

Assessing the Impact of Working Capital on Free Cash Flow: Evidence from Portuguese Accommodation Companies

António Borges Fernandes *

Sofia Cardim **

Jessica Ferreira ***

Lígia Pinto ****

ABSTRACT

This study analyses the impact of working capital (WC) on free cash flow (FCF) for Portuguese firms operating in Division 55 (Accommodation), a sector that is a central pillar of the national tourism industry and characterised by high capital intensity and pronounced seasonality. The empirical analysis is based on an unbalanced panel dataset of 5,744 firms, corresponding to 27,689 firm-year observations for the period 2011–2023, obtained from the SABI database. A panel data model is estimated using generalised estimating equations (GEE) with firm- and year-fixed effects to examine how changes in WC and its components influence firms' capacity to generate FCF. Twelve research hypotheses are formulated and empirically tested within a cash-flow-based valuation framework. The results show that variations in WC have a negative and statistically significant effect on FCF, indicating that increased investment in short-term operational assets constrains liquidity generation in the accommodation sector. Several components of WC are identified as significant determinants of FCF, while others do not exhibit statistically significant effects, underscoring the heterogeneous influence of short-term assets and liabilities on cash flow dynamics. The model adjustment criteria (QIC and QICC), assessed within the scope of the GEE, indicate that the estimated specification is well suited and robust, supporting the reliability of the results obtained. Although the analysis is limited to the accommodation sector, which may restrict the generalisability of the findings, the study makes an important contribution by adopting an FCF-based perspective on WC management. By focusing on liquidity generation rather than traditional profitability measures, this research enhances understanding of financial management dynamics in tourism-related firms and provides insights into firms' strategic flexibility and capacity to invest in market-facing activities.

Keywords: Accommodation sector, Financial management, Working capital and free cash flow, Panel data, Portuguese firms.

* UNIAG, Instituto Politécnico de Bragança (IPB), Bragança, Portugal. Email: antoniof@ipb.pt

** Instituto Politécnico de Bragança (IPB), Bragança, Portugal. Email: sofiacardim@ipb.pt

*** UNIAG, Instituto Politécnico de Bragança (IPB), Bragança, Portugal. Email: jessica.ferreira@ipb.pt

**** Instituto Politécnico de Bragança (IPB), Bragança, Portugal. Email: ligiapinto07@hotmail.com

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1. INTRODUCTION

Free Cash Flow (FCF) is a method used to evaluate companies or projects and to create value, based on the projection of future cash flows, updated to the current moment. FCF, therefore, represents the company's available profits that can be distributed to investors. To arrive at the FCF value, it is necessary to consider Earnings Before Interest and Taxes (EBIT), investment in fixed capital, depreciation and amortisation and the company's investment in Working Capital (WC). The need to finance the Operating Cycle (OC) reduces the income available to companies in the form of FCF, and it is essential to manage this properly to keep the company financially balanced. Although this analysis is fundamental for companies across all sectors of activity, this research will focus on the tourism sector, specifically on companies operating under Division 55 Accommodation (Portuguese Economic Activity Classification, Revision 4.0). The decision to analyse this particular group of companies is based on their significant contribution to Portuguese Gross Domestic Product and their specific characteristics (Costa & Costa, 2024). These companies are characterised by their high capital intensity, especially regarding large-scale projects, and are often subject to long payback periods (Matias et al., 2024). Recent research increasingly highlights the strategic role of liquidity and cash flow management in shaping firms' competitive behaviour and market performance, particularly in dynamic and service-oriented sectors. In addition, the sector is subject to strong seasonality, which means that cash flows are also irregular, making adequate and prudent cash management necessary. The industry is marked by strong competition (which varies across Portugal due to its high heterogeneity), leading to the need for differentiation and constant price pressure (Chambers & Cifter, 2022).

To answer the research question and validate the research hypotheses, Portuguese companies whose main activity is Division 55 Accommodation, financial data were collected from 2011 to 2023 using the Iberian Balance Sheet Analyses System (Sistema de Análise de Balanços Ibéricos, SABI), a tool provided by the Applied Research Unit in Management (UNIAG). The data was analysed using the Statistical Package for the Social Sciences (SPSS), which applied the linear regression model and compared means.

