Title: **PAYMENTE DAYS AND ACCOUNTING STANDARDS: SPANISH CASE**

Author(/s): **Mariano González and Enrique Rúa**

Date: **October-2017**

WORKING PAPER SERIES: 3/2017

CÁTEDRA CEU-MM
Madrid (Spain)
ISSN online: 2530-0237

Payment days and accounting standards: Spanish case[1]

Mariano González Sánchez
Associate professor of accounting and finance
Business Department, Universidad CEU San Pablo
Julian Romea, 23. 28003 Madrid (Spain)
+34.914566300 (ext. 5457)
gonsan@ceu.es

Enrique Rúa Alonso de Corrales
Associate professor of accounting and finance
Business Department, Universidad CEU San Pablo
Julian Romea, 23. 28003 Madrid (Spain)
+34.914566300 (ext. 5386)
ruaalo@ceu.es

ABSTRACT

The financial literature shows a consensus on the positive relationship between the suitable management of working capital and profitability for the company and shareholders. However, this is not the case when this relationship is analyzed in terms of components of the cash conversion cycle (CCC). In this context, the EU has attempted in recent years to facilitate the financial management of companies' working capital by reducing days payable outstanding (DPO). As an EU member country, Spain has transcribed this objective through an accounting standard that obliges reporting the true DPO in financial statement notes. Thus, given the lack of consensus on the CCC effects and the empirical opportunity of the Spanish Accounting Standard (SAS), we check if the normal DPO estimation is statistically valid and if CCC effects on company profitability and shareholder wealth differ depending on the DPO estimation method. The results show that the normal DPO estimation is not statistically valid, and only when we use its true value (SAS) do we find these negative and positive effects from days sales and DPO, respectively.

KEYWORDS: cash conversion cycle, day payment outstanding, accounting standard.

JEL: G31, M41, M48.

[1] Acknowledgement: This work has been supported by the Spanish Ministry of Economics and Competitiveness through grant MINECO/FEDER ECO2015-65826-P, and Cátedra Universidad CEU San Pablo - Mutua Madrileña insurance company (grant ARMEG 060516-USPMM-01/17).

1. INTRODUCTION

A key factor of non-financial firms' financial management is working capital. Basically, working capital includes the financial resources necessary to carry out business activities and depends on how the company intervenes in the exchange of flows with commercial debtors and creditors. Therefore, the relationship between the days of delay to pay received from creditors and those granted to customers condition a company's financial policy related to its business.

There is a vast financial literature that analyzes the effects of a company's trade policy on various indicators of its financial situation. These empirical studies can be grouped, according to the objective of this paper, depending on the way of measuring the exchange of flows with commercial debtors and creditors. In first case, working capital is expressed in monetary units (among others, Lewellen et al., 1980; Emery, 1984; Ng et al., 1999; Boisjoly, 2009; Hill et al., 2010), but for second case, it is estimate in units of time or days of financing or cash conversion cycle (among others, Wang, 2002; Deloof, 2003; Lazaridis and Tryfonidis, 2006, Garcia-Teruel and Martinez-Solano, 2007; Gill et al., 2010 and Enqvist et al., 2014). Note, for this second case, that the results found are not conclusive about the effects of cash conversion cycle on both firm profitability and shareholder wealth, and the sign of the effects of cash conversion cycle components is also unclear.

However, the financial literature is not the only institution to deal with the issue of commercial credit; the EU issued a standard in 2000 (Directive 2000/35/EC) that was subsequently modified during the financial crisis through Directive 2011/7/EU. This Directive is part of the financial and accounting harmonization strategy that the European Union has been developing (see Gornik-Tomaszewski, 2005) and, it aims to prevent late payment in commercial transactions in order to ensure the proper functioning of the internal market and differences between cross-border transactions. It also seeks to promote companies' competitiveness and, particularly for SMEs, prevent abuses by large companies and public administrations.

As consequence this Directive, the Spanish Accounting Regulator issued an accounting standard (Resolution dated January 29, 2016) on the information to be included in companies' annual financial statements with respect to the average period of payment to suppliers and their estimation method. To the best of our knowledge, this accounting standard is a unique milestone that will allow us to analyze the exact average payment period rather than the approximate one.

In this context, as the empirical results of the financial literature there does not seem to be a consensus; the main objective of this work is to contribute to clarifying doubts on the effects of the cash conversion cycle, and in order to take advantage of this unique empirical occurrence in the Spanish Accounting Standard (SAS), we test if the effects on firm profitability and shareholder wealth are the same using the exact DPO or its usual proxy. In this way, we also check whether the changes in the information to be disclosed bring value to the economic agents and, thus, a national standard could be applicable for other countries.

Therefore, in the following section, the context and motivation are presented. The literature review is analyzed in section three. Section fourth presents model, variables and hypotheses to be tested. The sample is described in section five, while the sixth section presents the results. We end the paper by offering our major conclusions.

