Italy + a_9Portugal + a_{10}Spain

```
glm(formula = OCF_increasing ~ Findebtratio + EBITratio + G012,
    family = binomial, data = glmDataCleaned)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-2.0950  -0.8899  -0.7233   1.2301   2.1357

Coefficients:
             Estimate Std. Error z value Pr(>|z|)
(Intercept) -1.670104   0.418951  -3.986 6.71e-05 ***
Findebtratio  0.016249   0.005412   3.002  0.00268 **
EBITratio     0.000631   0.001757   0.359  0.71953
G012Belgium   1.140330   0.454765   2.508  0.01216 *
G012Germany   0.523447   0.425142   1.231  0.21824
G012Greece   -0.546660   0.553801  -0.987  0.32359
G012Italy     0.019144   0.583063   0.033  0.97381
G012Portugal  3.222271   0.656180   4.911 9.08e-07 ***
G012Spain     0.433869   0.438102   0.990  0.32201
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 623.48  on 471  degrees of freedom
Residual deviance: 548.08  on 463  degrees of freedom
AIC: 566.08
```

With G012= country variable
Roctest: p.value= 69.9%
Hosmer.Lemeshow test: p.value= 94.2%

Regression 2:

$OCF_{increasing} = a_{01} + a_1 net\ indebtedness\ ratio + a_2 EBITratio + a_3\ Austria + a_4 Belgium + a_5 Germany + a_7 Greece + a_8 Italy + a_9 Portugal + a_{10} Spain$

```
glm(formula = OCF_increasing ~ Netindebtedness + EBITratio +
    G012, family = binomial, data = glmDataCleaned)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-2.1069  -0.8913  -0.7269   1.2164   2.0222

Coefficients:
               Estimate Std. Error z value Pr(>|z|)
(Intercept)    -1.429e+00  3.956e-01  -3.612 0.000304 ***
Netindebtedness  1.229e-02  4.466e-03   2.753 0.005911 **
EBITratio      -2.456e-05  1.799e-03  -0.014 0.989109
G012Belgium     1.152e+00  4.546e-01   2.534 0.011288 *
G012Germany     5.020e-01  4.246e-01   1.182 0.237093
G012Greece     -4.977e-01  5.512e-01  -0.903 0.366543
G012Italy       5.334e-02  5.825e-01   0.092 0.927035
G012Portugal    3.214e+00  6.563e-01   4.898 9.68e-07 ***
G012Spain       4.456e-01  4.373e-01   1.019 0.308298
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 623.48  on 471  degrees of freedom
Residual deviance: 549.55  on 463  degrees of freedom
AIC: 567.55
```

With G012= country variable
Roctest: p.value= 69.7%
Hosmer.Lemeshow test: p.value= 46.8%%

The coefficient of the financial debt ratio (a_1) is significantly different from zero. ***If the group has a higher financial debt ratio, that increases the probability that the group applies an "operating cash flow enhancing behaviour***". In this case a two-tailed hypothesis test is needed to measure the significance of the coefficient. The p-value is set at 0.00134% (=0.00268 / 2), which implies a high significance.

The coefficient of the EBIT ratio is not significantly different from zero, so there is no evidence to assume that the profitability level of a group has an impact on the classification option in the cash flow statement.

The probability of applying an “operating cash flow enhancing behaviour” is greater if the group is located in Portugal. As already remarked in section 3.1, this is due to the guidelines of the Portuguese National Accounting Plan (POC), which were applied in Portugal until 2009 but are still followed by Portuguese IFRS groups. A Belgian group has a higher probability of choosing classification options that enhance the net cash flow from operating activities, compared to groups established in Austria, Germany, Greece, Italy and Spain.

Linking these observations to the credit risk assessment system, one can conclude that IFRS groups with a higher financial debt ratio will have a higher estimated probability of a credit default within the next year, while at the same time they will be more likely to choose operating cash flow enhancing behaviour. The latter can lead to a higher cash flow ratio and thus offset the higher estimated credit risk. This observation needs to be taken into account when establishing a new statistical model to estimate the probability of default for IFRS consolidated financial statements.

