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THE USE OF ACCOUNTING INFORMATION TO ESTIMATE INDICATORS OF CUSTOMER AND SUPPLIER PAYMENT PERIODS

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European Committee of Central Balance Sheet Data Offices (ECCBSO)

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The Use of Accounting Information to Estimate Indicators of Customer and Supplier Payment Periods

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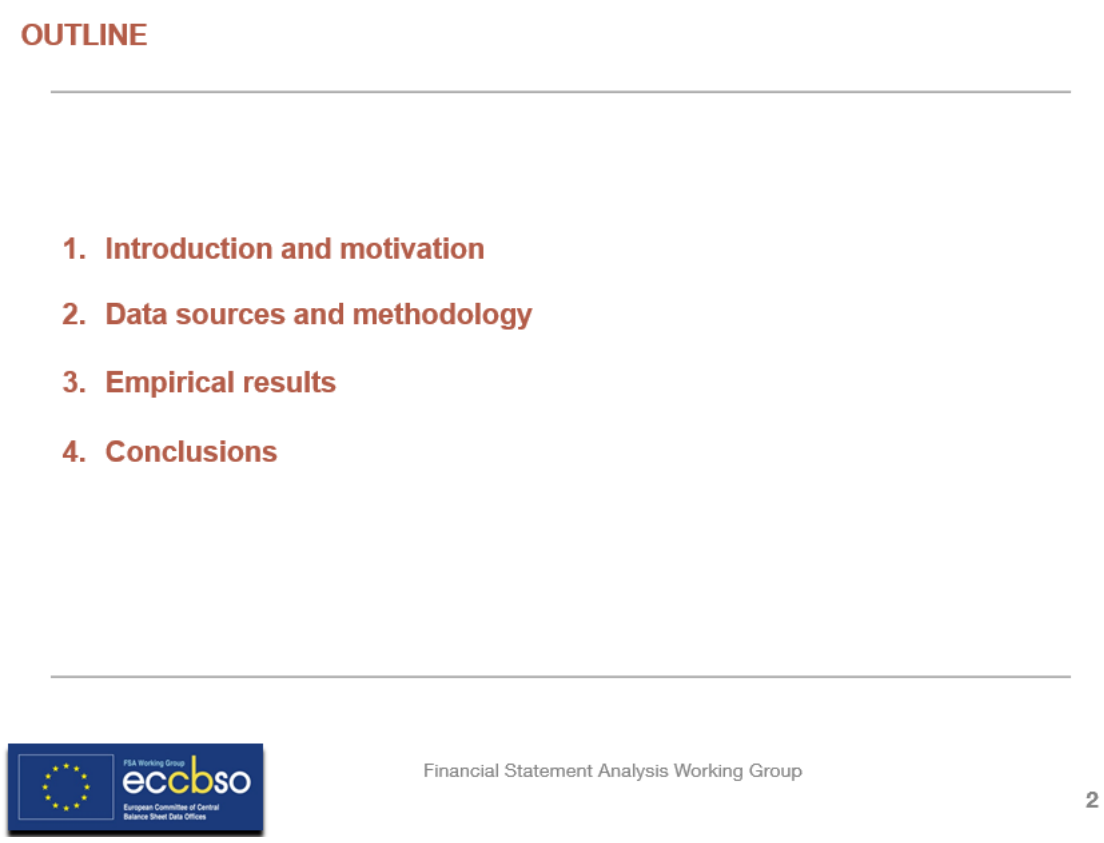
Financial Statement Analysis Working Group

This presentation intends to highlight the main results emerging from the studies conducted by the Financial Statements Analysis Working Group (FSA WG) of the European Committee of Central Balance Sheet Data Offices (ECCBSO) over the last few years.

The most recent studies of the group relate to trade credits of European non-financial corporations. These studies use accounting information drawn from financial statements in order to prepare indicators of days sales outstanding (DSO) and days payable outstanding (DPO), used as proxies for customer and supplier payment periods, respectively.

Results are presented for the eight countries participating in the working group: Belgium, Germany, France, Italy, Poland, Portugal, Spain and Turkey.



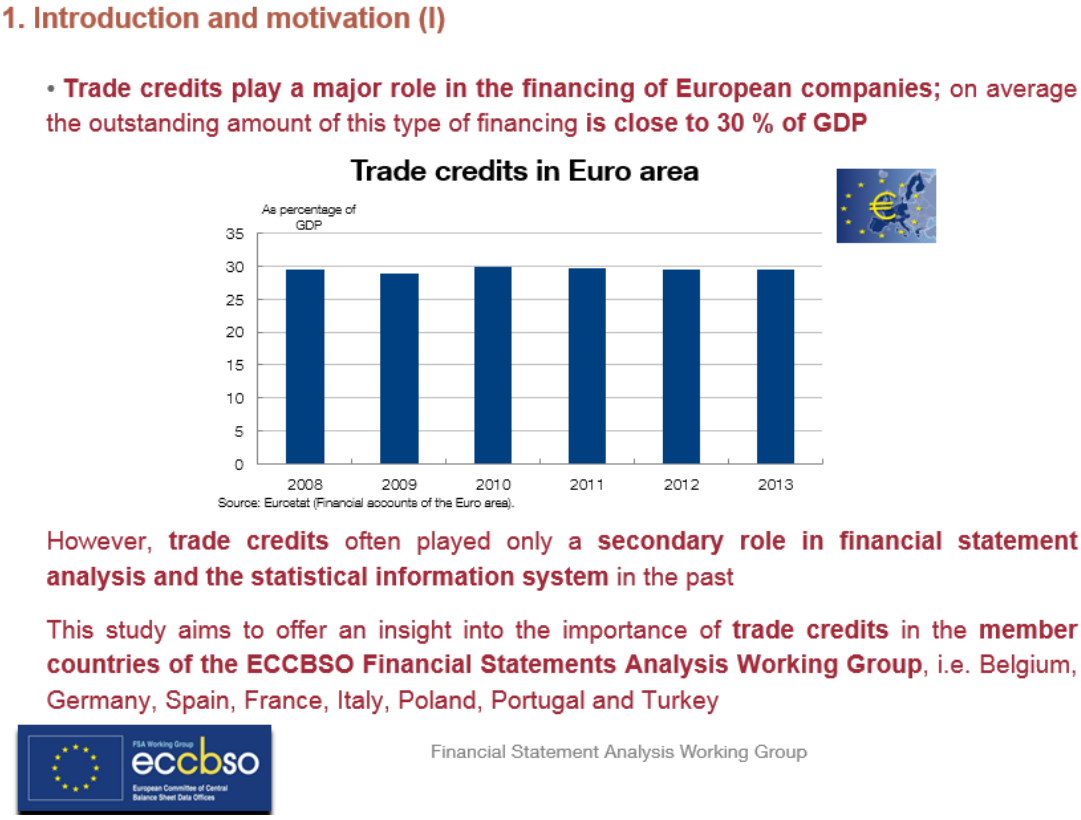
Slide 2 Structure of the presentation

The presentation is divided into four parts. The first section briefly explains the motivations of the study. Section 2 presents the methodology and the data samples. Section 3 offers a broad overview of the main findings, including differences between countries, sectors and sizes, and over time. Section 4 summarises and concludes.

OUTLINE

1. Introduction and motivation
2. Data sources and methodology
3. Empirical results
4. Conclusions

Slide 3 Introduction and motivation



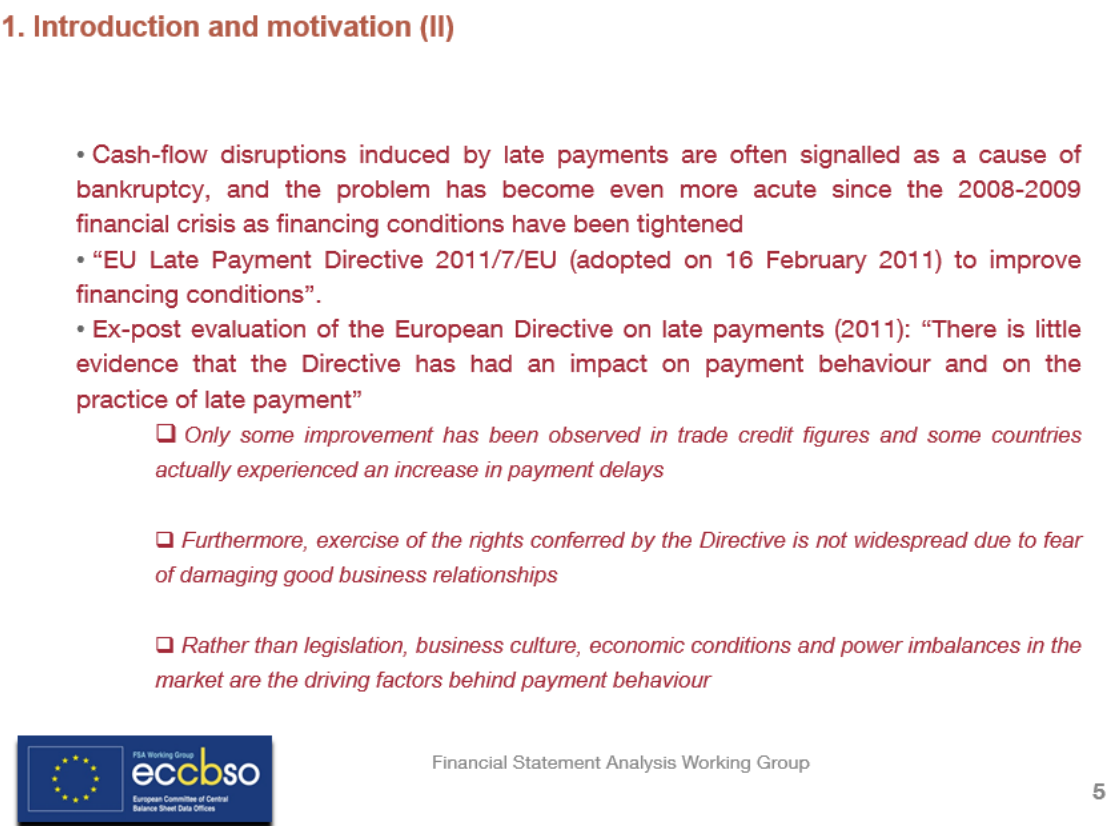
Slide 4 Introduction and motivation (I)

Trade credits play a major role in the financing of companies: on average the outstanding amount of this type of financing received by European non-financial corporations is close to 30% of GDP, being relatively stable in recent years.[1] Trade credits are an essential financing device in business. The motivation for the creditor is often a marketing consideration for further business relationships in the future, while for the debtor, trade credit is used as an alternative to other credit channels while it gives the company the time to control the purchased goods or services in due time, or the possibility of using an asset as input in the production process before it has been paid.

However, these business-to-business payments often played only a secondary role in financial statement analysis in the past, either from a microeconomic point of view or from a macroeconomic perspective, compared to other key financial ratios like profitability or equity capitalisation. Some initiatives have nonetheless been developed recently to monitor the developments of payment delays, such as the OECD scoreboard for small and medium-sized enterprises (SMEs) and entrepreneurship,[2] although the comparability of this information is incomplete due to lack of homogeneity of data sources used.

[1] According to the financial accounts of the Euro area (Eurostat).

[2] See the respective OECD website for SMEs and entrepreneurship.



Slide 5 Introduction and motivation (II)

In contrast, from a credit assessment point of view, trade credits are important. Each year across Europe thousands of SMEs go bankrupt because of cash flow disruptions induced by late payments. This challenge has become even greater since the 2008-2009 financial crisis, as financing conditions became tighter. The EU Commission reacted on this issue in order to protect SMEs with the adoption of the EU Late Payment Directive 2011/7/EU on 16 February 2011, which was due to be integrated into national law by Member States by 16 March 2013 at the latest. The main provisions of the new Directive are the following:

- General governments have to pay for the goods and services that they procure within 30 days or, in very exceptional circumstances, within 60 days.
- Companies have to pay their invoices within 60 days, unless they expressly agree otherwise and provided it is not grossly unfair.
- Automatic entitlement to interest for late payment.
- Statutory interest of at least 8% above the European Central Bank's reference rate.

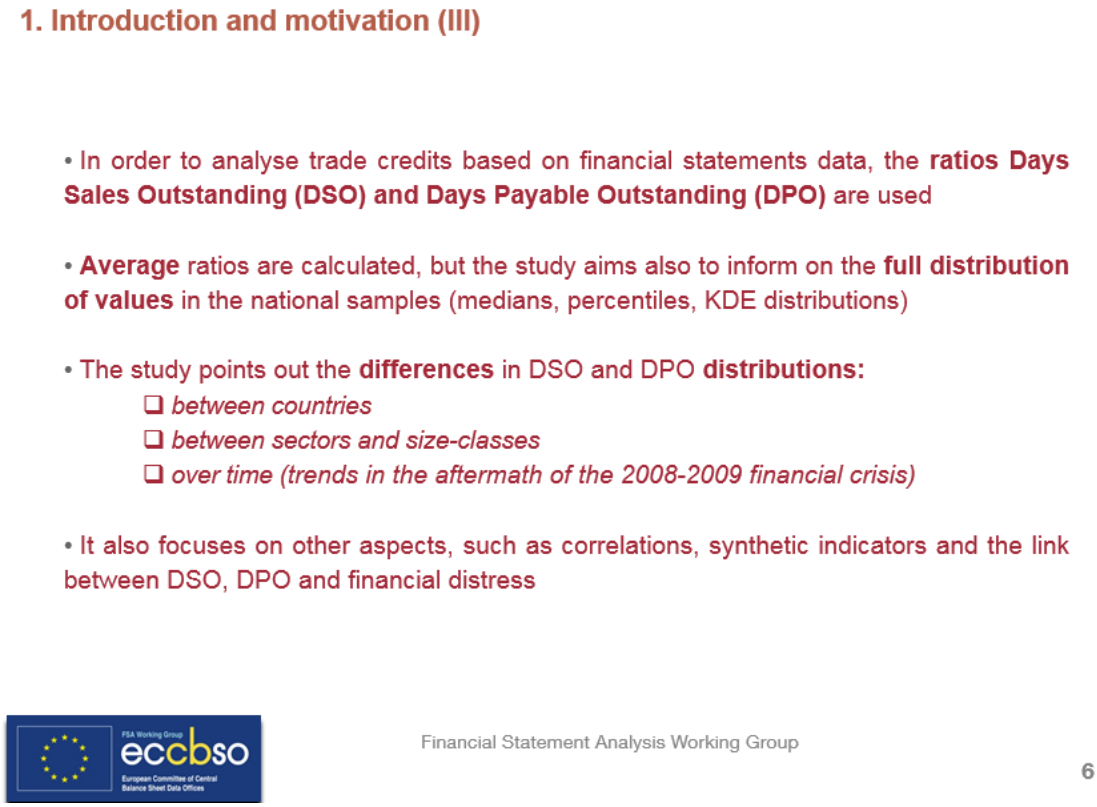
However, according to the ex-post evaluation of the Directive carried out in 2015[3], there is little evidence that the Directive has had an impact on payment behaviour and the practice of late payment. Only some improvement has been observed in trade credit

[3] See European Commission, Ex-post evaluation of Late Payment Directive, ENTR/172/PP/2012/FC – LOT 4 (2015).

figures and some countries even experienced an increase in payment delays from public authorities.

Furthermore, exercise of the rights conferred by the Directive is not widespread due to fear of damaging good business relationships. Rather than legislation, business culture, economic conditions and power imbalances in the market are the driving factors of payment behaviour.

Considering this context, the study aims to provide insight into the importance of trade credits in the member countries of the Financial Statements Analysis Working Group (FSA WG) of the European Committee of Central Balance Sheet Data Offices (ECCBSO).



Slide 6 Introduction and motivation (III)

The study makes use of the large datasets from each national CBSO, which allow drawing solid conclusions. Trade credit collection and payment periods are assessed by means of two key financial ratios: Days Sales Outstanding (DSO) and Days Payables Outstanding (DPO).

As many financial analysts often only have average or median ratios in mind, the study aims at informing about the full distribution of DPO and DSO, focusing, inter alia, on the differences between countries and sectors, as well as on the trends in the aftermath of the 2008-2009 financial crisis. In particular, the analysis uses Kernel Density Estimations (KDE), as this method allows for the most comprehensive representation of the distributions. It also focuses on other aspects, such as correlations, or the link between trade credit and financial distress.