2. CONTEXT AND MOTIVATION

Directive 2011/7/EU aims to prevent late payment in commercial transactions and, this rule applies to all payments from commercial transactions, defined as the trades between companies or between companies and public authorities that give rise to the delivery of goods or the provision of services in exchange for monetary compensation. In summary, Directive 2011/7/EU seeks to discourage the payment of commercial debts beyond the agreed deferral and to reduce internal and external costs and liquidity problems as a result of default.

As Luthardt and Zimmermann (2009) show the EU is well positioned to develop legitimate accounting procedures and, this Directive is an example of this, since the EU has established a series of regulatory requirements for payment delays in commercial operations, which should have been transposed into the national regulations of each member country before March 16, 2013. With regard to the interests of this paper, we outline two important issues of this European standard:

- Negotiation of payment periods is allowed, but as a rule, it should not exceed 60 days, and if the invoice does not indicate the term, it will be 30 days. However, if one of the parties is a public administration, the period is set within 30 days and 60 days as an exception.
- Transparency in the delay of payment by the various economic operators is requested from the Member States (Article 8).

Financial Statement Analysis[2] or FSA (2017) is the most recent studies of the group relate to trade credits of European non-financial corporations. This study use accounting information drawn from financial statements from 2002-2013, in order to prepare indicators of days sales outstanding (DSO henceforth) and days payable outstanding (DPO henceforth), used as proxies for customer and supplier payment periods, respectively. The results show that a clearly downward trend between 2000 and 2013 for both DSO and DPO, as a consequence of the impact of the European Directives relate to late payment in the EU members. Regarding the local standard on late payment, FSA (2017) notes while most 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; only France and Spain laws sets mandatory maximum payment delays.

In the case of Spain, in accordance with the transparency requirements of Directive 2011/7/EU (article 8), the second final provision of Law 31/2014 of 3 December transposes the directive's transparency requirement in such a way that it requires all commercial companies to include the average period of payment to suppliers expressly in their financial statements (into notes for annual statements). For this reason, the ICAC (Instituto de Contabilidad y Auditoría de Cuentas, since Spain is a mandatory country) issued an accounting standard (Resolution dated January 29, 2016) on the information to be included in companies' annual financial statements with respect to the average period of payment to suppliers and their estimation method. As note Pajunen (2013), the change in national accounting standards (Spanish Accounting Standards) is a response of the accounting regulations to a relevant issues, which is part of the national regulatory transformation to adapt to the EU environment.

However, the ICAC should simplify the SME estimation method as much as possible because Directive 2013/34/EU of the European Parliament and of the Council on annual financial statements does not mandate the inclusion of the average period of payment to suppliers in SME reports.

Thus, the ICAC defines the average period of payment to suppliers as the period between the delivery of goods or the provision of services by the supplier and payment time or, if reliable information on supplier is not available, the receipt of the corresponding invoice. Thus, in the financial literature, Gentry et al. (1990) developed a weighted cash conversion cycle (CCC

[2] The Financial Statement Analysis (FSA) is a working group established by the central banks of the European countries: Bank of Spain, Deutsche Bundesbank, Bank of France, Bank of Italy, Narodowy Bank Poslki, Bank of Portugal, Central Bank of the Republic of Turkey and National Bank of Belgium. This working group belongs to the European Committee of Central Balance Sheet Data Offices (ECCBSO) and, only eight countries participating in the working group: Belgium, Germany, France, Italy, Poland, Portugal, Spain and Turkey.

henceforth) that scales the timing by the amount of funds in each step of the cycle. However, this measure cannot be used because not all information necessary for calculation is available. In addition, the proposed methodology is no more than a weighted average of the normal estimates of the CCC; it is not a trade-by-trade estimation in which the payment days of each commercial operation are weighted by its monetary volume.

3. LITERATURE REVIEW

Lewellen et al. (1980) analyze the effects of a company's trade policy on firm profitability and, they found that trade policy can be used to increase firm value if financial markets are imperfect. Emery (1984) argued that there is an optimal credit commercial policy that entails an optimal value of commercial debtors when the marginal activity income equals the marginal cost. Additionally, Hill et al. (2010) found a linear relationship between commercial credit and firm value and suggested that operating and financing conditions should be considered when evaluating working capital behavior, including variables such as size and market/book value.

Another empirical study analyze the effects of working capital on liquidity; thus, Ng et al. (1999) observed that commercial credit is granted by a highly liquid company to lower-liquidity companies. Boisjoly (2009) found evidence to support the hypothesis that corporations with optimal working capital management show significant cash flow improvements.