5. CONCLUSION

The IFRS standards allow non-financial listed groups some flexibility on how to classify certain cash flow items within the statement of cash flow. This flexibility does not exist in US GAAP.

The calculation of the percentage of the listed groups that state their interest and dividends paid and received as an operating, investing or financing activity confirms a country-specific approach, which is especially evident in Portugal and Greece. The classification behaviour of Portuguese IFRS groups is influenced by the guidelines of the Portuguese National Accounting Plan. A sectoral breakdown of the classification options does not show sector-specific classification options.

The IFRS options for classifying interest and dividends paid and received hampers comparability between groups. IFRS groups with a higher cash flow ratio have a tendency to apply an operating cash flow enhancing classification behaviour. Because of this behaviour, those groups will obtain a lower estimated probability of a credit default within a year. Since the level of the adjusted cash flow ratio is still high, there is no reason for concern about the quality of the estimated probability of default.

More disturbing is the conclusion that IFRS groups with a higher financial debt level are more likely to opt for operating cash flow enhancing behaviour. This can lead to a higher cash flow ratio that mitigates their higher credit risk. When establishing new statistical models to estimate the probability of default for IFRS consolidated financial statements, it should be noted that when a cash flow ratio is incorporated in the model, the ratio needs to be carefully chosen, considering the impact of classification options in the cash flow statement.

Annex 1: formulas for financial ratios based on codes in the ERICA DB

$$Financial\ debt\ ratio\ = \frac{Current\ and\ non-current\ financial\ liabilities}{Total\ Assets} * 100$$

$$Financial\ debt\ ratio\ = \frac{cc\_60\_61 - cc\_71\_72}{cc\_3\_4} * 100$$

$$Capital\ Interest\ Burden\ = \frac{Interest\ expenses}{Liabilities} * 100$$

$$Capital\ Interest\ Burden\ = \frac{cc\_2420}{cc\_3\_4 - cc\_50\_56} * 100$$

$$Self\ financing\ ability\ = \frac{Retained\ Earnings}{Total\ Assets} * 100$$

$$Self\ financial\ ability\ = \frac{cc\_54\_55\_527}{cc\_3\_4} * 100$$

$$Net\ indebtedness\ = \frac{Current\ and\ non-current\ financial\ liabilities\ less\ cash\ and\ cash\ equivalents}{Total\ Assets} * 100$$

$$Net\ indebtedness\ ratio\ = \frac{cc\_60\_61 + cc\_71\_72 - cc\_48}{cc\_3\_4} * 100$$

$$EBITratio\ = \frac{Profit/loss\ from\ operating\ activities}{Revenue} * 100$$

$$EBITratio\ = \frac{cc\_10\_22}{cc\_10} * 100$$

Annex 2: Correction for outliers

A q1 and q99 quartile are calculated for each independent variable of the 2 logistic regressions (equation 5 and 6). The IFRS groups with a value below q1 or above q99 are examined and corrected if necessary.

Outlier values for the *financial debt ratio*:

- q99 = 99,06% → 5 groups have a financial debt ratio > q99, a correction via winsorization was applied for 2 outlier values
- q1 = 0% →9 groups have a financial debt ratio = q1, no correction was applied

Outlier values for the *EBIT ratio*:

- q99 = 177.63% → 5 groups have an EBIT ratio > q99: a correction via winsorization was applied for all 5 outlier values
- q1 = -421.83% → 5 groups have an EBIT ratio < q1: a correction via winsorization was applied for all 5 outlier values

Outlier values for the *net indebtedness ratio*:

- q99 = 89.82% → 5 groups have an net indebtedness ratio > q99: a correction via winsorization was applied for 2 outlier values
- q1 = -43.13% → 5 groups have an net indebtedness ratio < q1: no correction was applied

Depending on the size of the ratio value, the ratio value was winsorized by the q1 or q99 value, depending on which quartile was exceeded.