OUTLINE

1. Introduction
2. Data sources and methodology
3. Empirical results
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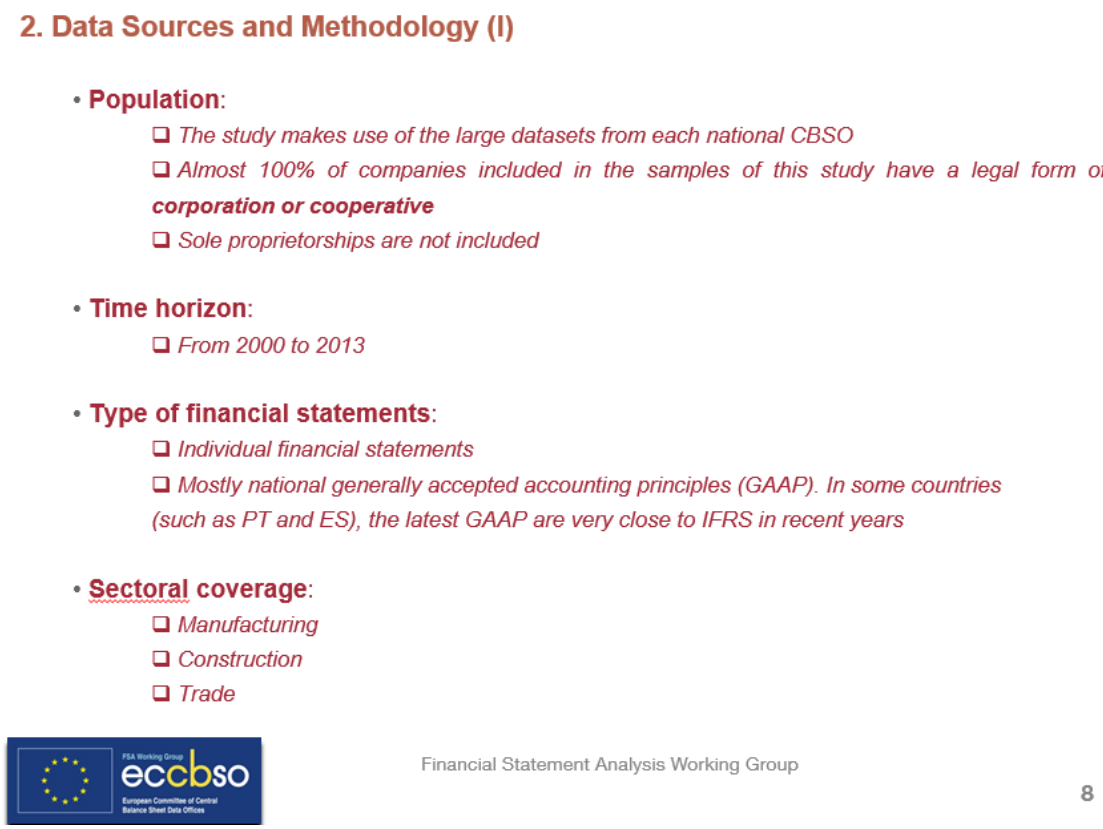
Slide 7 Data sources and methodology



Slide 8 Data sources and methodology (I)

Population

Like the previous research projects of the FSA WG, this one has been conducted on the basis of the extensive samples of financial statements included in the databases managed by each country. These databases are described briefly in the annex. Almost 100% of companies included in the population for this study have a legal form of corporation or cooperative. Sole proprietorships are not included as they are not part of the non-financial corporations institutional sector in the European System of National and Regional Accounts (ESA 2010), but also because sole proprietors have specific features and differ fundamentally from incorporated companies.[4] Partnerships are also excluded in particular from the German and Polish sample for the latter reason. For some other countries, partnerships are included in the sample for comparison with other national statistical publications, which are completely aligned with the composition of the institutional sector of non-financial corporations in ESA 2010, although their share in the entire population is largely negligible. Further, some national samples in the WG exclude companies when they belong to the General Government sector according to the ESA 2010.

[4] This is particularly true for small entrepreneurs when manager and shareholder are the same person, e.g. in this case personnel costs in the income statement generally do not cover the salary of the management.

Cooperatives, in contrast, were included in this study. They represent an important share of economic activity in some of the countries analysed, particularly in the Italian construction sector.

Time horizon

The FSA WG of the ECCBSO traditionally uses a long-term perspective for its analyses. 2000 was chosen as the starting year for this research. The analysis horizon is long enough to allow, among other aspects, the assessment of the impact of the strong downturn period starting in 2008.

One should keep in mind that economic structures and activities have undergone changes in the last 15 years. For example, mergers and acquisitions led to a stronger concentration in this period, which is evidenced by the growing percentage of companies belonging to a group. A second limitation when analysing corporate balance sheet data (in this context, trade credit data from financial statements) over such a long horizon is the sensitivity of changes in some data samples. In Italy, for example, the number of companies analysed in the present study dropped in 2008 due to the increase in the number of firms which can prepare their financial statements under a simplified form. In other cases, data collection has undergone significant improvements. In Portugal, for example, the "whole universe" of non-financial corporations has been covered since 2006, whereas before that date, the Portuguese database only contained statements collected on a voluntary basis through an annual survey.

Type of financial statements

The study only uses individual financial statements. The underlying accounting regimes are mostly national generally accepted accounting principles (GAAPs). Some of these national GAAPs are close to the International Financial Reporting Standards (IFRSs). In some member countries, IFRSs are required for all or only a subset of entities, while other entities can opt for IFRSs instead of using national GAAPs. This is, for example, the case in Italy: the use of IFRSs is compulsory for financial companies and listed companies, but it is voluntary for non-financial companies.

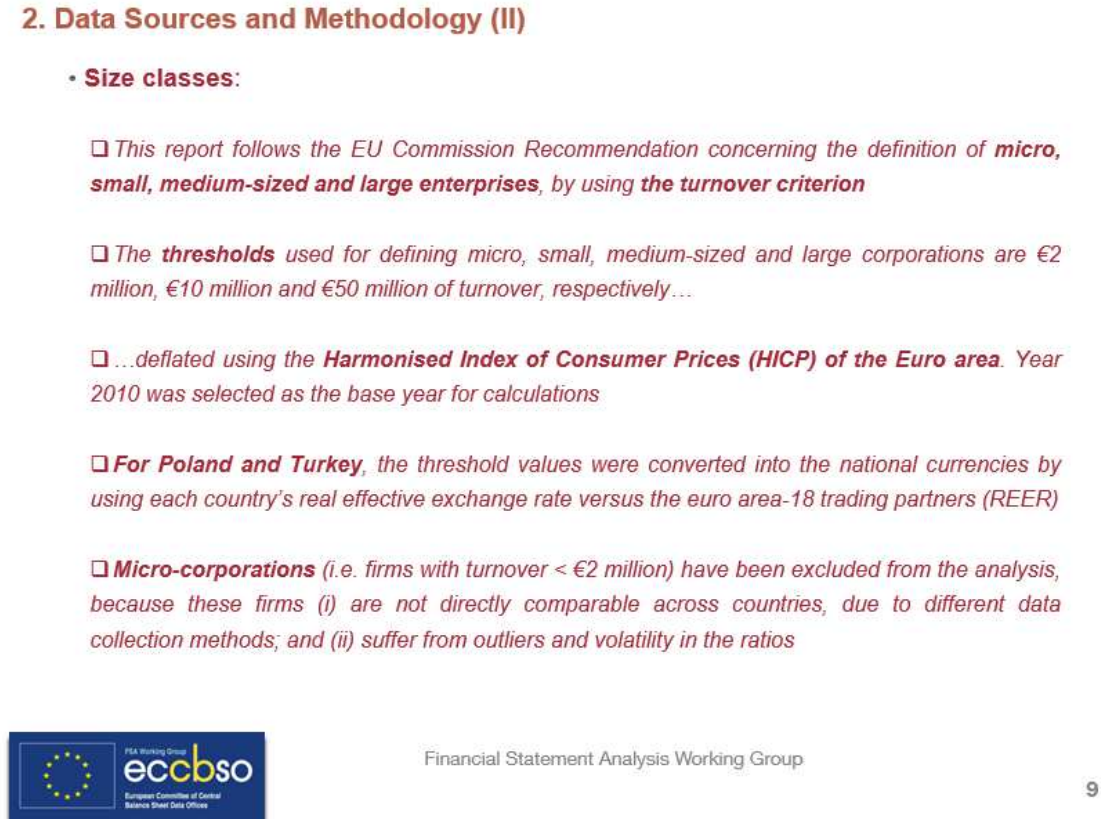
Sectoral coverage

This report focuses on the manufacturing, construction[5] and trade sectors, because these branches are amongst the most homogeneous ones in terms of activity and market conditions, which imply a high degree of cross-country comparability.

Despite a declining importance in most European countries, manufacturing remains of major interest from an economic point of view, especially because of its impact on value added creation and its links with other economic branches. The construction sector undoubtedly makes a very important contribution to the national economy, especially in consideration to its leading role. The trade credit behaviour of the trade sector (as part of the service sector) is also interesting to investigate and to compare with that of the

[5] Demolition and site preparation (NACE Rev. 2, Group 43.1) is excluded from the construction sector as annual accounts of companies in these fields show quite different characteristics.

production sectors. Because of their specificities, the trade sub-sectors (i.e. motor vehicle trade, retail trade and wholesale trade) were also analysed.



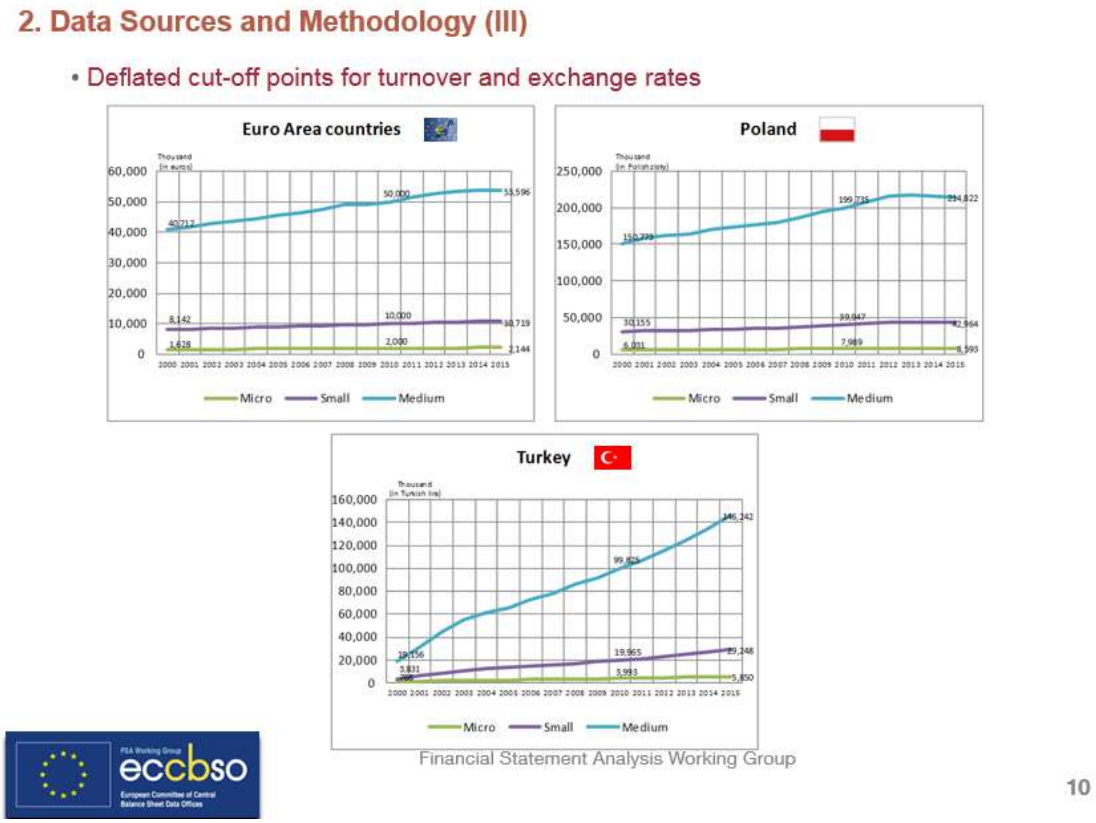
Slide 9 Data sources and methodology (II)

The FSA WG follows the turnover thresholds recommended in the EU Commission Recommendation concerning the definition of micro, small, medium-sized and large enterprises.[6] In some national samples, the data on the number of employees is not available or is of insufficient quality.

The thresholds used for defining micro, small, medium-sized and large corporations are €2 million, €10 million and €50 million of turnover, respectively. Since the research starts from the year 2000, there is a possibility that companies might have changed size categories due to inflation-induced reasons in this long-term horizon. This is why thresholds were deflated with the Harmonized Index of Consumer Prices (HICP) of the euro area.[7] 2010 was selected as the base year for calculations.

[6] See EU Recommendation of 6 May 2003.

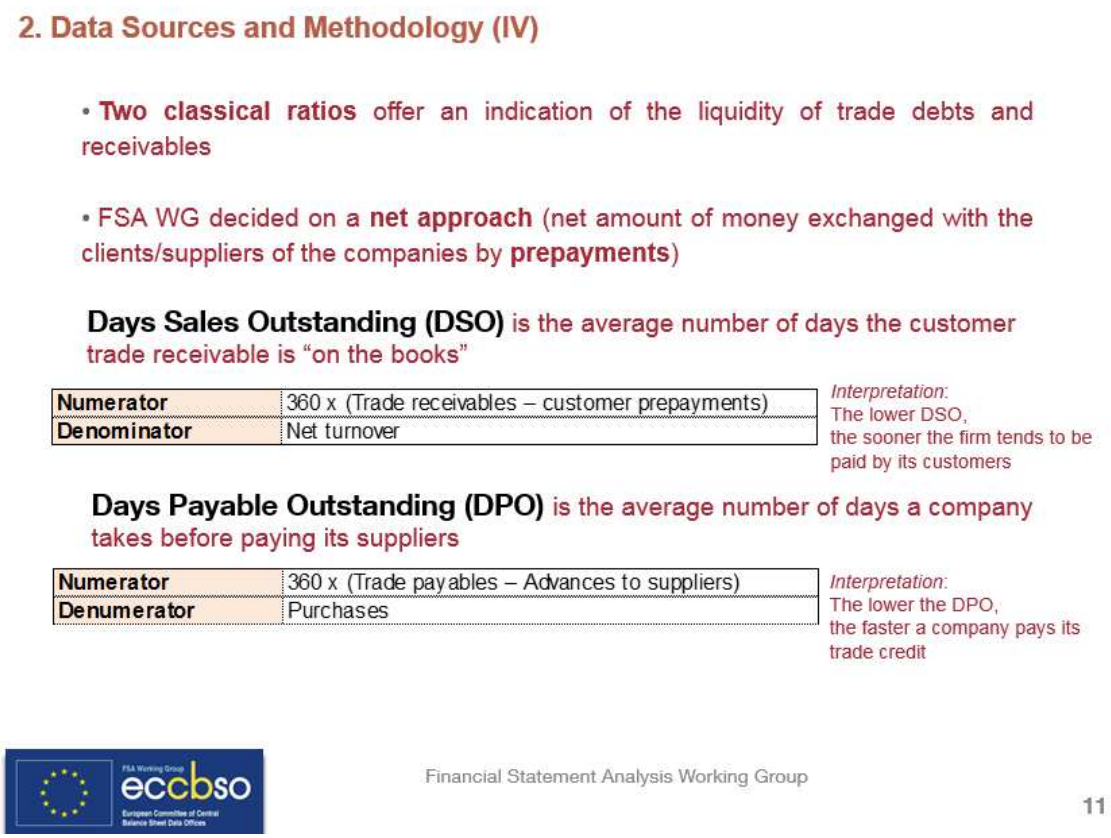
[7] Thresholds obtained using the HICP index for the euro area as a whole were compared with thresholds for each particular country obtained using national HICP indices. The comparison revealed that common and country-specific thresholds have moved in the same direction and do not present significant differences.



Slide 10 Data sources and methodology (III)

There are two non-euro area countries in the FSA WG, namely Poland and Turkey, for which additional calculations were needed in order to express threshold values in their national currencies. For this purpose, the euro area HICP deflated thresholds were converted by using each country's flexible real effective exchange rate (REER) versus the euro area-18 trading partners.[8] This slide illustrates how the deflated cut-off points for turnover evolved in euro area countries, in Poland and in Turkey, over the period 2000-2015. In the case of the euro area, the updated thresholds reached €2.1, €10.7 and €53.6 million, respectively, in 2015.

[8] An analysis showed that flexible exchange rates would give a better picture of the countries' economic situation over time rather than using fixed exchange rates for the base year 2010.



Slide 11 Data sources and methodology (IV)

The analysis focuses mainly on the Days Sales Outstanding (DSO) and Days Payable Outstanding (DPO) ratios, as computed on the basis of financial statements. These two classic ratios offer an indication of the liquidity of trade debts and receivables. DSO is often used to spot customer payment patterns. It is defined as the number of days the average customer trade receivable is "on the books". The lower the ratio, the sooner the firm tends to be paid by its customers, and vice versa. In this study, DSO has the following definition:

Days Sales Outstanding (DSO):

Numerator	360 x (Trade receivables – customer prepayments)
Denumerator	Net turnover

The FSA WG decided on a net approach when analysing trade credit figures with DSO and DPO. In case of DSO, a company can have receivables from its customers when selling a product, but it can also receive liquidity in the form of advances from its customers. Subtracting these prepayments from the receivables gives the net amount of money exchanged with the clients of a company. As a consequence, the resulting DSO can be negative.

DPO on the other hand can explain a company's pattern of payments to suppliers. The more timely a company pays its trade credit, the lower the DPO figure. DPO is defined as follows:

Days Payable Outstanding (DPO)

Numerator	360 x (Trade payables – Advances to suppliers)
Denumerator	Purchases

DPO is calculated on a net basis, as is DSO. Liabilities to suppliers for delivered goods or services are netted with advances paid by the company. As a result, DPO can also be negative.

When analysing DSO and DPO, it should be stressed that these ratios compare flows relating to an entire financial year (sales or purchases) with stocks as at the end of the financial year (trade debts or receivables). As trade debts and receivables tend to fluctuate over time, DPO and DSO are proxies for the values of payment periods, and therefore not always representative. Further, trade debts and receivables taken from the balance sheet often include value added tax (VAT), whereas sales and purchases do not. As VAT data are available in some countries (e.g. Belgium) and not in others, flows were considered without VAT for the sake of cross-country comparability.