Regarding companies' financial capacity, Petersen and Rajan (1997) found empirical evidence that large firms with better access to financial markets (better ratings) offer more commercial credit. In this same line, Faulkender and Wang (2006) proved that this type of large and solvent company has fewer problems in financing its commercial activity. Accordingly, Kieschnick at al. (2013) was the first empirical study to analyze the influence of working capital management on shareholder wealth, and for a sample of US companies, they found that an increase in the client investment creates higher profitability for the shareholder than inventory investment. Additionally, they showed that the results are subject to the company's financial constraints, such as credit risk or leverage. However, using a US sample over a 30-year period between 1982 and 2011, Aktas et al. (2015) found that efficient working capital management is highly valuable, particularly in expanding investment periods. Murfin and Njoroge (2015) studied the effects of financing through commercial credit among large companies, that is, taking advantage of credit from suppliers instead of going to the capital market, and found that a delay in payment to suppliers allows these companies to increase turnover, although this has a negative effect on CAPEX (Capital Expenditure or funds used by a company to acquire or

upgrade physical assets) and liquidity, but financial capacity, according to the company's rating, increases. Finally, Filbeck et al. (2017) showed higher risk-adjusted performance measures than the S&P-500 index for companies with superior working capital management strategies, according to the classification reported by CFO Magazine.

Another research line analyzes the effect of trade policy on SMEs. Accordingly, Martínez-Sola et al. (2014) found a positive linear relationship between the investment in commercial credit and company profitability, as a result of which the benefits associated with commercial credit exceed suppliers' financing costs.

In determining how to analyze the effects of working capital management, for the purposes of this paper, we should emphasize empirical studies that have measured working capital in terms of days of financing or the so-called cash conversion cycle, which involves breaking down working capital into three components: inventory days outstanding (i.e., how many days it takes to sell the entire inventory or inventory turnover), days sales outstanding (i.e., the number of days needed to collect on sales, which involves and depends on accounts receivable) and, days payable outstanding (DPO, which involves the company's payment of its own bills or accounts payable). Thus, Wang (2002), Deloof (2003), Lazaridis and Tryfonidis (2006), Garcia-Teruel and Martinez-Solano (2007), Gill et al. (2010) and Enqvist et al. (2014) all proposed a negative relationship between CCC and corporate profitability, consistent with the view that less profitable firms wait longer to pay their bills. However, a delay in payments to the firm's suppliers increases the accounts payable cycle, which effectively decreases the length of the CCC and makes working capital more efficient.

Therefore, while Wang (2002) and Deloof (2003) found this negative effect, Lazaridis and Tryfonidis (2006) found that more profitable firms have longer accounts payable cycles; in contrast, Garcia-Teruel and Martinez-Solano (2007) found no such measurable influences for a sample of Spanish small and medium-sized enterprises (SMEs), and Gill et al. (2010) found no relationship between accounts payable and profitability. On the other hand, for a sample of Finnish companies, Enqvist et al. (2014) analyzed whether the crisis had changed the effects of working capital management and found that the efficiency of inventory management and the increase in the average collection period had a more positive effect during periods of crisis; however, in relation to the average period of payment, they found a positive relationship that decreased during the crisis period.

In summary, while the financial literature shows a clear consensus on the effects of the management of working capital on profitability, liquidity and credit risk, when the study is in

terms of CCC does not occur the same. Therefore, there is a doubt about the usefulness of the information revealed for the analysis of the effects of trade policy measured in terms of CCC.

4. EMPIRICAL MODEL, VARIABLES AND HYPOTHESES

As mentioned above, the SAS establishes two methods to calculate DPO; the one for large companies (DPO-a, henceforth) includes greater information requirements and increases accuracy, while the one for SMEs (DPO-b, henceforth) is simpler. These methods are described in Appendix A-1 and, while DPO-a is a weighted average by the monetary volume of each commercial transaction, DPO-b is a simple arithmetic mean of the initial and final values from the balance sheet.

In this context, this paper aims to analyze the DPO since we have true data for large companies for the first time, and we test two hypotheses:

- Hypothesis-1 (*H1*): *is the normal approximation in the financial literature (DPO-b) a good DPO-a estimator?*
- Hypothesis-2 (*H2*): If, as indicated in the financial literature above, commercial credit and therefore working capital or CCC is an explanatory factor of a company's profitability and shareholder wealth, *which of the two DPO estimates is a better explanatory factor?*

To test these hypotheses, the variables used are defined in Appendix A-2. The empirical model, to test the hypotheses, is described in Appendix A-3.

5. DATA COLLECTION

The SAS on DPO is applicable to financial account statements beginning on January 1, 2015. Therefore, the first fiscal year audited after that date is our sample time period.

Additionally, in order to estimate the DPO by both methods, the sample consists of large Spanish non-financial listed firms, which guarantees that financial accounting statements are homogenized because they are all subject to the IFRS (International Financial Report Standard). Then, because the normal accounting databases, such as COMPUSTAT, SABI (Sistema de Análisis de Balances Ibérico) and others, do not have an item to report the DPO required for Spanish companies in their financial statement notes, we must look for the DPO value within the financial statements for each firm, and to avoid the asymmetry resulting from obtaining accounting information from different sources, the other necessary accounting variables are also extracted from these financial statements. For each firm, this manual data collection is conducted for the official financial statements filed in the CNMV (Comisión

Nacional del Mercado de Valores is the Spanish Security Commission) and is available on its website (http://cnmv.es). The market data (stock returns, risk-free rate and betas) are obtained from BLOOMBERG. Finally, the initial sample is composed of 116 Spanish non-financial firms, but the final sample includes 91 companies because we eliminated the companies in financial restructuring or merger processes.