2. Data Sources and Methodology (V)

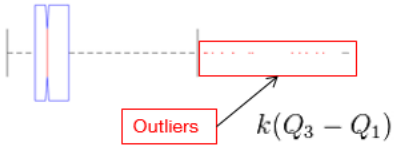
- **Rejection of outliers**:
  Exclusion of extreme microdata ("outliers") with **Box-Plot method, for each sector/size/year combination**

  Method based on the interquartile range (Q3-Q1), with a multiplier k (k=6 is used in order to exclude only very extreme outliers):

Algebraically:

$$[Q_1 - k(Q_3 - Q_1), Q_3 + k(Q_3 - Q_1)]$$

Graphically:

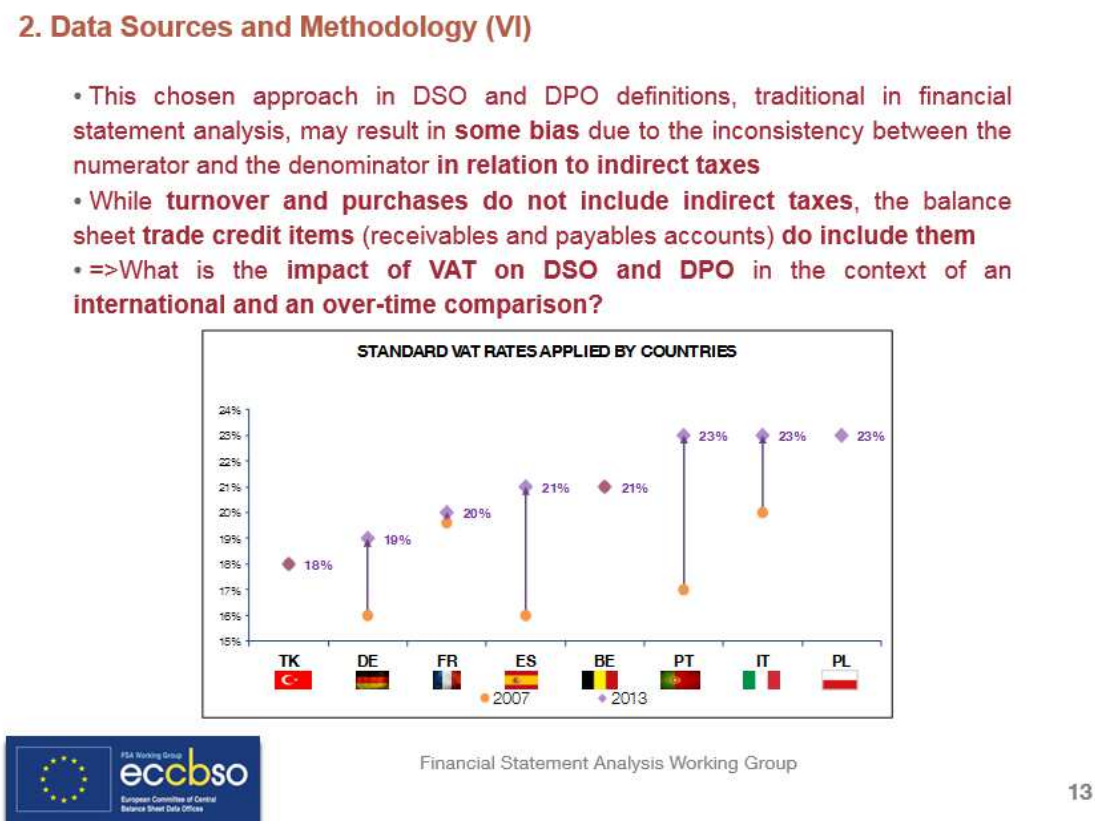


- NB: There is a variety of possible treatments for outliers (eg. use of standard deviation instead of interquartile range, 1%-99% cut-offs, winsorisation, etc.)

Slide 12 Data sources and methodology (V)

A common method of quality control, the Box-Plot method, was implemented to exclude extreme observations ("outliers"). This method is based on the interquartile range (IQR) and it excludes:
a) observations which have values lower than Q1 – 6 IQR
b) observations which have values higher than Q3 + 6 IQR

Parameter 6 is used to exclude only extreme outliers. IQR was preferred to other measures such as standard deviation, as the latter is influenced by outliers. Moreover, exclusion of observations was preferred to winsorisation, because in some countries the identified outliers relate to very likely "errors" in the data.



Slide 13 Data sources and methodology (VI)

Indicators of customer collection (DSO) and supplier payment periods (DPO), based on accounting figures, are usually defined as receivables divided by turnover and payables divided by purchases, respectively. However, this traditional approach may result in some bias due to the inconsistency between the numerator and the denominator in relation to indirect taxes.

While the figures for turnover and purchases in the income statement do not include indirect taxes, since these variables are defined in European Accounting Directives so as to exclude value added tax (VAT) and other indirect taxes, the balance sheet trade credit items (receivables and payables accounts) do include indirect taxes. This discrepancy between numerator and denominator arises only in the case of domestic transactions, since in the case of exports and imports, for tax liability reasons, VAT amounts are not included in receivables or payables:

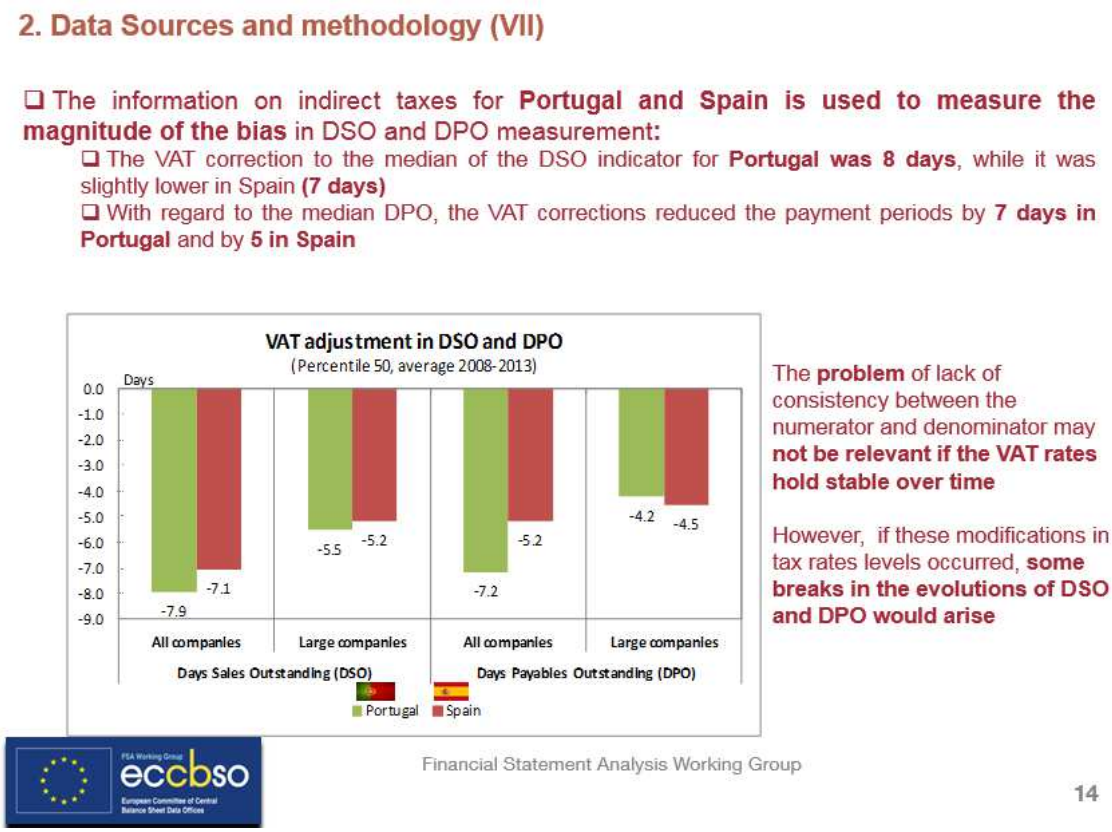
$$Days\ Sales\ Outstanding\ (DSO) = \frac{360 \text{ x } Trade\ receivables\ (\text{including VAT on domestic trans.})}{Net\ turnover\ (\text{excluding VAT})}$$

$$Days\ Payables\ Outstanding\ (DPO) = \frac{360 \text{ x } Trade\ payables\ (\text{including VAT on domestic trans.})}{Purchases\ (\text{excluding VAT})}$$

In order to measure to what extent the absence of VAT in the denominators may affect the measurement of collection and payment periods, this slide and the following one analyse the impact of VAT on DSO and DPO in the context of an international and an over-time comparison. Naturally both comparisons imply unavoidable differences in the VAT rates between countries and tax rate changes within a national tax regime. The chart shows the differences in the standard VAT rates in each country between 2007 and 2013, which could give rise to inconsistencies in the comparison of DSO and DPO levels among the different countries.

In traditional accounting statements, information on indirect taxes, such as VAT, is hard to obtain, since firms act merely as collectors of these taxes on behalf of the tax authorities and VAT is charged only on final consumption. The net outstanding balances on the VAT accounts in financial statements – often not available as a separate item - represent the VAT collected less the VAT that has been paid, which will be passed on to the tax authorities. In most cases, financial statements do not show either the gross VAT charged on sales or the gross VAT paid on purchases.[9] For this reason, when information about gross payments of VAT is required, it is necessary to obtain it from other sources, such as statistics of the tax authorities or specific Central Balance Sheet Data Office (CBSO) questionnaires on this topic.

[9] Belgian companies provide data on paid and charged gross VAT values, but due to differences in the availability of VAT data across countries, they were not included in the calculations for this report in order to ensure maximum comparability.



Slide 14 Data sources and methodology (VII)

In order to assess the bias caused by VAT in DSO and DPO measurement, the information on indirect taxes available for Portugal and Spain[10] is used to measure the magnitude of the bias. Chart 2 shows the corrections arising from inclusion of the VAT amounts available from other sources in the denominators (sales and purchases) of DSO and DPO.

For all companies, the VAT correction to the median of the DSO indicator for Portuguese firms was around eight days in the period 2008-2013, while it was slightly lower in Spain (seven days). With regard to the median DPO, the VAT corrections reduced the payment periods by seven days in Portugal and by five in Spain. The smaller correction in DPO and DSO for Spanish firms, in comparison to Portuguese ones, could be related to the lower levels of standard VAT rates during the period.

With regard to large companies, the VAT corrections in the median DSO and DPO for this segment of firms were smaller in magnitude than for all firms, probably because a higher proportion of large firms are exporting and importing companies, in which the VAT on domestic sales and purchases has a lower weight in the net turnover and purchases in the income statement.

[10] The Portuguese and Spanish CBSOs traditionally compute and release the indicators of customer collection and supplier payment periods adjusted for the VAT corrections. See the CBSO websites of Banco de Portugal and Banco de España for more details.

The problem of lack of consistency between the numerator and denominator in the traditional definition of DSO and DPO may not be relevant if the change over time[11] in these indicators is considered rather than their level. Indeed, it should be stressed that the indicators obtained from accounting data are approximations of true periods and are useful for analysing changes and trends. Significant differences in levels between countries or sectors also can give insights, but these indicators should not be used to verify the degree of compliance with the legal limits set for payment periods,[12] and they may have certain limitations for use in international comparisons among countries with different VAT rates.

[11] Although the significant changes in VAT rates that occurred in Portugal and Spain between 2007 and 2013 might influence DSO and DPO time series analysis (within the same country).

[12] Such as the indicator of payment delays from the OECD Scoreboard "Financing SMEs and Entrepreneurs". http://www.oecd-library.org/docserver/download/8515011e.pdf?expires=1453660041&id=id&accname=oid007437&checksum=B2DF49CEF4FBE26CF29FB5864153B908

2. Data Sources and methodology (VIII)

- National datasets - breakdown by size

Number of companies, 2013

All sectors, by size

Units	Belgium	Germany	Spain	France	Italy	Poland	Portugal	Turkey
Small	3.308	13.632	17.865	52.144	38.396	7.930	8.088	2.365
Medium-sized	3.862	9.953	3.164	16.125	14.635	3.637	1.887	2.348
Large	1.370	4.659	713	4.555	3.721	1.316	420	966
Total	8.540	28.244	21.742	72.824	56.752	12.883	10.395	5.679
p.m. Micro	1.976	12.886	174.937	64.897	13.665	7.574	123.194	727

% of the total	Belgium	Germany	Spain	France	Italy	Poland	Portugal	Turkey
Small	38,7	48,3	82,2	71,6	67,7	61,6	77,8	41,6
Medium-sized	45,2	35,2	14,6	22,1	25,8	28,2	18,2	41,3
Large	16,0	16,5	3,3	6,3	6,6	10,2	4,0	17,0
Total	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Slide 15 Data sources and methodology (VIII)

As mentioned, for this study, FSA WG makes use of the large datasets from each national CBSO. The granularity in the information due to the access to data at the firm level allows a deep characterisation of payment behaviour in the European firms. Although the national datasets can generally be considered as comprehensive, the representativeness within the micro size class in some countries is not as good as for the other size classes. This originates from the widely distinct ways of collecting balance sheet data in the participating countries.

The datasets of Portugal[13] and Spain used in this study can be considered to give a satisfactory and complete picture. The National Bank of Belgium and Centrale dei Bilanci (Italy) gather data on the whole population of companies ("whole universe"), but in both countries, data on turnover or purchases is not available for most micro firms, as they are allowed to file their financial statements under a simplified version. As a consequence, an important share of Belgian and Italian micro firms could not be analysed. The German selection of firms has a general bias such that micro entities do not enter the database completely: smaller companies only need to publish a balance sheet and they are mostly not included in additional data sources (like data from credit institutions or from public sources). The French database only includes companies with

[13] Since 2006.

a turnover of at least €0.75 million or companies with bank loans of at least €0.38 million. For Poland, entities with less than 10 employees do not enter the database.

Consequently, statistics based on micro size entities are difficult to compare across countries. Moreover, interpretation of financial ratios is blurred for many micro companies, as (very) small numerators or denominators tend to generate volatility and sometimes questionable figures, especially at the extremes of the distributions. These two reasons explain why micro firms were excluded from the analysis.

The breakdown by size classes of national samples (after exclusion of micro firms) shows quite different profiles according to the country. Small firms are very numerous in Spain (82%), Portugal (78%), France (72%), Italy (68%) and, to a lesser extent, Poland (62%). As a consequence, the number of large firms is quite restricted in those countries. Conversely, in Belgium, Germany and Turkey, the share of medium-sized and large companies is significantly higher.

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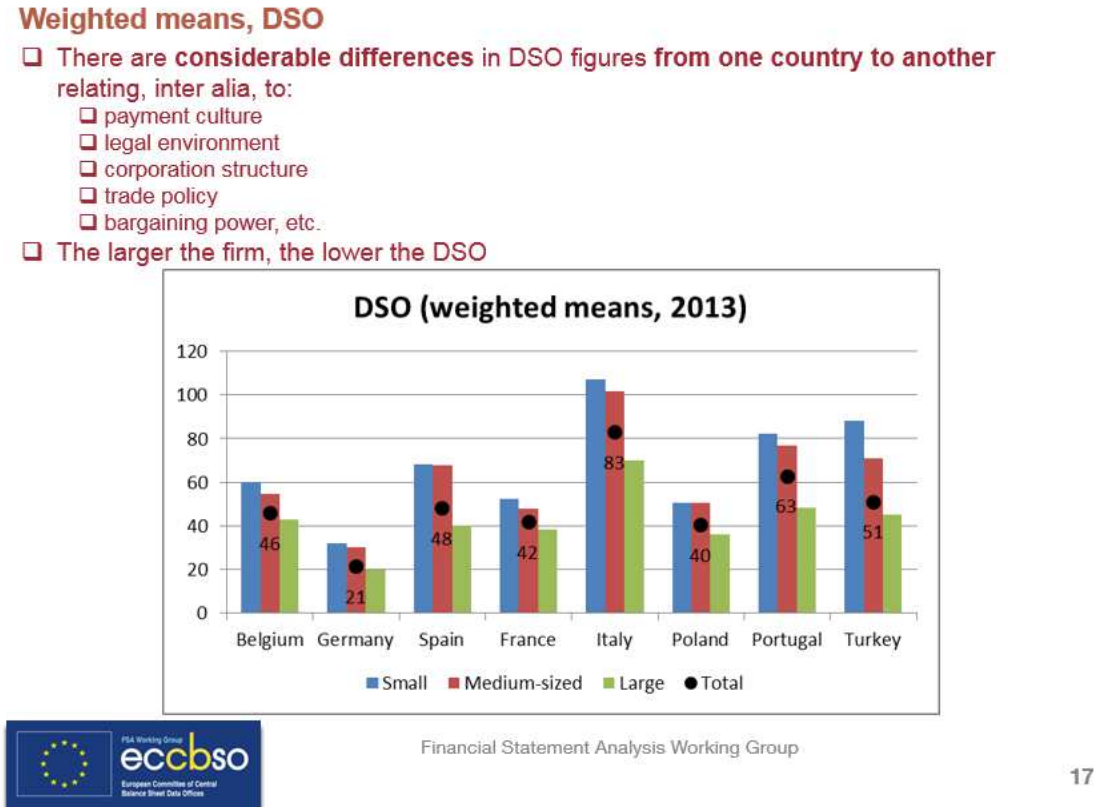
Slide 16 Empirical results



Slide 17 Weighted means, DSO

This slide and the next one present weighted[14] means for DSO and DPO, by country and by size class (all sectors).

There are considerable differences in DSO and DPO figures across the analysed countries: for the whole population, collection of trade credit ranges from 21 days in Germany to 83 days in Italy, with other countries in between. Note that differences of profile between countries observed for the national samples as a whole remain true for every size class.

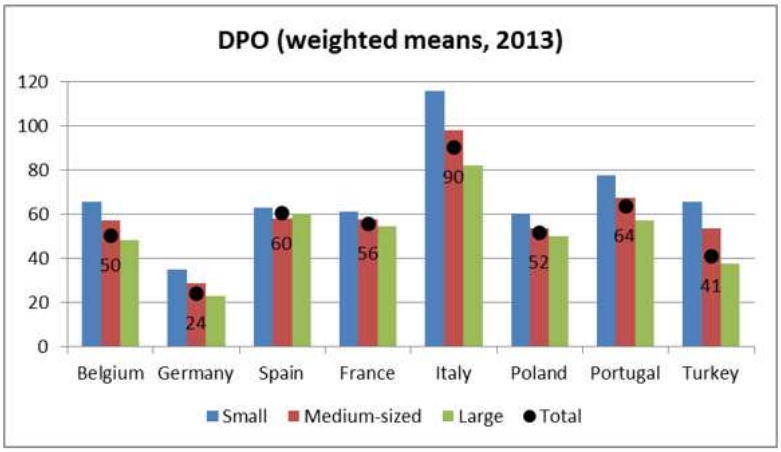
Even if economic integration and the European legal framework (with the Directive on Late Payments) tend to reduce differences between countries, other factors explain why DSO and DPO results differ among countries, like differences in national legislation, in national and/or sectoral payment culture, in corporation structure (firms operating in a group framework or alone), in the nature of the commercial counterpart (household, business, public authority), in bargaining power and in individual preferences in commercial policies (some companies may prefer to hold on to cash longer to be more liquid and safe; others may use a strict supply chain that cannot afford payment term changes).

[14] Weighted mean are computed by aggregating the data of the numerator on the one hand, and the data of the denominator on the other hand for each node.

In all countries, DSO figures decrease when size increases. While differences between small and medium-sized firms are quite small in most cases, those with large firms are markedly higher. The gap between large and small firms is particularly high in Italy, Portugal, Turkey and Spain. These size differences point out the peculiarities of larger firms, reflecting among other things their ability to get paid earlier because of their negotiating power or their better organisation. Moreover, the standard deviation across countries also decreases with size, indicating that the behaviour of larger firms is more homogeneous, which might be explained by various factors, such as international relationships or the standardisation of administrative procedures.

Similar assessments hold for median values. Note that because of the numerical importance of smaller companies, the median values for the total size class are usually closer to the small size category. In contrast, the weighted averages of the total size class are closer to the large size category because of the high figures of larger companies.

Weighted means, DPO

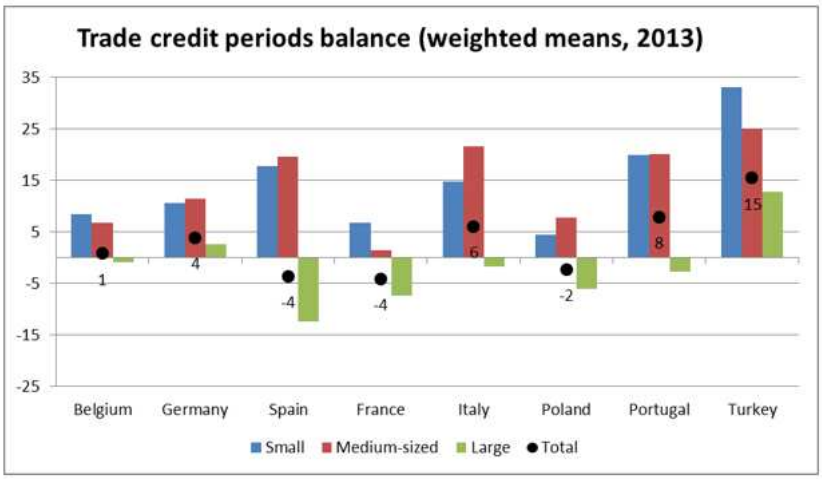


Slide 18 Weighted means, DPO

Similar differences are observable for DPO, with minor deviations in the ranking of countries in comparison to DSO data. As for DSO, the lowest DPO value is registered in Germany (24 days) and the highest one in Italy (90 days). The other countries are relatively close to each other.

What is worth mentioning is that differences by size classes can also be observed (the larger the firm, the smaller the DPO), but in most cases they are less marked than for DSO. The size factor thus plays a less important role for DPO than for DSO, which can be explained at least partly by bargaining power phenomena: large companies can be expected to be able to get paid earlier, and at the same time to pay their suppliers relatively later.

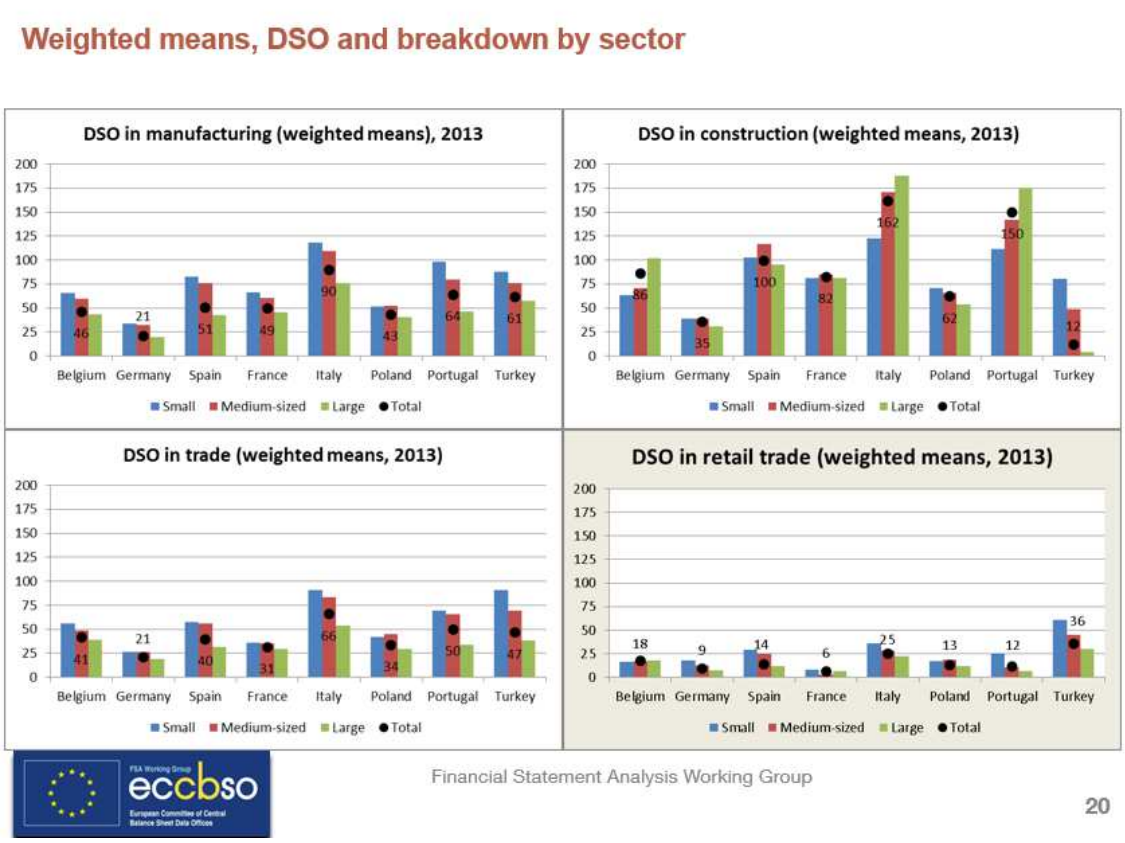
Weighted means. Trade credit periods balance



Slide 19 Weighted means, trade credit periods balance

This slide presents the trade credit periods balance by size class. Trade credit balance is defined as the difference between trade receivables and trade payables, divided by turnover, and expressed in number of days. As such, it synthetises net position on trade credit (assets – liabilities). Likewise, it could be worth mentioning that SMEs from Italy, Portugal, Spain and Turkey have higher trade credit balances than other countries.

As can be deducted from the previous slides, large firms generally have a lower trade credit balance than others. Moreover, they are the only category of firms with a negative balance (in six out of eight countries). These findings mean that large firms with DSO relatively lower than DPO are more likely to find financing through trade credit than other size categories.



Slide 20 Weighted means, DSO, breakdown by sector

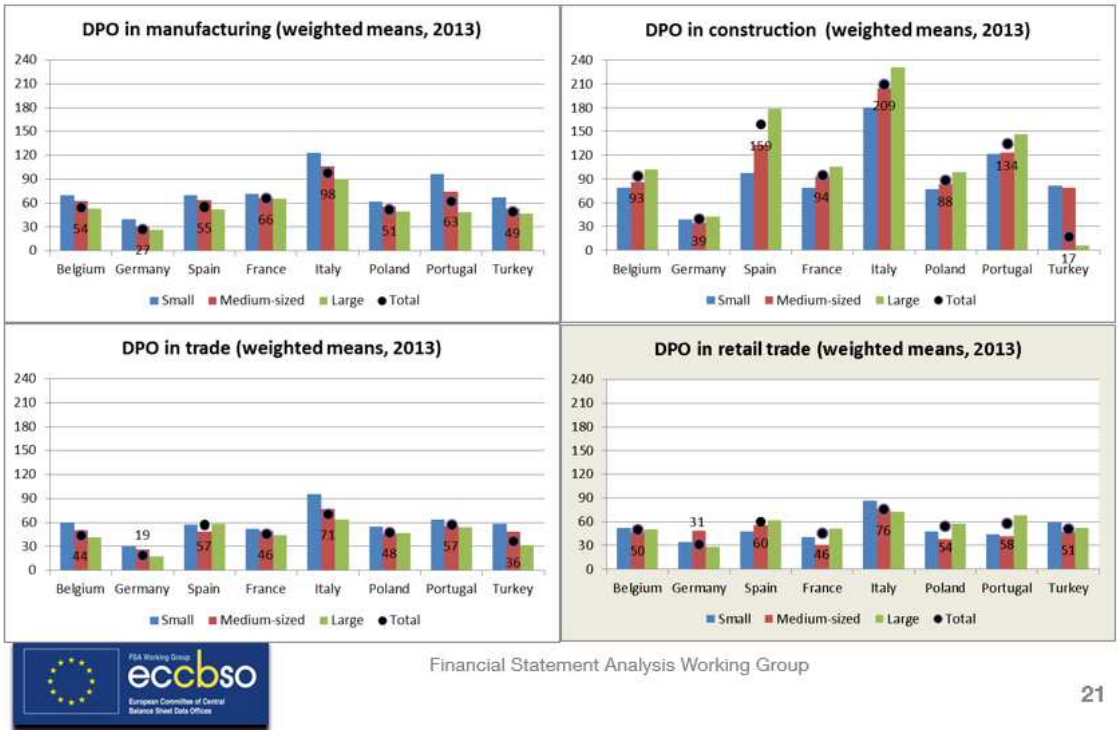
The present slide offers a breakdown of DSO by size class and by sector (manufacturing, construction and trade). Because of its specificities, the retail trade subsector is also presented.

Similar profiles, with lower DSO and DPO figures in Germany and higher ones in Italy are observable when considering figures by sector.

Generally speaking, DSO figures are markedly lower in trade and higher in construction. DSO levels in manufacturing are in the middle. For manufacturing and trade as well, the smaller the firm, the higher the DSO. In construction, the relation between DSO level and size class is less clear. In Belgium, Italy and Portugal, one can even observe that the larger the firm, the larger the DSO. This can be related to firms' activity profiles, which can be very different on the basis of size in construction. Large firms tend to be more involved in civil engineering and other long-term construction projects, which imply a longer operating cycle and, consequently, longer payment periods. Moreover, large firms are also more involved in projects for public authorities, which might tend to pay later. By contrast, smaller firms are more specialised in limited and shorter building projects (like private dwellings) and/or in finishing off works (plumbing, electricity, carpentry, painting, etc.), which imply shorter payment periods on average.

The low DSO levels in trade can be related to the nature of customers and of activities. In the retail trade, in particular, customers are usually households who frequently pay cash, so that the DSO of that sector is very low in every country, with the exception of Turkey. The significantly higher DSO levels in the Turkish retail trade can be explained by the fact that an important share of Turkish retail trade firms has multiple activities. For instance, fuel retailers are also active in commodities wholesale, whereas food retailers are also active in marine fishing or cattle breeding[15].

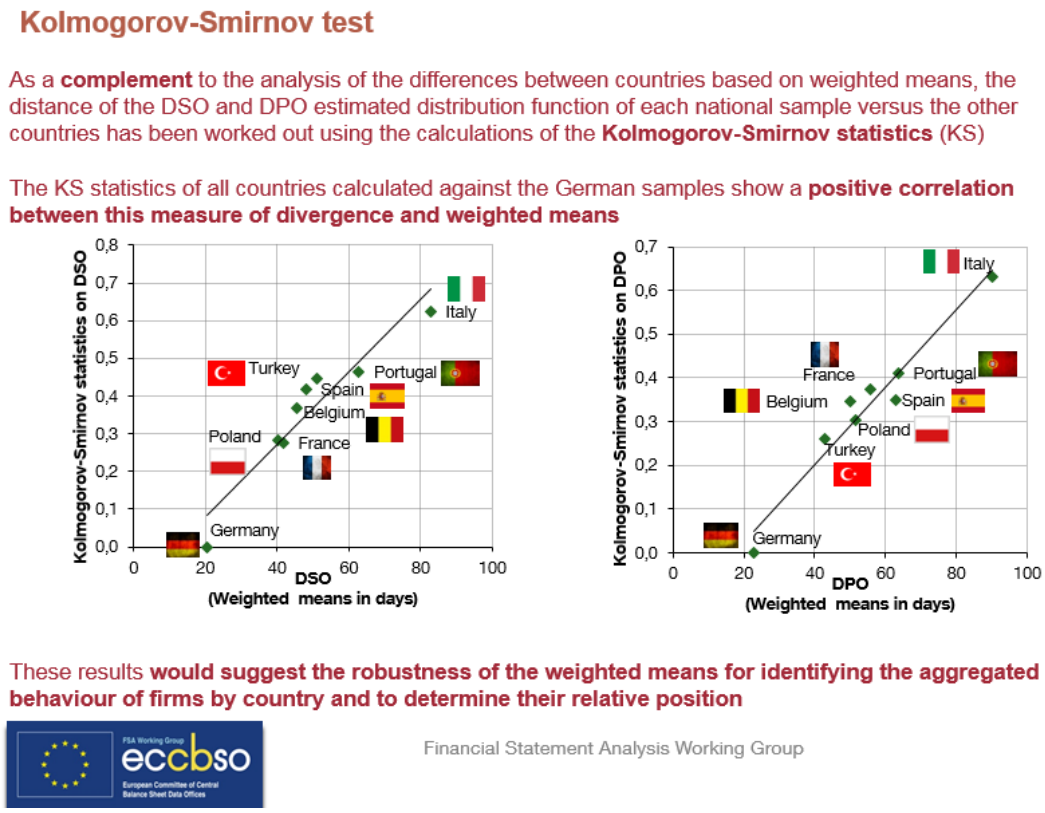
[15] Incidentally, some companies may be misclassified as retail while they are probably wholesalers.



Slide 21 Weighted means, DPO, breakdown by sector

Similar observations can be made for DPO for manufacturing and construction.

Conversely, DSO and DPO levels can be very different for some trade activities (such as retail trade or, to a lesser extent, motor vehicle trade), because the commercial counterpart's profile is not the same for trade receivables and for trade debts. Thus, where most of the customers of these firms are households, with substantially short payment delays, most of their suppliers are other firms, with longer payment terms. Consequently, DPO levels are higher than DSO levels in retail trade, and they are closer to levels in manufacturing.



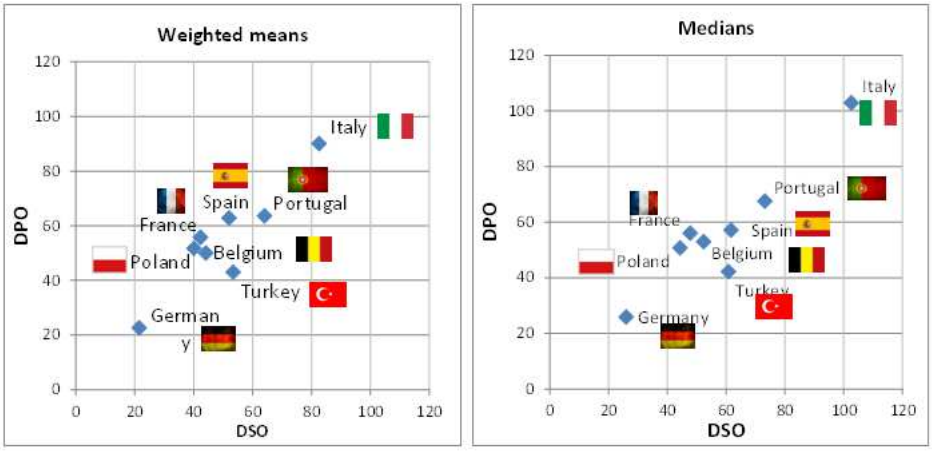
Slide 22 Kolmogorov-Smirnov test

As a complement to the analysis of the differences between countries based on means and medians, the distance between each national sample's DSO and DPO distribution function and those of the other countries has been calculated using the Kolmogorov-Smirnov statistics (KS).[16] Thus, the smaller the KS, the greater the similarity between the sample distributions, and vice versa. As can be seen on this slide, the KS statistics of all the countries calculated relative to the German sample's DSO and DPO shows a positive correlation between this measure of divergence and the weighted means. This confirms that the weighted means are a robust way of characterising the aggregated behaviour of firms in individual countries.

[16] The Kolmogorov–Smirnov statistics are used here to analyse whether two underlying one-dimensional distributions differ.