In Appendix B, Table 1 shows a descriptive statistical data analysis. *DPO*, *DI* and *DSO* are expressed in fractions of a year, so that they are comparable with the other variables that have been estimated for this time measurement, such as *return* or *ROA*. First, note that the highest *DPOa* is 104 days (0.2849), in excess of the limit set by European regulations; additionally, note that *DPOb* is higher than *DPOa* for most companies, so the root mean squared error is 63.34 days.

In Appendix B, Table 2 shows the correlation matrix. The correlation between shareholder wealth (*return*) and company profitability is 50%. Another relevant finding is that, while *DI* and *DSO* show correlations of the same sign – in contrast to the three measures of profitability – *DPOa* and *DPOb* have correlations with different signs for each measure of profitability and return, although the correlation between the two is positive.

6. RESULTS

6.1. Hypothesis tests

From the previous analyses of correlations, the interest in the result for the first hypothesis increases (relationship between *DPOa* or exact estimation and, *DPOb* or usual proxy). In Appendix C, Table 3 shows the results of the proposed model estimates by cross-section. Clearly, the first hypothesis is rejected; therefore, the relationship between the exact DPO and its proxy is significant only at the 5% confidence level but far from the expected value (1) at 0.018; in contrast, the *DSO* proxy shows higher significance (1%) and a weight of 0.0304.

Now, we test the second hypothesis on the effects of CCC components on shareholder wealth. In Appendix C, Table 4 shows a similar goodness of fit of the model when using exact *DPO* or its proxy. However, when analyzing the effect of the DPO on shareholder risk-adjusted wealth, we observed that the effect is statistically significant at 5% but with a different sign, the *DPOa* is positive, while its proxy (*DPOb*) is negative. In addition, we observed a *DSO* effect that is negative but significant only with *DPOa*.

The results for the effects of CCC components on *ROA* and *ROI* are shown in Appendix C, Table 5 and Table 6, respectively. The effects on *ROA* and *ROI* are similar; only *DSO* shows a

statistically significant negative effect. Additionally, as might be expected, the fixed assets control variable (*FA*) shows a negative effect on firm profitability.

In summary, it seems clear that the *DPO* proxy is not equivalent to the exact *DPO* and that replacing one with another entails divergence in the effects of CCC components on shareholder wealth and company profitability. Therefore, we propose a robustness test in the next subsection.

4.2. Robustness test

In order to determine the sensitivity of DPO approach to its exact value, we designed a simulated experiment which is described in Appendix D-1. We first assign a behavior (probability distribution) to each variable involved in the DPO estimation and then simulate one by one keeping the rest constant. All the results of the simulations are in Appendix D-2 Table 7, but we highlight the following:

- Variations in the amount of each trade operation do not have a significant effect on explaining the difference between the exact DPO and its proxy.
- Increases in the average number of days that the payment to commercial creditors is delayed mean that the difference between the exact DPO and its proxy decreases. However, because the EU regulation aims to limit the deferral to 60 days and even reduce it, this variable cannot be used to reduce the difference.
- If the average rate of unpaid trading at fiscal year-end increases, the degree of fit – but not the reduction in the difference between the two DPO estimates – is higher. This finding is logical because the pending operations are the initial and final stocks – from which the proxy of the DPO is estimated.
- Finally, only if the average rate of commercial transactions carried out and paid during the fiscal year increases with respect to the rate of pending paid transactions does the difference between the two estimates decrease and even become zero.

7. CONCLUSIONS

While there is a consensus in the financial literature regarding the positive relationship between suitable working capital management and firm profitability or shareholder wealth, this is not the case with respect to the effects of its temporal expression or CCC. Given the lack of clear empirical evidence on the sign of the effects of CCC components (days sales outstanding, DPO and days inventory) and the occasional empirical advantage of the SAS, which requires reporting the exact DPO, this paper examines, on one hand, whether the DPO

proxy has statistical validity and, on the other hand, the signs of the CCC components and whether the result differs when using the exact DPO or its proxy.

As the financial literature notes, suitable working capital management consists of a reduction in days sales outstanding and/or days inventory and an increase in DPO, which improve both firm profitability and shareholder wealth. The results obtained for a sample of Spanish non-financial listed companies show that this premise is fulfilled only for the exact DPO and not for the proxy normally used in the analysis of financial statements.

Therefore, the results show that increases in days sales outstanding imply a reduction in shareholder wealth, which will be passed on to commercial debtors, while increases in DPO suppose a shareholder wealth increase, which will be deducted from trade creditors. This multiple effect with different signs is not observed when the proxy of payment days is used; in this case, only a negative joint effect is obtained. With regard to company profitability, exact and proxy DPO were not significant and only the days sales outstanding component of the CCC showed a negative effect.