Correlations at country level

For both weighted means and median values, DSO and DPO are **positively and closely linked** (>0.90): the higher the DSO, the higher the DPO, and viceversa



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Slide 23 Correlations at country level

The charts show how DSOs and DPOs are positively and closely linked to one another in the case of both weighted means and median values: the higher the DSO, the higher the DPO, and vice versa. In almost all combinations (country/size/sector), correlation coefficients reach levels higher than 0.9. This indicates that the data are consistent and are as expected given that, for a country as a whole, late payments in some companies should correspond to late collection in other firms, and conversely (excluding impacts such as imports/exports, business-to-customer or business-to-government relationships, or the fact that this study focuses on just three sectors).

Correlations at firm level

Correlation coefficients remain positive but are markedly lower (between 0.20 and 0.40 in most cases)

Correlation Coefficients DSO vs DPO in 2012

Sector	Size	Belgium[(1)]	France[(1)]	Germany	Italy	Poland	Portugal	Spain	Turkey
1 Manufacturing	1 Micro	0,28	0,30	0,23	0,33	0,30	0,32	0,83	0.07[(Δ)]
1 Manufacturing	2 Small	0,31	0,33	0,19	0,31	0,30	0,29	0,28	0,15
1 Manufacturing	3 Medium	0,27	0,34	0,14	0,32	0,34	0,29	0,15	0,15
1 Manufacturing	4 Large	0,35	0,26	0,07	0,33	0,24	0,26	0,15	0,20
1 Manufacturing	Total w/o Micro	0,30	0,33	0,16	0,33	0,30	0,31	0,21	0,17
2 Construction	1 Micro	0,14	0,40	0,26	0,26	0,41	0,30	0,00[(Δ)]	-0.12[(Δ)]
2 Construction	2 Small	0,26	0,39	0,27	0,42	0,39	0,30	0,10	0,20
2 Construction	3 Medium	0,33	0,37	0,22	0,41	0,35	0,53	0,66	0.12[(Δ)]
2 Construction	4 Large	0,27	0,31	0,11[(Δ)]	0,42	0,56	0,69	-0,08[(Δ)]	0.13[(Δ)]
2 Construction	Total w/o Micro	0,30	0,38	0,25	0,43	0,38	0,34	0,12	0,18
3 Trade	1 Micro	0,14	0,37	0,28	0,25	0,24	0,25	0,01	0.06[(Δ)]
3 Trade	2 Small	0,36	0,45	0,29	0,45	0,34	0,45	0,38	0,20
3 Trade	3 Medium	0,37	0,48	0,10	0,40	0,40	0,43	0,50	0,36
3 Trade	4 Large	0,42	0,39	0,04	0,31	0,41	0,20	0,88	0,21
3 Trade	Total w/o Micro	0,37	0,45	0,20	0,43	0,35	0,45	0,44	0,27

(1) Correlation coefficients relate to year 2013.
(Δ) Correlation coefficients are not significantly different from 0 at the 95% threshold.

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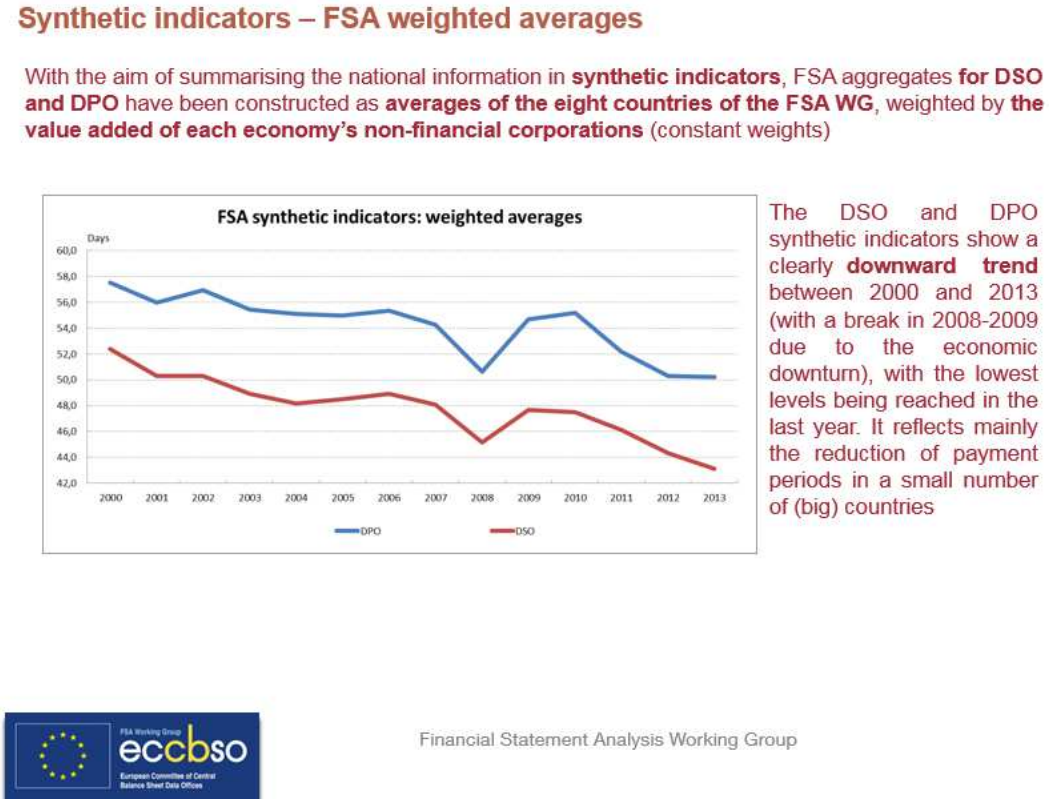
Slide 24 Correlations at the firm level

Correlation coefficients between DPO and DSO have also been calculated at the firm level for each country, sector and size class, in order to establish how enterprises adjust DPO to changes in DSO at the individual level.

In almost all cases, the correlations are positive, generally ranging from 0.20 to 0.40. The correlation at the firm level therefore remains positive, but is markedly lower than at the country level.

On the one hand, the expected positive link is present in the data as, logically, companies should, at least to some extent, match their DPO and DSO. However, the relatively low correlation indicates that there are many other factors influencing both variables, e.g. commercial policies, bargaining power, or sectorial differences. Negative correlations can be observed too in a few cases, but they are rarely significantly different from zero.

Sector-specific features can also be observed, especially the markedly lower correlations in retail trade, highlighting the disconnection between both sides of trade credit channel in that branch (mostly due to customers' cash payments).



Slide 25 Synthetic indicators – FSA weighted averages

In order to summarise national data in synthetic indicators, DSO and DPO aggregate figures have been constructed using weighted averages of the eight countries' results.[17] Several tests were carried out, and it appeared that using constant weights[18] over - the weight being the national value added of non-financial corporations - was the best solution, as it makes it possible to isolate the contribution of ratios changes in each country year after year.

These FSA weighted average ratios show a clearly downward trend between 2000 and 2013 for both DSO and DPO, with the lowest levels being reached in last year of the series. This downward trend may be related to various factors such as a tendency towards better management of trade credit by firms, the impact of the European Directives[19] on Late Payments (towards a harmonisation of the payment terms), and specific national circumstances.

As regards the latter, it is noteworthy that France had the biggest impact on the downward trend, due to the application of the LME ("*Loi de modernisation de l'économie*") law since 2009, which sets mandatory maximum payment delays. When no payment period is set in the contract, the legal delay is 30 days; contractual agreements

[17] Chained values were used to deal with the problem of missing data for Poland before 2005.

[18] Calculated as the average on the period 2000-2013.

[19] Directive 2000/35/EU and Directive 2011/7/EU, both of them relate to late payment in the EU members.

are allowed, with a maximum term of 45 calendar days from the end of the month or 60 calendar days from the date when the invoice was issued.

Maximum payment delays were imposed in Spain too, but only in 2013, when the Late Payment directive was transposed. In this country, when parties have not agreed on a payment period, the delay is set at 30 days after the receipt of goods or services in business-to-business transactions. In case of contractual agreement, the payment period cannot exceed 60 calendar days. In business-to-government transactions, the payment term is set at 30 days.

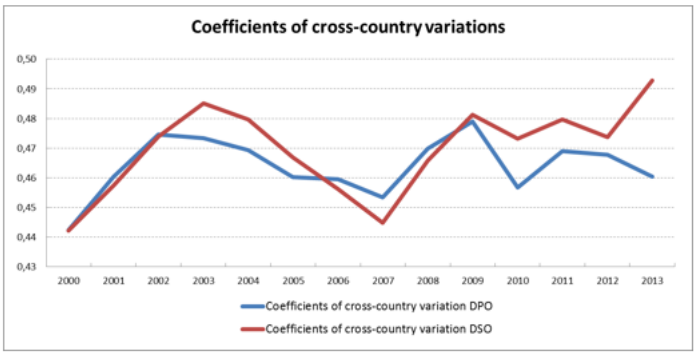
In other countries, national laws are less strict, especially for business-to-business transactions, for which contractual agreements exceeding the legal payment term are usually allowed provided they are not grossly unfair to the creditor.

Finally, a break can be seen between 2007 and 2010 as a direct result of the economic downturn, which led to a temporary increase in the DSO and DPO figures in some countries (mainly Spain, Portugal and Turkey) during the crisis.

Synthetic indicators - Cross-country variations

To measure the **dispersion** of DSO and DPO of the individual countries around the FSA averages, **coefficients of variation were calculated too**

These weighted cross-country **coefficients of variation** are calculated as the weighted (by the respective value added of non-financial corporations) **standard deviation** of DSO/DPO across countries divided by the FSA synthetic indicator

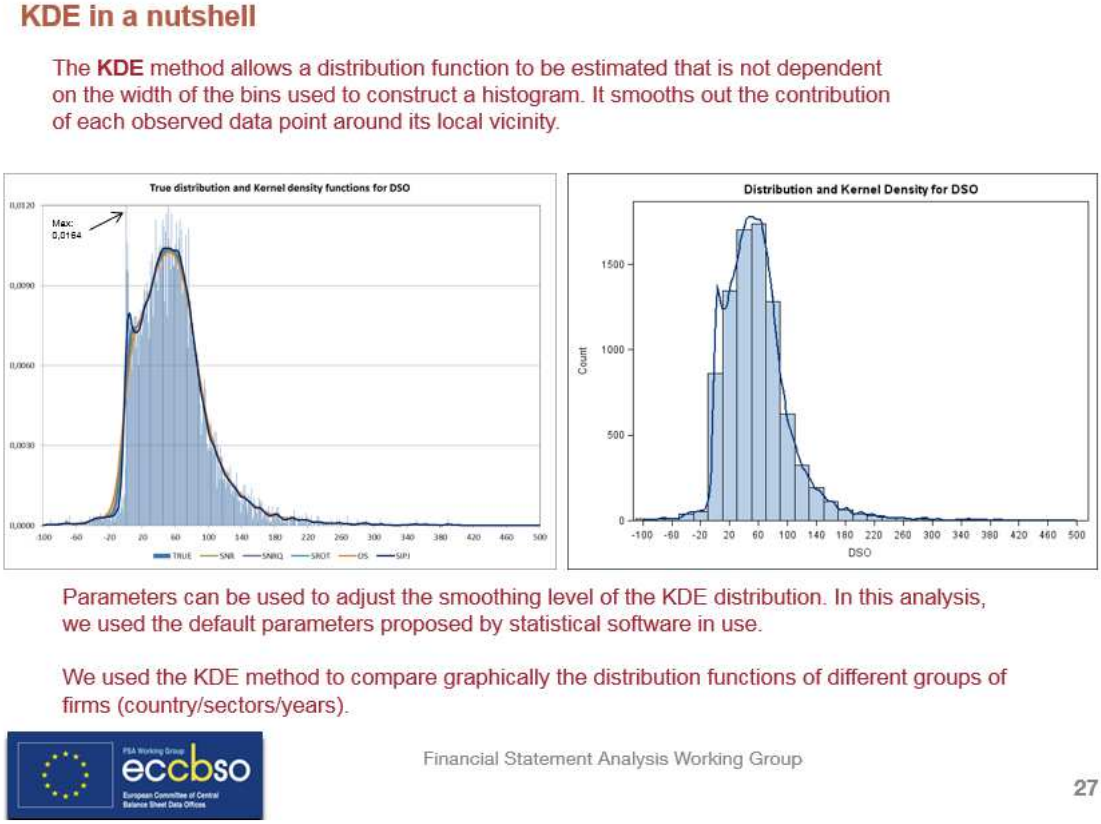


After 2007, a trend has been observed towards an **increase in the heterogeneity in the national behaviour** of customer--collection and supplier-payment periods, **due to probable substantial differences in the macroeconomic consequences of the crisis**

Slide 26 Synthetic indicators - Cross-country variations

Additionally, to measure the dispersion of DSO and DPO of the individual countries around the synthetic weighted means, coefficients of variation were calculated. These cross-country coefficients of variation are calculated as the weighted (by the value added of non-financial corporations) standard deviation of DSO and DPO across countries divided by the synthetic weighted mean. This indicator is used to describe developments in the heterogeneity of DSO and DPO in the countries studied.

What can be concluded is that, since the outbreak of the financial crisis in 2008, a tendency has been observed towards an increased heterogeneity in the national behaviours of customer-collection and supplier-payment periods, likely due to substantial differences in the macroeconomic consequences of the crisis. As a result, at the end of the period under analysis, both synthetic indicators of dispersion in DSO and DPO reached, overall, to above pre-crisis levels of divergence.



Slide 27 KDE in a nutshell

Kernel estimators are used to tackle the disadvantages of histograms. Constructing a histogram implies considering the width of the bins (i.e. sub-intervals in which the whole data interval is divided) and the end points of these bins (where each bin starts and ends). However, even if the bins are narrow, histograms are not smooth.

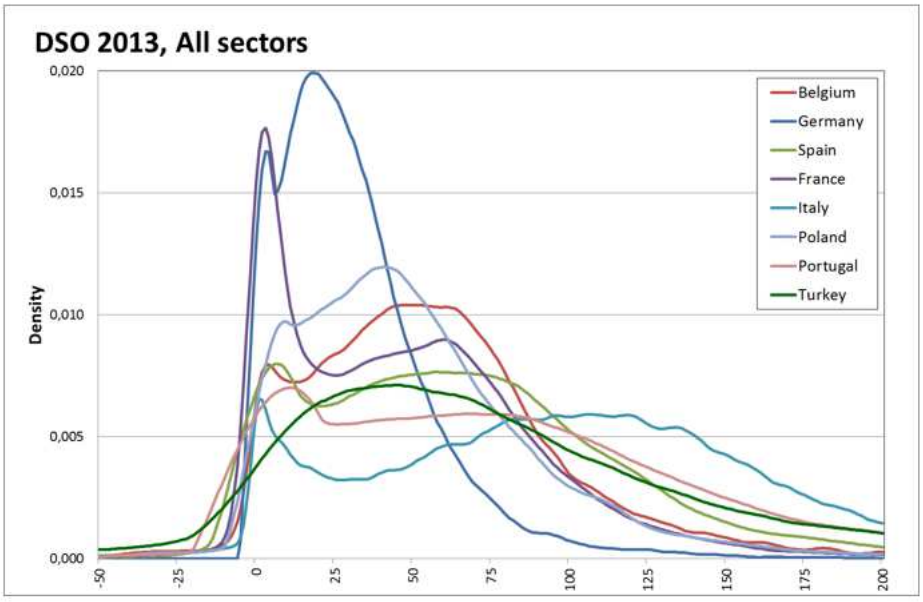
The KDE method makes it possible to estimate a full distribution function, which is independent from the width of the bins used to construct a histogram. The estimate smooths out the contribution of each observed data point around its local neighbourhood (kernel principle). The profile of the distribution function obtained is smoother and allows graphical comparison between groups of firms.

Parameters can be used to adjust the smoothing level of the KDE distribution.[20] It is up to the investigator to examine the results that seem inherently reasonable. In this analysis, the FSA WG chose to use the default parameter proposed by the statistical software used by each institution, which in most cases gave the most satisfactory results.

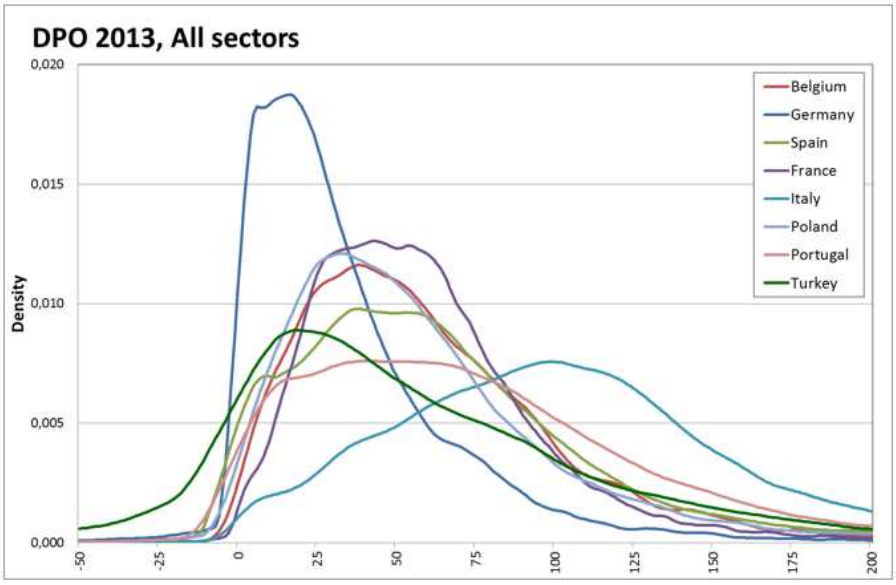
The results obtained from KDE are discussed in the following slides, by country, by sector and over time.

[20] Two parameters can be used to adjust the smoothing power of a KDE distribution: the method used to compute the bandwidth, and a multiplier. For technical explanations, see Barnes and al (http://www2.sas.com/proceedings/sugi26/p176-26.pdf).

KDE distributions, by country



KDE distributions, by country



Slides 28 and 29 KDE distributions, by country

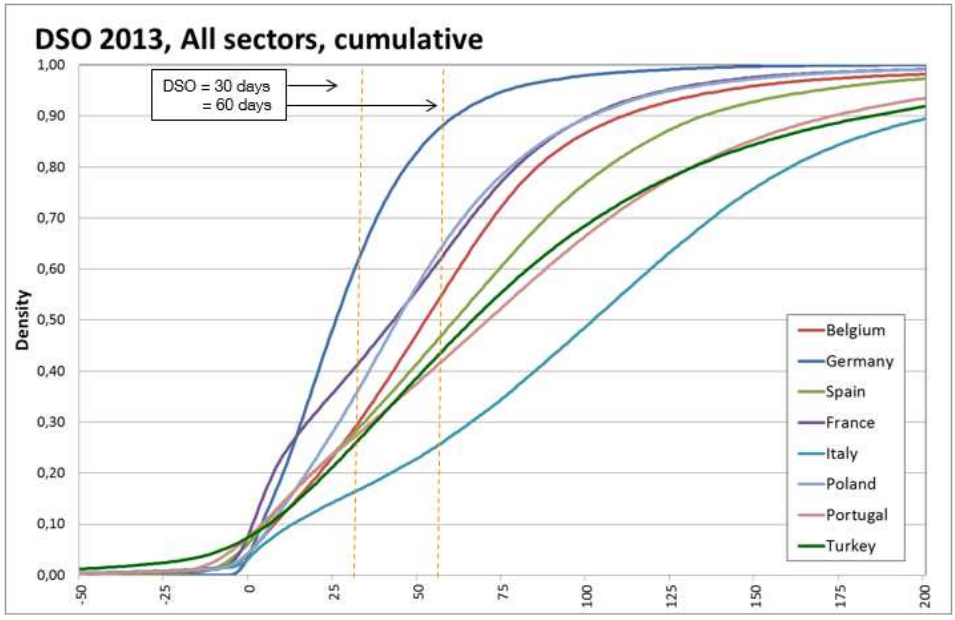
As in the case of the weighted average results, Germany and Italy present KDE functions somewhat different from those of the other countries, which present more similar behaviour for both DSO and DPO.

The German KDE functions are more left-hand sided than those of the other countries. By contrast, Italy presents flatter and right-hand sided DPO and DSO density functions, which means that firms' payment behaviours differ widely. More than one company in three pays trade debts or collects trade credit after 120 days or later in Italy, while two firms in three have DSO and DPO values lower than 40 days in Germany.

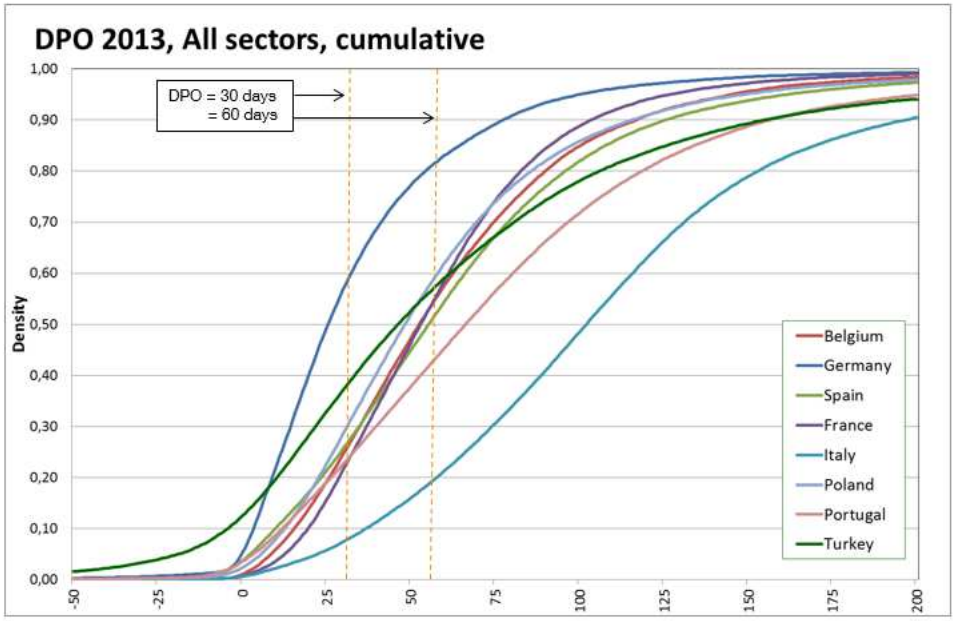
The DSO KDE distributions present two peaks in nearly every country. The first peak is probably due to cash trading (particularly in the retail trade), and the second one to commercial legislation or to differences in commercial practices, which may vary from country to country. For Germany, the DPO function is located to the left of the DSO function, which means that companies generally pay their invoices before they collect payments. The opposite is the case in the other countries.

Note that the DPO's denominator for Turkey is the cost of goods sold (this implies a broader definition than the concept of "purchases" used for the other countries), so that the results for this indicator might be not directly comparable with those observed in the other countries

Cumulated KDE distributions, by country



Cumulated KDE distributions, by country



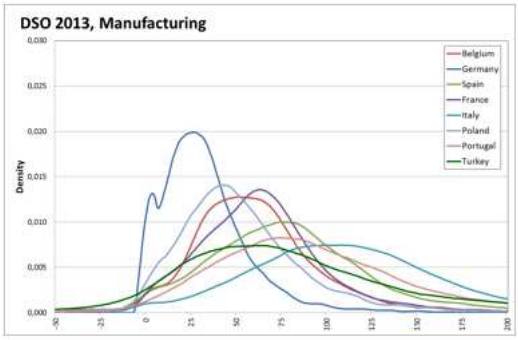
Slides 30 and 31 Cumulated KDE distributions, by country

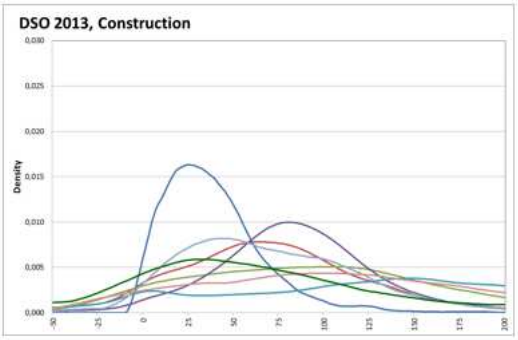
KDE distributions can also be presented in cumulative form. If the comparison of the cumulative KDE functions essentially leads to the same conclusions as above, they can easily be used to rank countries for a specific DSO or DPO value. For example, as illustrated on the slides one can see that 28% of the Italian firms have DSO levels of less than 60 days, vs 89% in Germany. The other countries rank between 44% in Portugal and 67% in Poland.

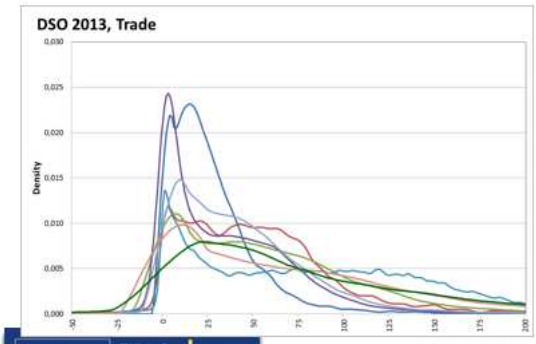
Cumulated DPO distributions are more concentrated than DSO ones for the same 60 day term. As usual, Italy and Germany record the most extreme values, but in the other countries, 45% to 62% of the firms record DPO values of less than 60 days; this share is between 55% and 62% in five out of the eight countries.

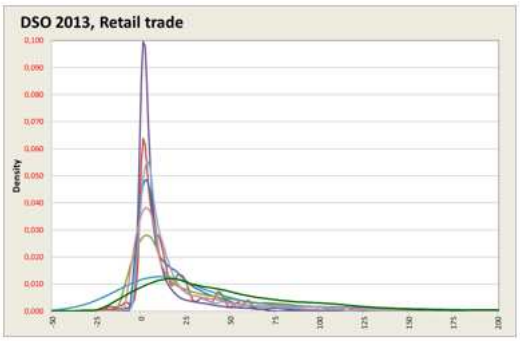
The right side of the distribution shows that the share of companies with DSO and DPO values lower than 200 days is close to 100% in countries such as Germany, France Poland, Belgium and Spain. However, some countries record a relatively large number of firms with DSO or DPO values higher than 200 days, like Portugal (6% of the total number of observations for DSO and 5% for DPO), Turkey (7% for DSO observations) and Italy (9% of the firms for both DSO and DPO).

KDE distributions, by country and sector









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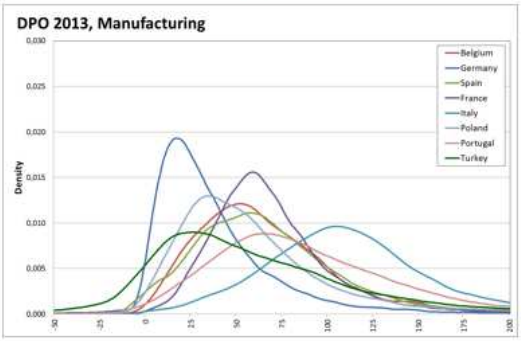
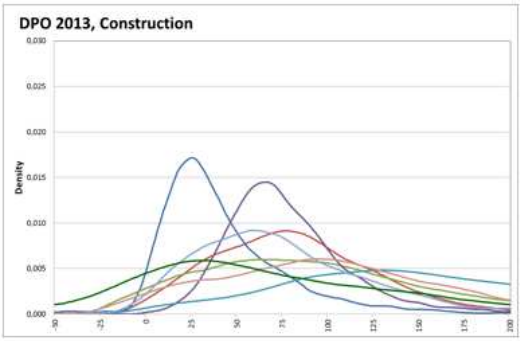
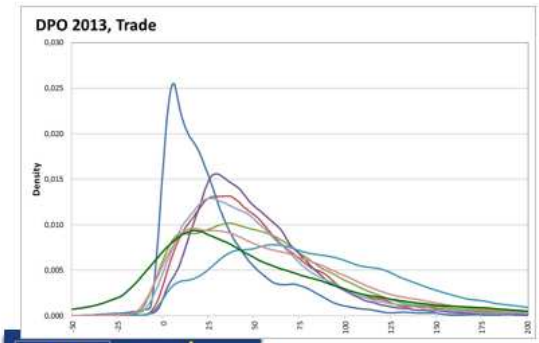
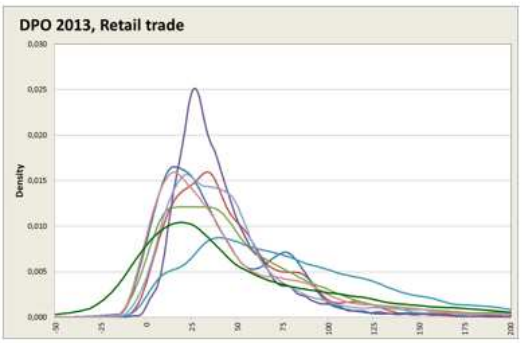
KDE distributions, by country and sector









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Slides 32 and 33 KDE distributions, by country and sector

As the database structure (i.e. the breakdown of the national samples by activity) may affect the results, sectorial KDE distributions were also analysed.

Although DSO and DPO patterns of countries remain the same when analysing sectors (with more left-hand sided functions for Germany and more right-hand sided ones for Italy), some other interesting conclusions can be inferred from the sectorial results.

In general, all the countries present functions that are more left-hand sided for trade and (flatter and) more right-hand sided for construction

As expected, DSO payment periods are shorter in the trade sector, with a peak around zero in most countries, corresponding to the large volume of cash sales in the retail trade. France can be seen to have the largest share of firms with very short payment terms: 28% of firms have DSO values equal to 0 (cash), 1 or 2 days, while this share is less than 5% in Italy and Turkey.

All the countries present flatter density curves for construction, suggesting longer DSO periods in a large number of firms. Only Germany presents a distinctive (more left-hand sided) behaviour, but this is less pronounced than in manufacturing or trade. Note that some construction firms record negative DSO figures. As construction firms frequently work on long-term contracts, they require prepayments or scheduled payments for work in progress and the numerator of their DSO ratio can even be negative.

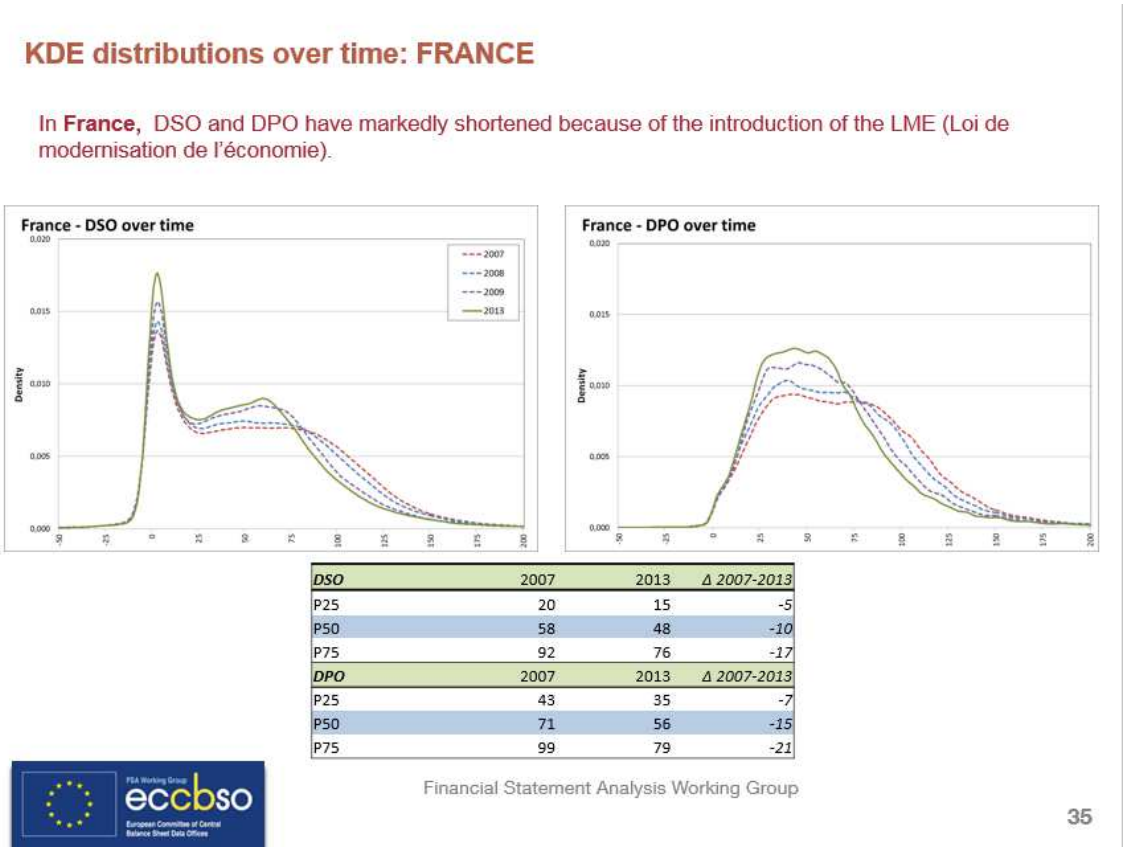
The profiles of the KDE distributions for manufacturing vary widely from one country to another.

Slide 34 Extreme values in DSO and DPO ratios: Turkish case study

Even after excluding outliers, some firms show very high or very low DSO or DPO ratios. Turkish colleagues investigated the reasons for this by holding one-to-one interviews. From this investigation, it appeared that these companies show some similarities in terms of the structure of their businesses.

For construction companies, accounting differences or interim payment problems can result in extreme ratios.

For the manufacturing sector, long-term manufacturing process (especially in the shipbuilding subsector of other transport equipment) and working with international orders are the key issues for having extreme DSO and/or DPO values.
Trade companies related to long-term energy investments and machine trade can show outlier movements. The interesting cases here are some sub-group companies and trade companies working with dealers.