To analyze the robustness of the results outside the sample, we performed a Monte Carlo experiment on the behavior of the variables involved in estimating DPO. The results indicate that only if the average rate of the number of commercial transactions performed and paid during the fiscal year is higher than that of the operations pending payment at year end will the error of the calculation approach of the DPO decrease.

In short, an accounting standard for reporting the exact days sales and payment outstanding can provide relevant information on the optimal management of working capital and could allow economic agents to make sound decisions with this information instead of the usual proxy estimation. Therefore, our empirical evidence indicates that a change in accounting standards that required disclosure of accurate estimates of CCC components adds value to investors, analysts, and other economic agents. From an accounting perspective, it allows to replace a still photo from balance sheet by the true dynamics of the business activity of the company, which would doubtless reduce the gap between the cash principle and the accrual principle. In addition, given the difference observed between the two methods of estimation of the DPO, it is advisable, in order to achieve higher transparency and business competitiveness, that accounting standards require a review by the auditor of the estimate disclosed in the notes to the financial statements.

APPENDIX A-1: Methods of estimating DPO

The SAS considers two methods:

a) Method for large companies: this is a more realistic estimation method because *DPO* is a weighted average of the delay days (*d*) by the amount deferred (*q*) for each commercial operation (*i*), distinguishing between *n* operations settled (*p*) and *m* operations pending payment (*np*), and the *n*+*m* total commercial operations during the fiscal year:

$$DPO_a = \frac{\sum_{i=1}^{m} d_i^{np} \cdot q_i^{np} + \sum_{i=1}^{n} d_i^{p} \cdot q_i^{p}}{\sum_{i=1}^{m} q_i^{np} + \sum_{i=1}^{n} q_i^{p}} = \frac{\sum_{i=1}^{m+n} d_i \cdot q_i}{\sum_{i=1}^{m+n} q_i} = \frac{\sum_{i=1}^{m+n} d_i \cdot q_i}{Q} \quad (1)$$

b) Method for SMEs: this is the normal approach used by researchers and analysts, where *S* is the value of the commercial creditors according to the balance sheet at the end of the sequential fiscal years *t*-1 and *t*; and *G* is the expenses for net purchases of goods and the provision of services included in the income statement for fiscal year *t.*

$$DPO_b = 365 \cdot \frac{\frac{S_t + S_{t-1}}{2}}{G} = \frac{\frac{S_t + S_{t-1}}{182.5}}{G} \quad (2)$$

Thus, the first method reflects a volume-weighted accounts payable value, while the second method is the normal approach that takes neither volume nor other factors, such as business seasonality, into account. To obtain the same result using both estimation methods, it is necessary that

$$\begin{matrix} \sum_{i=1}^{m+n} d_i \cdot q_i = \frac{S_t + S_{t-1}}{182.5} \\ Q = G \end{matrix} \quad (3)$$

Clearly, (3) is not fulfilled, since, for example, *Q* includes the initial value of the unsettled transactions from the previous fiscal year, while *G* excludes the change in inventory value, that is, while *Q* follows a cash principle, *G* follows the accrual.

APPENDIX A-2: Variable

We define the following variables, grouped into categories:

- Dependent variables: The dependent variable for the first hypothesis is defined as *DPOa*, estimated according to expression (1) for each company. In the second hypothesis, we use two measures of firm profitability: *ROA*, or return on assets, defined as the ratio of Net Operating Profit After Taxes (*NOPAT*) to total Assets (*A*); and *ROI*, or return on operating investment, defined as the ratio of *NOPAT* to fixed assets (*F*) and working capital (*WC*). Moreover, in the second hypothesis, to analyze shareholders' risk-adjusted wealth, we defined the ratio of the stock return (*R*) excess on the risk-free rate (Rf) to the stock beta (β).
- Independent variables: For the first hypothesis, the independent variable is defined as *DPOb*, estimated according to expression (2) for each company. For the second hypothesis, the independent variables are *DPOa* or *DPOb*. Additionally, we include the rest of the CCC components estimated by the normal procedure, i.e., days inventory (*DI*) and days sales outstanding (*DSO*).
- Control variables: As the revised literature notes, we must include certain control variables that capture companies' particular financial constraints, such as growth (*G*) or the change rate of net turnover, the size or logarithm of total assets (*LnA*), debt or the ratio of debt to the market value of equity (*D*), and the ratio of fixed assets to total assets (*FA*).

APPENDIX A-3: Empirical model

The proposed model to estimate the first hypothesis (*H1*) is

$$\begin{aligned} &j = 1,...,J \ firms \\ &DPOa_j = \alpha_0 + \alpha_1 \cdot DPOb_j + \alpha_2 \cdot DI_j + \alpha_3 \cdot DSO_j + \gamma_1 \cdot G_j + \gamma_2 \cdot LnA_j + \gamma_3 \cdot D_i + \gamma_4 \cdot FA_j + \varepsilon_j \end{aligned} \quad (4)$$

Where we express the *H1* as $\alpha_1 - 1 = 0$. Therefore, not rejecting *H1* assumes that the exact DPO estimate can be replaced by its proxy.

Subsequently, we test the second hypothesis with the following two expressions, one for each DPO estimation method:

$$\begin{aligned} &j = 1,...,J \ firms \\ &k = 1,2,3 \\ &y_{k,j} = \lambda_{a,0} + \lambda_{a,1} \cdot DPOa_j + \lambda_{a,2} \cdot DI_j + \lambda_{a,3} \cdot DSO_j + \delta_{a,1} \cdot G_j + \delta_{a,2} \cdot LnA_j + \delta_{a,3} \cdot D_i + \delta_{a,4} \cdot FA_j + \xi_{a,j} \\ &y_{k,j} = \lambda_{b,0} + \lambda_{b,1} \cdot DPOb_j + \lambda_{b,2} \cdot DI_j + \lambda_{b,3} \cdot DSO_j + \delta_{b,1} \cdot G_j + \delta_{b,2} \cdot LnA_j + \delta_{b,3} \cdot D_i + \delta_{b,4} \cdot FA_j + \xi_{b,j} \end{aligned} \quad (5)$$

Where both expressions are estimated for three different dependent variables:

$$\begin{aligned} &j = 1,...,J \ firms \\ &y_{1,j} = \frac{NOPAT_j}{A_j} \\ &y_{2,j} = \frac{NOPAT_j}{F_j + WC_j} \\ &y_{3,j} = \frac{R_j - Rf}{\beta_j} \end{aligned} \quad (6)$$

Thus, since only the value of DPO differs in each pair of estimates, we select the DPO value whose model has the highest degree of adjustment as the most explanatory value, and we then check the effect sign of each CCC component.

APPENDIX B: Statistical summary of data

Table 1. Data descriptive statistical analysis

Variables	Mean	Std. Dev.	Max	Min	Quantile-1	Quantile-3
return	0.0035	0.0473	0.1185	-0.2141	-0.0070	0.0222
ROA	0.0375	0.0848	0.2984	-0.1559	-0.0052	0.0721
ROI	0.0574	0.1413	0.5316	-0.2715	-0.0070	0.0961
DPOa	0.1359	0.0603	0.2849	0.0027	0.0956	0.1685
DPOb	0.3054	0.4251	3.3965	0.0348	0.1094	0.3445
DI	0.1154	0.2045	1.0806	0.0000	0.0110	0.1291
DSO	0.2724	0.3907	2.1592	0.0018	0.0708	0.2856
LnA	13.3801	2.0473	18.2594	7.2130	11.6746	14.7019
G	0.0659	0.6063	2.6912	-0.9742	-0.1807	0.1273
D	2.0878	3.7367	17.3917	0.0631	0.4788	1.7766
FA	0.7100	0.2017	0.9887	0.0950	0.5907	0.8919

Table 2. Pearson correlation matrix

	return	ROA	ROI	DPOa	DPOb	DI	DSO	LnA	G	D	FA
return	1										
ROA	0.5003	1									
ROI	0.4873	0.9040	1								
DPOa	0.0980	-0.1284	-0.1112	1							
DPOb	-0.2809	-0.0819	-0.0671	0.2138	1						
DI	0.1078	0.0212	0.0291	0.0853	-0.1067	1					
DSO	-0.2379	-0.3460	-0.2291	0.2612	0.4930	0.0188	1				
LnA	0.0533	0.0712	0.0672	-0.0592	0.1019	-0.1782	-0.0789	1			
G	0.0663	0.1636	0.0957	-0.0651	0.0071	0.0141	-0.2304	-0.1446	1		
D	-0.1042	-0.1641	-0.0577	0.0835	0.0332	-0.0902	0.3322	0.0056	-0.0461	1	
FA	-0.0245	-0.1190	-0.2104	-0.0695	0.0561	-0.0942	-0.0264	0.2668	-0.0865	0.0866	1

APPENDIX C: Testing hypotheses

Table 3. Results of hypothesis nº1

variables	parameter	std. error	t-prob
Constant	0.1189**	0.0080	0.0000
DPOb	0.0180*	0.0090	0.0490
DI	0.0280	0.0280	0.3193
DSO	0.0304**	0.0112	0.0083
R^2 adjusted	8.67%		
Chi^2 test (DPOb-1=0)	8151.9 [0.0000]**		

Note: ***std. error*** are robust against heteroscedasticity and autocorrelation (HACSE)

Table 4. Results of hypothesis nº2 for shareholder wealth

variables	parameter	std. error	t-prob	parameter	std. error	t-prob
Constant	-0.0253	0.0382	0.5095	-0.0149	0.0363	0.6815
DPOa	0.1286*	0.0615	0.0396			
DPOb				-0.0264*	0.0130	0.0447
DI	0.0248	0.0247	0.3182	0.0218	0.0246	0.3789
DSO	-0.0324*	0.0142	0.0257	-0.0101	0.0165	0.5448
LnA	0.0016	0.0026	0.5241	0.0024	0.0026	0.3621
G	0.0016	0.0085	0.8464	0.0045	0.0086	0.6004
D	-0.0002	0.0014	0.8828	-0.0007	0.0014	0.6204
FA	-0.0060	0.0256	0.8140	-0.0051	0.0254	0.8403
R^2 adjusted	11.23%			9.75%		