Slide 35 KDE distribution over time: France

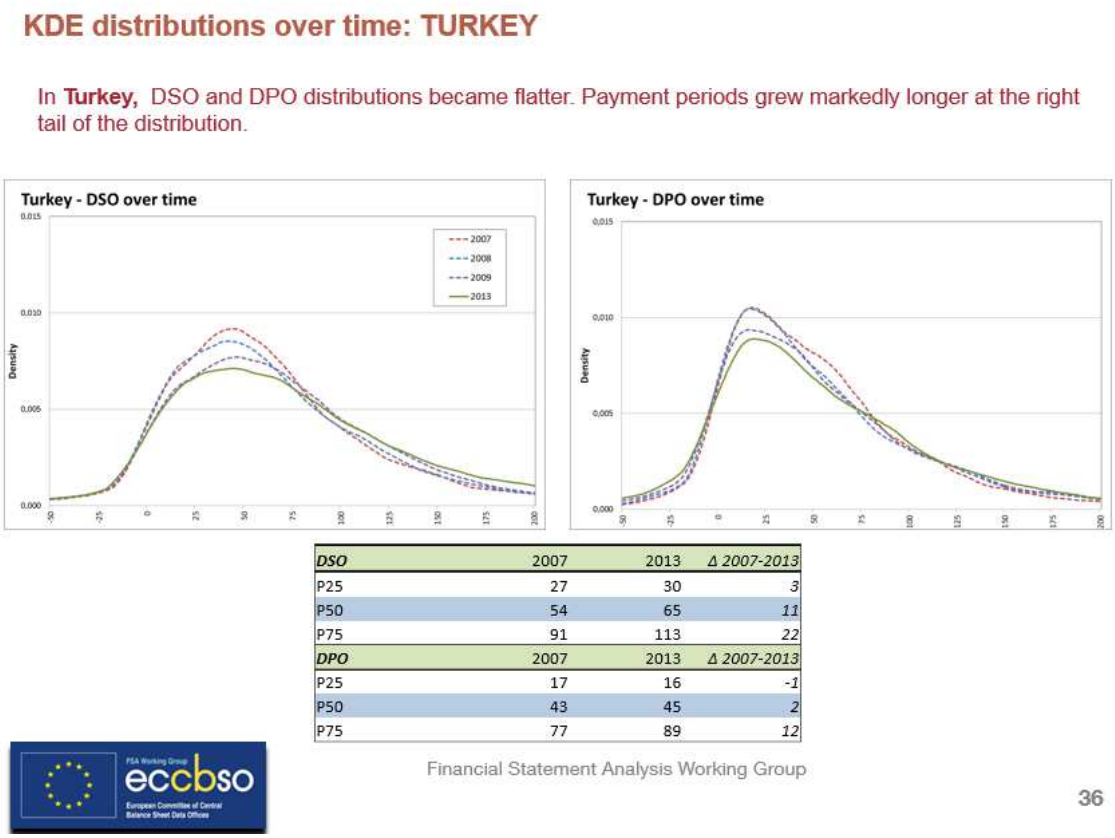
It is frequently said that DSO and DPO indicators are structural in nature as they are shaped by long-run determinants (such as, *inter alia*, the legal framework, commercial/business practices, the economy's sectorial composition or demography of firms) and that short-term changes are small.

One question that arises is whether the financial crisis in 2008/2009 had changed the DSO and DPO distributions significantly. For the purpose of this analysis, KDE graphs have been plotted for the years 2007, 2008, 2009 and the most recent year 2013 for every country. It appears that changes in the distributions have been quite limited, except in France and Turkey.

Changes in percentile values between 2007 and 2013, in days

DSO	Belgium	Germany	Spain	France	Italy	Poland	Portugal	Turkey
P25	-6	-3	-2	-5	0	-1	0	3
P50	-6	-4	-4	-10	-2	2	-1	11
P75	-6	-4	-7	-17	2	4	-3	22
DPO	Belgium	Germany	Spain	France	Italy	Poland	Portugal	Turkey
P25	-5	-4	-2	-7	-6	-4	-2	-1
P50	-6	-6	-5	-15	-5	-4	-6	2
P75	-7	-8	-6	-21	-1	-4	-12	12

Strict payment delays were applied in France since the introduction of the LME (loi de modernisation des enterprises) legislation in 2009, so that no payment delays longer than 60 days are authorised in business-to business transactions (even if exceptions exist for road transport of goods for example where deadlines for payment are 30 days). The payment delays for transactions with public authorities are even shorter (30 days)[21]. The change in the legal framework markedly improved payment delays for French companies: the median value decreased by 10 days for DSO and by 15 days for DPO. At the upper tail of the distribution, the decrease was even larger, with a shortening of the payment delays of close to 20 days for percentile 75.



DSO	2007	2013	Δ 2007-2013
P25	27	30	3
P50	54	65	11
P75	91	113	22
DPO	2007	2013	Δ 2007-2013
P25	17	16	-1
P50	43	45	2
P75	77	89	12

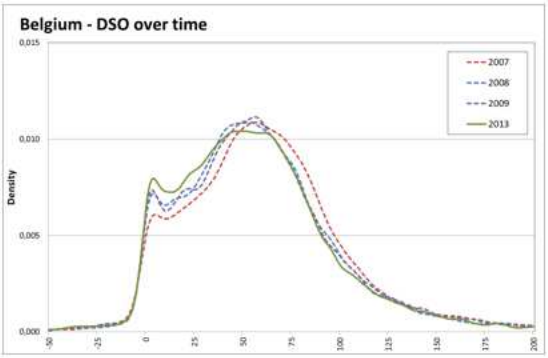
Slide 36 KDE distribution over time: Turkey

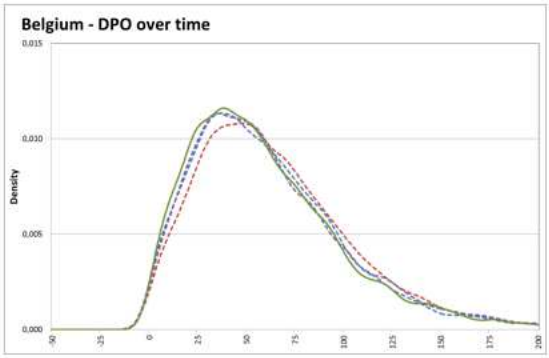
In Turkey, increased payment delays were recorded for a large share of firms in 2013 compared to pre-crisis levels. In 2007, half of the firms recorded DSO values of a maximum of 54 days. In 2013, the median amounted to 65 days in 2013 (+11 days). The increase totalled 22 days for the P75 value. DPO levels also increased, but less markedly.

[21] Except for hospital sector where deadlines for payment are 50 days

KDE distributions over time: BELGIUM

In **Belgium,** the differences over time are small. We can only observe a slight change in the KDE distributions to the left, indicating a shortening of the payment periods.





DSO	2007	2013	*Δ 2007-2013*
P25	33	27	*-6*
P50	58	52	*-6*
P75	84	78	*-6*
DPO	2007	2013	*Δ 2007-2013*
P25	36	31	-5
P50	59	53	*-6*
P75	89	82	-7

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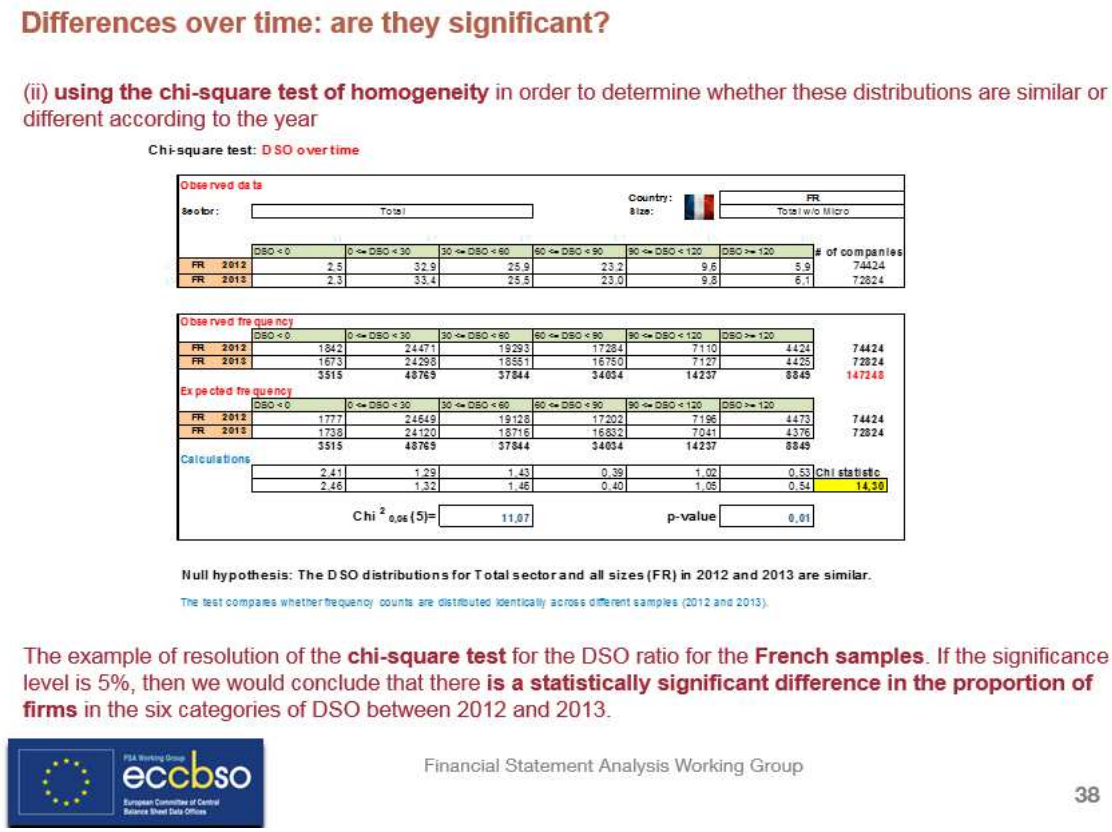
Slide 37 KDE distribution over time: Belgium

In Belgium, both DSO and DPO became slightly shorter between 2007 and 2013: overall DSO and DPO distributions moved to the left, which can be also seen in the decrease in the P25, P50 and P75 values (-5 to 6 days).



Slide 38 Differences over time: are they significant?

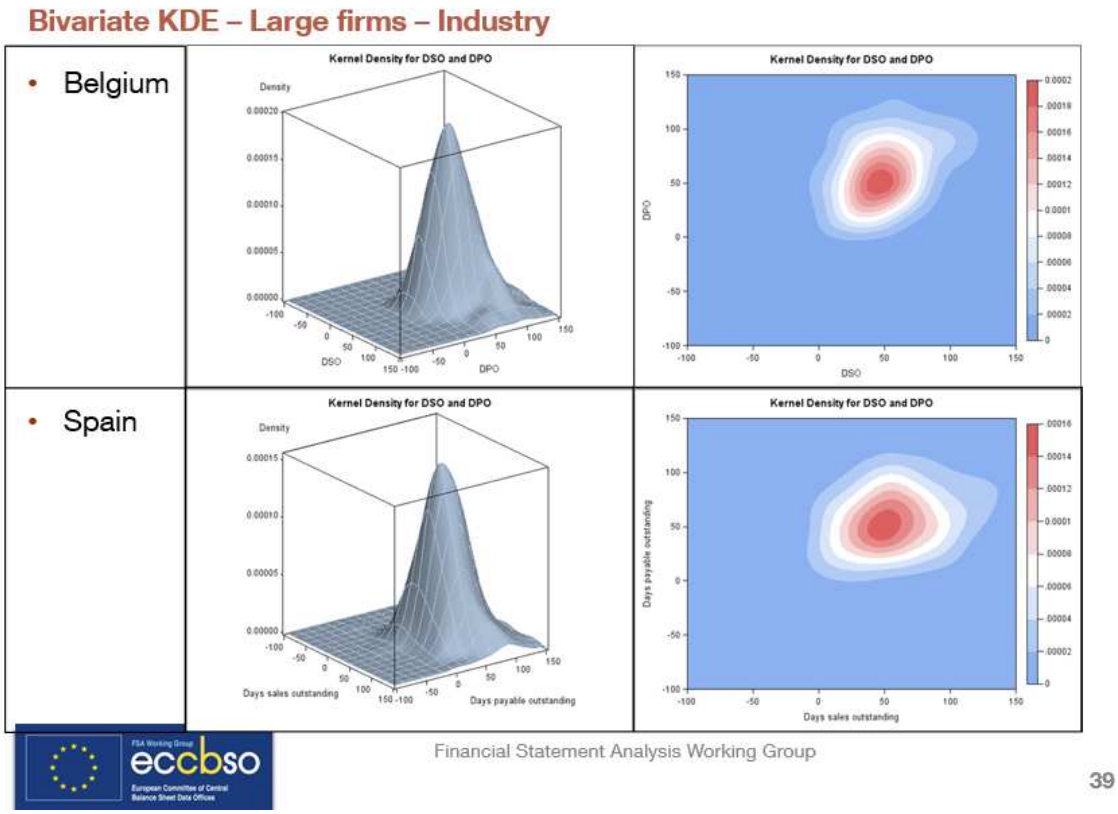
A comparison of the 2001-2013 distributions of DSO and DPO for each national sample based on the chi-squared test offers empirical evidence of the changes over time in both variables. The comparison of the DSO and DPO distributions are not based on the KDE functions for this calculation, but on the true distributions of value by six DSO/DPO levels (negative values; from 0 to 30 days; from 30 to 60 days; from 60 to 120 days; more than 120 days).

The slide compares the 2012 and 2013 DSO distributions for France. The p-value for the chi-square test concludes that there is a statistically significant difference between 2012 and 2013.

Generally the results suggest significant changes in the distributions over time. Cases where the difference is not significant mostly relate to years close to one another. However, these differences are nowhere near as strong as the differences between countries.

With regards to DSO, the dominant feature is the heterogeneity over time of most national samples, suggesting the existence of several underlying factors modifying European firms' patterns in trade credit collection periods over recent years. Nevertheless, there were some exceptions, such as Germany and Belgium, which have showed more relative stability in this indicator's pattern in the post-crisis period.

The DPO ratios also progressed similarly. Most of the national samples have pointed to statistically significant differences in their compositions in terms of the categories of DPO between two subsequent years. These results could have been determined by different disrupting factors, such as the use of trade credit as an alternative financing channel during the crisis, the inclusion of the European Directive on Late Payment or the idiosyncratic shocks which have affected some countries or sectors of activity during the crisis.

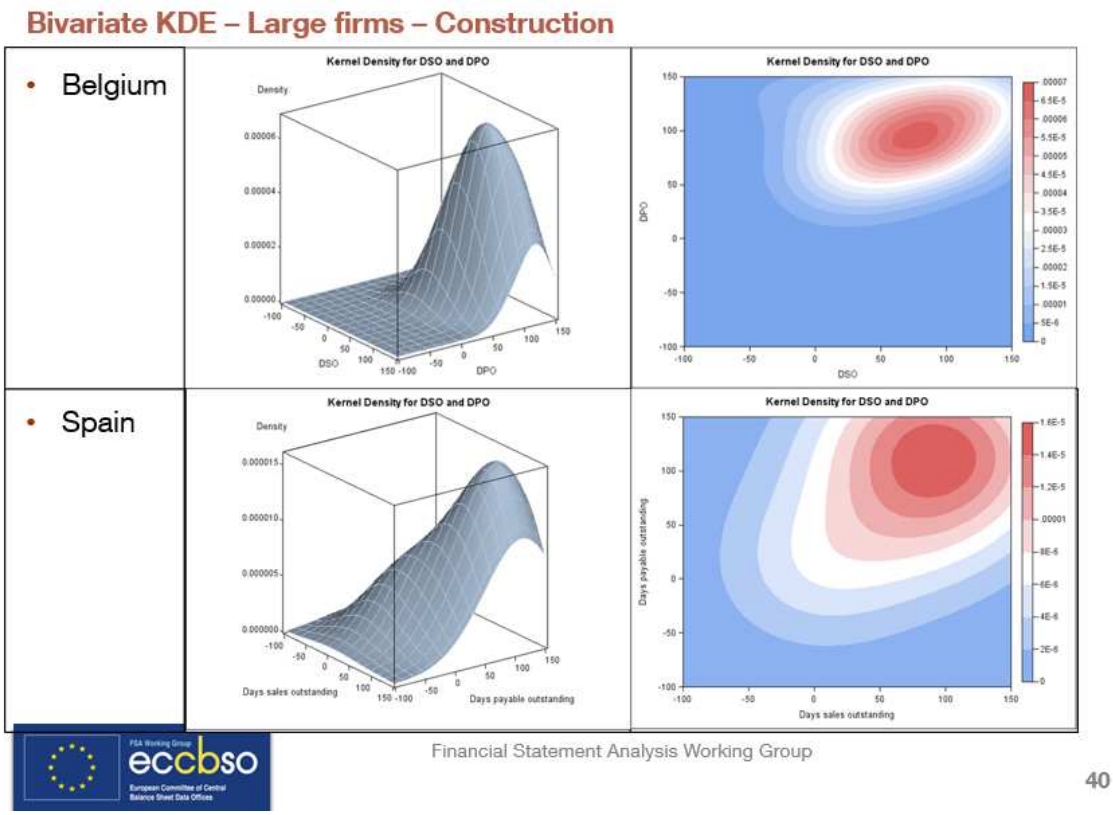


Slide 39 Bivariate KDE – Belgium – Large firms - Industry

During its study the group also ran bivariate kernel density estimations (KDEs), which are a generalisation of the univariate kernel densities presented in the previous slides. The advantage of bivariate KDE is, of course, that it combines two variables on a single graph. Moreover, the results can be plotted in the form of contour lines, like a topographic map. Contour lines are isodensity lines showing peaks and valleys as well as the steepness of the slopes.