Note: ***std. error*** are robust against heteroscedasticity and autocorrelation (HACSE)

Table 5. Results of hypothesis nº2 for ROA

variables	parameter	std. error	t-prob	parameter	std. error	t-prob
Constant	0,0497	0,0740	0,5036	0,0461	0,0671	0,4942
DPOa	-0,0682	0,1557	0,6626			
DPOb				0,0205	0,0202	0,3114
DI	0,0126	0,0404	0,7559	0,0156	0,0392	0,6914
DSO	-0,0637*	0,0247	0,0118	-0,0798*	0,0353	0,0265
LnA	0,0042	0,0045	0,3534	0,0037	0,0044	0,4084
G	0,0130	0,0153	0,3972	0,0107	0,0166	0,5196
D	-0,0010	0,0011	0,3694	-0,0006	0,0013	0,6574
FA	-0,0600*	0,0276	0,0329	-0,0612*	0,0288	0,0366
R^2 adjusted	14,93%			15,41%		

Note: ***std. error*** are robust against heteroscedasticity and autocorrelation (HACSE)

Table 6. Results of hypothesis nº2 for ROI

variables	parameter	std. error	t-prob	parameter	std. error	t-prob
Constant	0.1018	0.1153	0,3798	0,0860	0,1053	0,4167
DPOa	-0.1640	0.2363	0,4895			
DPOb				0,0246	0,0375	0,5134
DI	0.0286	0.0617	0,6441	0,0304	0,0590	0,6073
DSO	-0.0775*	0.0316	0,0163	-0,1000*	0,0475	0,0383
LnA	0.0087	0.0077	0,2628	0,0080	0,0076	0,2902
G	0.0093	0.0174	0,5957	0,0067	0,0194	0,7323
D	0.0017	0.0027	0,5158	0,0022	0,0027	0,4225
FA	-0.1760*	0.0854	0,0424	-0,1761*	0,0855	0,0426
R^2 adjusted		12.80%			13.18%	

Note: ***std. error*** are robust against heteroscedasticity and autocorrelation (HACSE)

APPENDIX D-1: Simulated experiment

First, we define the following variables and their behavior:

- The monetary amount of each commercial credit transaction is distributed as a cumulative normal with a mean (μ) and a standard deviation (σ).
- We assume that the number of commercial transactions paid during the fiscal year, those outstanding at the end of the year and the delay days for each commercial operation all follow a discrete Poisson distribution with different event mean rates: λ_p, λ_{np} and λ_d, respectively.

The simulation process is described below:

1. We generate N transactions paid during the year and M operations not paid at the end of the year. For this, we simulate N + M Poisson random numbers with parameters λ_p and λ_{np}, respectively.
2. For each operation simulated in step 1, we simulate its quantity from a normal distribution accumulated with parameters μ and σ. We also simulate the respective period of payment delay from a Poisson of parameter λ_d.
3. After obtaining all the simulated values, the exact DPO is calculated by applying the expression (1) and its approximation by (2).
4. The process from 1 to 3 is repeated R times.
5. Then, we perform a least squares regression for the R values obtained and check the relationship between the exact value of DPO and its approximation.
6. Finally, steps 1 to 5 are repeated but one of the parameters of the distributions is changed (*ceteris paribus*) in order to check the sensitivity of the results.

APPENDIX D-2: Results of simulated experiment

Table 7. Results of simulation

Scenarios	Parameters	slope	R^2	Chi^2 test	RMSE
1	$\lambda(p)=10$; $\lambda(np)=10$; $\lambda(d)=5$; $\mu=1$; $\sigma=0$	0.0308**	95.17%	13551.09 [0.000]	84.62
2	$\lambda(p)=1$; $\lambda(np)=10$; $\lambda(d)=60$; $\mu=1$; $\sigma=0$	0.1821**	95.50%	1691.64 [0.000]	98.71
3	$\lambda(p)=10$; $\lambda(np)=55$; $\lambda(d)=60$; $\mu=1$; $\sigma=0$	0.1968**	99.07%	3375.43 [0.000]	47.87
4	$\lambda(p)=10$; $\lambda(np)=10$; $\lambda(d)=60$; $\mu=1$; $\sigma=0$	0.3131**	95.57%	700.43 [0.000]	32.12
5	$\lambda(p)=10$; $\lambda(np)=10$; $\lambda(d)=60$; $\mu=10000$; $\sigma=5000$	0.3136**	95.43%	695.26 [0.000]	31.57
6	$\lambda(p)=10$; $\lambda(np)=10$; $\lambda(d)=120$; $\mu=1$; $\sigma=0$	0.5419**	95.67%	182.07 [0.000]	20.51
7	$\lambda(p)=10$; $\lambda(np)=1$; $\lambda(d)=60$; $\mu=1$; $\sigma=0$	0.8768**	85.11%	4.14 [0.042]	14.99
8	$\lambda(p)=55$; $\lambda(np)=10$; $\lambda(d)=60$; $\mu=1$; $\sigma=0$	1.0028**	95.76%	0.69 [0.406]	4.53

Note: ***RMSE*** is root mean squared error between DPO exact and its proxy.

REFERENCES

- Aktas, N.; Croci, E. and Petmezas, D. (2015). Is working capital management value-enhancing? Evidence from firm performance and investments. Journal of Corporate Finance, 30: 98-113.
- Boisjoly, R. (2009). The cash flow implications of managing working capital and capital investment. Journal of Business Economic Studies, 15 (1): 98–109.
- Deloof, M. (2003). Does working capital management affect profitability of Belgian firms? Journal of Business Finance & Accounting 30 (4): 573-587.
- Directive 2011/7/EU of the European Parliament and of the Council of 16 February 2011 on combating late payment in commercial transactions Text with EEA relevance. http://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32011L0007
- Emery GW, 1984. A pure financial explanation for trade credit. Journal of Financial and Quantitative Analysis 19, 271-285.
- Enqvist, J.; Graham, M. and Nikkinen, J. (2014). The impact of working capital management on firm profitability in different business cycles: Evidence from Finland. Research in International Business and Finance, 32: 36-49.
- Faulkender and Wang, 2006. Corporate Financial Policy and the Value of Cash. Journal of Finance 61, 1957-1990.
- Filbeck , G.; Zhao, X. and Knoll, R. (2017). An analysis of working capital efficiency and shareholder return. Review of Quantitative Financial and Accounting, 48: 265–288.
- Financial Statement Analysis for the European Committee of Central Balance Sheet Data Offices (2017). The use of accounting information to estimate indicators of customer and supplier payment periods. (Review date: April 25, 2017). https://www.eccbso.org/wba/pubblica/news.asp
- Garcia-Teruel, P. J. and Martinez-Solano, P. (2007). Effects of working capital management on SME Profitability. International Journal of Managerial Finance 3 (2): 164-177.
- Gentry, J.A., R. Vaidyanthan and H.W. Lee (1990). A weighted Cash Conversion Cycle. Financial Management, 19 (1): 90-99.
- Gill, A., Biger N., and Mathur, N. (2010). The relationship between working capital management and profitability: evidence from the United States. Business and Economics Journal, 10: 1-9.

- Gornik-Tomaszewski, S. (2005). Antecedents and Expected Outcomes of the New Accounting Regulation in the European Union. Research in Accounting Regulation, 18: 69-103.
- Hill, M.: Kelly, G. and Highfield, M. (2010,b). Net operating working capital behavior: a first look. Financial Management, 39 (2): 783–805.
- Kieschnick, R.; Laplante, M. and Moussawi, R. (2013). Working capital management and shareholders´ wealth. Review of Finance, 17 (5): 1827-1852.
- Lazaridis, I. and Tryfonidis, D. (2006). Relationship between working capital management and profitability of listed companies on the Athens Stock Exchange. Journal of Financial Management & Analysis 19 (1), pp. 26-35.
- Lewellen W, McConnell J, Scott J, 1980. Capital markets influences on trade credit policies. Journal of Financial Research 1, 105–13.
- Luthardt, U. and Jochen Zimmermann, J. (2009). A European view on the legitimacy of accounting procedures: Towards a deliberative-accountability framework for analysis. Research in Accounting Regulation, 21(2): 79-88.
- Martínez-Sola, C.; García-Teruel, P. and Martínez-Solano, P. (2014). Trade credit and SME profitability. Small Business Economics, 42 (3), 561-577.
- Murfin, J. and Njoroge, K. (2015) The Implicit Costs of Trade Credit Borrowing by Large Firms. Review of Financial Studies, 28 (1), 112-145.
- Ng CK, Smith JK, Smith RL, 1999. Evidence on the determinants of credit terms used in interfirm trade. Journal of Finance 54, 1109–1129.
- Pajunen, K.(2013). Changing reporting models: A summary of the experience in Finland. Research in Accounting Regulation, 25(2): 260-261.
- Petersen MA, Rajan RG, 1997. Trade credit: theories and evidence. Review of Financial Studies 10, 661-691.
- Resolución de 29 de enero de 2016, del Instituto de Contabilidad y Auditoría de Cuentas, sobre la información a incorporar en la memoria de las cuentas anuales en relación con el periodo medio de pago a proveedores en operaciones comerciales. «BOE» núm. 30, de 4 de febrero de 2016, páginas 9356 a 9361.
- Wang, Y. J. (2002). Liquidity management, operating performance and corporate value: Evidence from Japan and Taiwan. Journal of Multinational Financial Management 12 (2): 159-169.