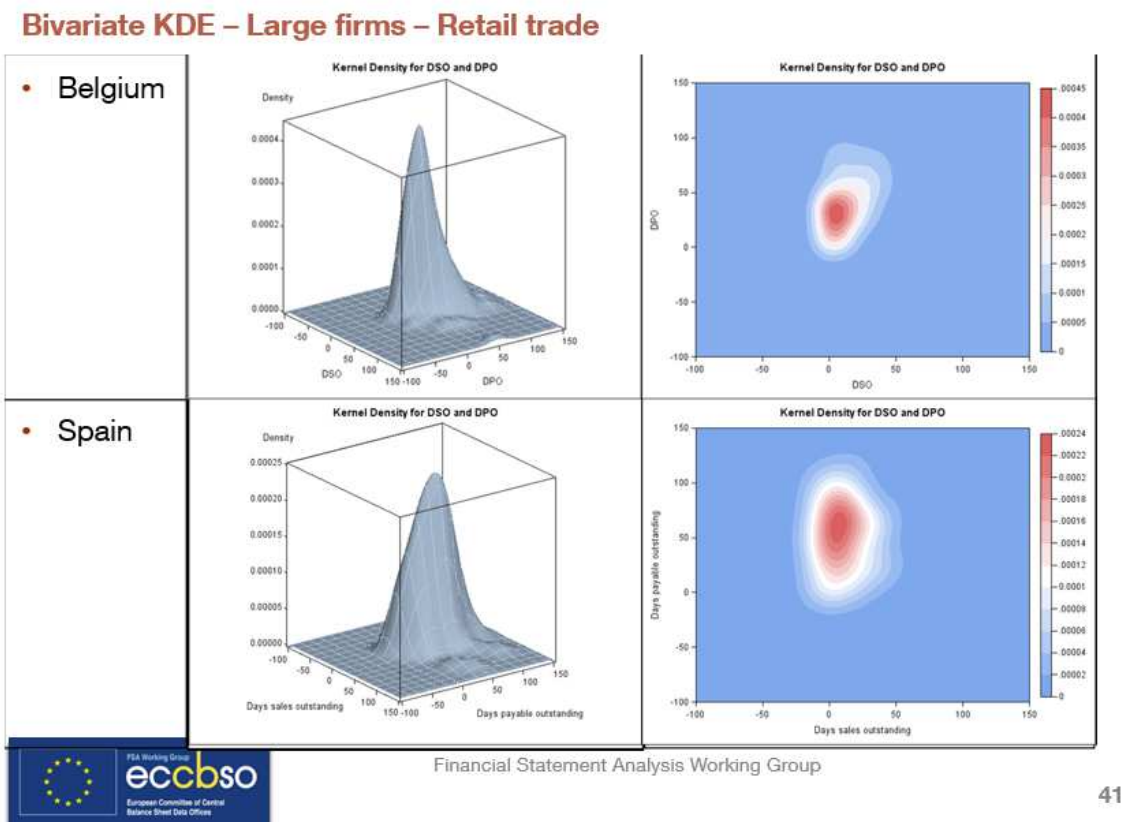
This slide and the next two show some results for DSO and DPO figures in the case of Belgium.

The present slide shows a first bivariate KDE for large firms in industry. It appears that the highest point of the distribution is around 50 days for both variables, and that the whole distribution is very concentrated around that peak, with a slight exception for some companies with high DPO's, for which we can see a higher dispersion, but to quite a small extent.



Slide 40 Bivariate KDE – Belgium – Large firms - Construction

This slide presents the results for large construction firms, and highlights some of the specific features of the sector. First, the peak is higher than for manufacturing firms, for both DSO and DPO. Second, there is a wider variety of behaviours than in manufacturing, as the contour lines appear to be more scattered. These differences reflect features of the construction sector, such as a longer operating cycle than in other branches, which implies longer terms for both payables and receivables. Moreover, the sector offers a variety of activities, ranging from finishing off works to civil engineering, aimed at a variety of customers, from private persons to large private firms or to public authorities. Finally, one can also see that the higher the DSO, the higher the DPO.



Slide 41 Bivariate KDE – Belgium – Large firms – Retail trade

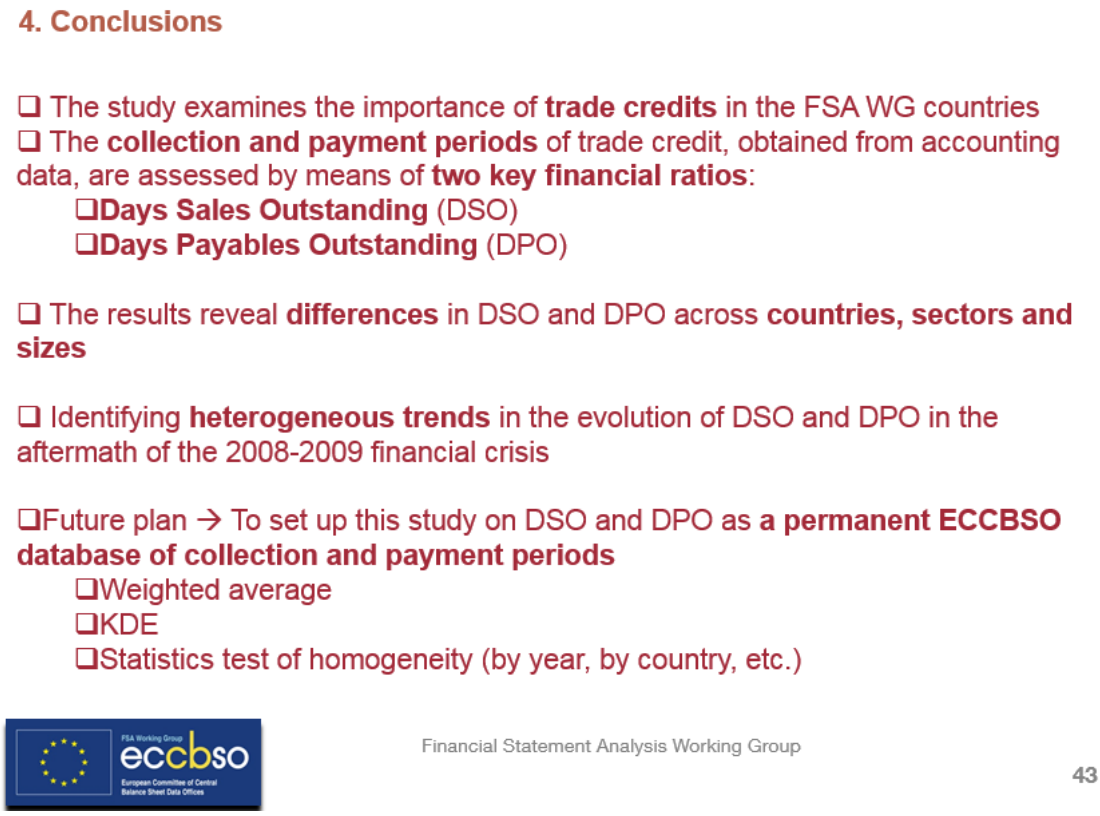
Finally, this slide shows the bivariate chart for large retail firms. Compared with other sectors, this is the most concentrated bivariate distribution, with DSOs close to zero in many cases and DPOs concentrated around 30 days.

But one can see that there is more variability in the case of DPO, which can reach up to 100 days, whereas the variability is more limited in the case of DSO. This difference in variability between the two variables can be explained by the fact that all retail trade firms tend to receive their money early, because they sell mostly to households for cash, whereas on the other hand the behaviour regarding DPO is more diverse, because of different business-to-business relationships.

As a conclusion regarding bivariate KDEs, it is clearly interesting to combine two dimensions in one chart in order to contrast DPO figures with DSO figures. Nevertheless, while bivariate KDEs are quite appealing from a graphical point of view, they are not always easy to interpret.

OUTLINE

1. Introduction
2. Data sources and methodology
3. Empirical results
4. Conclusions



Slide 43 Concluding remarks

Trade credits play a major role in companies' financing. The outstanding amount of this type of financing received by European firms averages close to 30% of GDP and has been relatively stable in recent years. In spite of this magnitude, this topic has frequently played only a secondary role in the analysis and the statistical information in the past. This study aims to offer insights into the behaviour of trade credits in the member countries of the ECCBSO Financial Statements Analysis Working Group, i.e. Belgium, Germany, Spain, France, Italy, Poland, Portugal and Turkey.

Our study examines how firms finance themselves through the trade credit channel using granular accounting data from FSA WG countries. By means of two key financial ratios: Days Sales Outstanding (DSO) and Days Payables Outstanding (DPO). The study identifies differences in DSO and DPO figures between countries (due to different payment traditions, legal environments, corporate structures or different commercial negotiating policies), sizes (the larger the size, the lower the DSO and DPO) and sectors (DSO and DPO are lower in trade sector and longer in construction sector).

The use of synthetic indicators, to summarise the national information by building averages weighted by the value added of non-financial corporations in each economy, shows the FSA average DSO and DPO to be on a clear downward trend with a sharp break in 2008-2009, reaching its lowest levels in 2013. However, as has been noted,

there have been some heterogeneous trends in the evolution of DSO and DPO since 2007 due to substantial differences in the macroeconomic consequences of the crisis.

FSA WG makes use of the large datasets from each national CBSO and access to data at firm level. This granularity in the information enables a detailed understanding of the characterisation of payment behaviour among European firms, using Kernel Density Estimation, which is very useful as a means of making graphical comparisons between countries and sectors, and observing changes over time, including the bivariate analysis of DSO and DPO as well as the univariate analysis of each of them.

To capitalise on the efforts invested in this study, and given the importance of trade credits in the financing of companies, it would be worth establishing this study on DSO and DPO as a permanent ECCBSO database of collection and payment periods.

ANNEX NATIONAL DATA SOURCES

Belgium

The Belgian CBSO was created in 1978 within the National Bank of Belgium. Almost all companies incorporated under Belgian law have to publish their financial statements and, where applicable, their consolidated group statements. Nearly all financial statements are now filed on-line using the XBRL standard. They are entirely public and can be consulted free of charge on the Bank's website by anyone who is interested. For the financial year 2013, the database includes more than 345,000 accounts from non-financial companies. Most companies have to draw up their financial statements under Belgian GAAP in one of the two standardised formats described in the law. Large companies are obliged to use the full format, while other companies can opt for the shorter version. More than 90% of accounts are filed under the latter.[22]

Germany

The main data source of the statistical part of the CBSO of the Bundesbank is the Financial Statements Data Pool. Starting with the 1997 financial year, the pool is a voluntary facility of the Bundesbank in cooperation with institutions of the banking sector as well as other institutions with extensive financial statements data of non-financial corporations. The purpose of this facility is to bring together the data of the institutions in anonymised form. In addition, the data pool is supplemented by financial statements which the Bundesbank obtains in connection with its refinancing operations as well as publicly accessible data from public data providers. The Financial Statements Data Pool gives the Bundesbank access to over 100,000 financial statements of German companies per year for its evaluations. Measured in terms of turnover from the Federal Statistical Office's turnover tax statistics, the corporations recorded in the data pool represent about two-thirds of the business activity of German firms outside the financial sector.[23]

Spain

The CBSO of Banco de España collects annual accounts from two data sources. Starting in 1983, CBSO collects information from a sample of enterprises that collaborate on a voluntary basis (CBA). Since 1990, it has also processed annual series obtained from the Mercantile Registries (CBB/RM). The information used for this study includes data from both CBA and CBB/RM.

CBA contains mostly medium-sized and large companies operating mainly in the industrial and service sectors. The enterprises included in the data set cover a significant portion of economic activity (more than 30% of the gross value added of the non-financial corporation sector). The sample contains around 10,000 companies. It is not statistical and is biased towards large companies. The level of detail of the information of this source is quite high and there is direct contact with the companies in the filtering process.

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[22] Because of the absence of information about turnover and purchases (i.e. essential items for the computation of DPOs and DSOs) in almost all financial statements filed under the abbreviated presentation, those accounts had to be excluded from the present analysis. For more information for Belgium, see the Belgian CBSO website.

[23] For more information, see the website for the Bundesbank's Corporate financial statements statistics.

Since 1990, Spanish companies have been obliged to deposit their annual accounts with the Mercantile Registers (CBB/RM). This has led to collaboration between Banco de España and the Mercantile Registries in order to facilitate the statistical use of the annual accounts. The level of detail and the quality of the accounting information in the CBB/RM are not as high as in the CBA. Consequently, all the accounting statements are automatically filtered, without contacting the enterprises, and eventually only those reporting fully consistent data are considered. For example, in 2008, out of an initial total of 790,000 enterprises, 602,000 were included in the statistics (approximately 16% of non-financial corporations' gross value added). This sample is not statistical either and is biased towards micro and small companies.[24]

France

The main data source for the Banque de France is the FIBEN Companies Database (*Fichier Bancaire des Entreprises*) which, besides a selected set of financial statements data transmitted by the companies themselves, collects information from a variety of other sources, including journals of legal notices, registrars of commercial courts, France's national statistical office (INSEE) and credit institutions. It was originally set up to facilitate the implementation of monetary policy, but is now used for other purposes as well, such as banking supervision, individual diagnosis, risk assessment of company failure, as well as for portfolio and other analysis. The database included 291,000 companies for the last fiscal year.

The FIBEN database includes legal entities and natural persons that are domiciled or have registered offices in France. A broad range of information is gathered, including *inter alia*:

- balance sheets and profit-and-loss accounts for companies with a turnover of at least €0.75 million or companies with bank loans of at least €0.38 million;
- companies with bank loans over €25,000, requiring disclosure to the Bank's central credit register;
- information on businesses' bill payment incidents or on the personal situation of their senior managers;
- legal information pertaining to judgments handed down by a commercial or a civil court ruling over a commercial case;
- companies with economic and financial ties to legal entities or sole traders;
- *de jure* managers of the companies;
- descriptive details, such as the firm's name, legal status and NACE business code, the address of its registered offices, a list of managers and partners, details of equity ownership, etc.[25]

Italy

Although it is not a central bank, Centrale dei Bilanci (CeBi) was one of the founding members of the ECCBSO. As a private company, Centrale dei Bilanci focused on providing financial information on Italian firms to their owners, the Banca d'Italia and

[24] For more information see the CBSO website of Banco de España.

[25] For more information see the FIBEN website of Banque de France.

other commercial banks. In 2009, Centrale dei Bilanci was merged in several steps into Cerved Group spa; which is now a private company independent of its former owners. Centrale dei Bilanci, as a branch of this group, continues to work on its traditional fields, providing financial information and credit risk diagnosis for Banca d'Italia and other Italian commercial banks.

The Italian database of accounting data on an individual basis used for this study draws on two different sources:

- CeBi database: this consists of over 50,000 companies' financial statements p.a. which are collected in cooperation with the branches of associated banks. The dataset is available from 1982 onwards. Since 1996, the database has been partially (approximately 50%) updated by the Cerved Database. This sample is not representative from a statistical point of view, because it includes mostly larger Italian corporations (also collected with more details). The coverage for medium-sized and small companies is lower.
- Cerved database: this includes from 1993 financial statements deposited each year at the Chamber of Commerce by all Italian corporations (in 2015 more than 900,000 firms).
  For the purpose of this study, only firms using not simplified presentation of the financial statements were considered.[26]

Poland

Financial annual statements of non-financial enterprises are collected by the Central Statistical Office (CSO), which is a statistical institute responsible for collecting and publishing statistics on the country's economy, population and society. Data collected in accordance with the NACE Revision 2 classification are available from 2005 (data according to NACE Revision 1 are available from 1995). These data are subject to statistical confidentiality and may not be disclosed to anyone.

The survey covers entities organised in the form of commercial companies (personal and capital), civil partnerships, state-owned enterprises, co-operatives, branches of the foreign entrepreneurs, state organisational entities, and natural persons running businesses employing 10 or more people, and keeping the books (both the accounting ledgers and the revenue and expense ledgers).

The survey includes companies whose activities according to NACE Rev. 2 are classified under sections A-N and P-S (with NACE Rev.1.1. under sections A-K and M-O). The data do not cover banks, credit institutions, brokerage and insurance companies, investment and pension societies, National Investment Funds, higher education colleges, individual households in the agricultural sector, independent public healthcare centres nor cultural institutions that are legal entities.

For example, in 2014, the sample consisted of over 82,000 companies, but out of this number only about 56,000 prepared a full balance sheet and profit and loss account. The rest of the sample, i.e. about 26,000 entities, provided only selected required data. The

[26] For more information, see the website of Centrale dei Bilanci.

sample of companies available in the database for 2014 covers about 3% of total number of companies and about 57% of total number of employees.

Portugal

The Central Balance-Sheet Database (CBSD) of Banco de Portugal stores economic and financial data on Portuguese non-financial corporations based on corporate accounting data collected on an individual basis. Up to 2005[27] the information was collected through an annual survey (replied to voluntarily) and had data for around 17,500 companies per year, which corresponds to approximately 5% of the total number of non-financial corporations, 36% of the total number of employees and nearly 60% of the gross value added of non-financial corporations.

Annual data for 2006 onwards have been gathered through an innovative reporting system called "IES" – *Informação Empresarial Simplificada* (Simplified Corporate Information). IES enables electronic submission of the accounting, fiscal and statistical information that companies usually have to submit to the Ministry of Justice, the Ministry of Finance, Portuguese National Statistical Institute (INE) and the Banco de Portugal. IES allows companies to fulfil four obligations, vis-à-vis four public entities, through a single electronic submission and at a single moment in time. Almost all non-financial corporations are covered by the CBSD, with more than 300,000 corporations per year.[28]

Turkey

Turkey's Central Balance-Sheet Database (CBSD), which was used for this study, compiles the financial and non-financial data of individual real sector enterprises with positive loan balances vis-à-vis the financial sector as of year-end and aggregates these individual data by sector and size for each reporting period. Data for the entities included in the database are available for an unbroken period of three consecutive years preceding the reporting year. The process of identifying firms to include in a given year's study aims to ensure a representative sample of firms with active loan balances vis-à-vis the financial sector as of year-end of the last reporting period and of firms whose data are used for GDP calculations by the Turkish Statistical Institute in the previous year(s). Data for entities with credit relationships with banks are obtained through the banks' networks, those that do not have a credit relationship provide data individually directly to the unit. Most of the information was collected through banks as they have a reporting obligation to the Central Bank of Turkey. Companies' individual balance sheets and income statements prepared for corporation tax purposes in accordance with Turkey's Tax Procedure Law are used in the preparation of Company Accounts. The Balance Sheet Centre collects three years' risk data for around 10,000 companies per reporting period, covering approximately 35% of total loan balances and these companies' total net sales constitute 60% of total turnover of all domestic non-financial corporations.

[27] The CBSD started in 1983 and was successively enlarged. Since 1999 all sectors of economic activity have been covered (except financial activities, general government, households and extra-territorial organizations).

[28] For more information see the CBSD website of Banco de Portugal.