To meet the proposed objectives, this paper begins with a theoretical framework. This first section, the introduction, presents the study's objective and the main parts of the paper. The second section, literature review, aims to explain the main concepts using previous studies: the FCF method and the WC, in order to understand the relationship between these indicators, what influences them and the characterisation of the values they can assume. This is followed by the third section, which describes the methodology used throughout the work. This section analyses the Portuguese companies operating under Division 55 Accommodation, outlines the research hypotheses, and presents the sample, variables, and econometric models used. The fourth section presents the sample characterisation and the study's results. The fifth section discusses the results obtained, and the sixth section presents the main conclusions, limitations, and possible lines of future research. Despite the extensive literature on WC management, existing studies predominantly adopt an efficiency-based perspective, focusing on operational cycle optimisation through indicators such as the cash conversion cycle and its components. While this approach has generated important insights, it provides a limited understanding of how WC dynamics directly affect firms' capacity to generate FCF, particularly in capital-intensive and highly seasonal industries. As a result, the theoretical link between WC decisions and liquidity generation remains underexplored, especially in tourism-related sectors.

This study addresses this gap by adopting an FCF-based perspective and empirically examining how changes in WC and its individual components influence liquidity generation in the accommodation sector. By doing so, the paper advances existing research beyond descriptive or efficiency-oriented analyses and contributes to a more nuanced understanding of the financial management challenges faced by tourism firms.

Accordingly, this study adopts an FCF perspective rather than a traditional WC efficiency approach based on ratios such as the cash conversion cycle. The analysis focuses on how changes in WC and its components affect firms' capacity to generate FCF in the Portuguese accommodation sector.

2. LITERATURE REVIEW

Adequate and balanced financial management is one of the main requirements for a company's long-term survival and growth. The FCF method is used to support and assess this management. In addition to determining a company's financial health, this method enables measurement of its

capacity to invest in growth, highlighting the growing importance of treasury management alongside financial management. According to a report by The Association of Corporate Treasurers (2020), 85% of companies worldwide recognise treasury management as a strategic business area. This area of the company is mainly related to WC, ensuring liquidity for the company's CO. Treasury management also enables anticipation of potential shortfalls or future risks by providing immediate, real access to cash flows, balancing immediate financial stability with long-term sustainability (Wang, 2024). Recent research highlights the growing centrality of digital marketing and data-driven communication strategies in firms' competitive positioning within new media environments (Hussain & Ayob, 2023).

Digital communication through social media significantly influences consumer behaviour and purchase intentions, reinforcing its strategic relevance for firms' marketing activities (Almousa et al., 2020; Ulas, 2020).

2.1 Free cash flow method

The Discounted Cash Flow (DCF) model is a traditional company valuation model based on discounting cash flows over the years. According to Dec (2020), the number of users of this method has grown, and it is widely used by professional investors as well as less specialised users, such as clients in the retail sector. According to Ortiz (2021), the model is prevalent in financial evaluation and management. With the growing number of users interested in these areas, the model has been extended, and different approaches to it have emerged.

Regarding its objectives, the DCF model is an instrument that allows companies and projects to be valued by updating their projected future cash flows (Erb, 2020; Yaari et al., 2016). Moreover, it can also be considered a method for creating value. In terms of valuation, this model is very popular among investment companies, analysts and managers and company owners due to its simplicity of use (Dec, 2020). According to Yaari et al. (2016), the projection of past cash flows provides relevant data for estimating the value of the company and its investment projects. However, in accordance with Bancel and Tierny (2010) the model's ability to determine long-term cash flows is small and subject to errors derived from optimism about the valuation.

According to this model, the variation in company leverage does not influence the market value of companies, as it is independent of their financial structure, which is the conclusion of the study developed by Modigliani and Miller (1958). Additionally, Bancel and Tierny (2010) revealed that the model in question tends to undervalue the value of projects with greater flexibility. In

accordance with Bancel and Tierny (2010) and Berk and DeMarzo (2017) the formula to calculate FCF in company valuations is presented in Equation 1:

$$FCF = EBIT \times (1-T) + AM/DEP - CAPEX - \Delta WC \quad (1)$$

With:

EBIT \times (1-T) - Profit Before Financing Costs and Taxes (or Operating Profit).

AM/DEP - Depreciation and Amortisation for the year.

CAPEX - Investments in Fixed Capital.

ΔWC - Change in Investment in WC.

For investors or shareholders, the discount rate represents the minimum expected rate of return for an investment with a certain level of risk defined for a particular company and operation (Dobrowolski et al., 2022). Alternatively, for those who use the FCF to analyse the financial performance of an investment project, the Weighted Average Cost of Capital (WACC) reflects the price of obtaining capital (Dobrowolski et al., 2022), as it reflects the weighting of the average cost of equity and the cost of debt, through the market value of equity and the market value of debt (Bancel & Tierny, 2010).

2.2 Working Capital

The WC can be understood as the short-term capital needed to keep the business running efficiently (Berk & DeMarzo, 2017). According to Mortal (2006) WC is an indicator of a company's liquidity. As a result, WC represents financial protection for companies, thereby reducing their risk of bankruptcy (Sierpinska & Kowalik, 2021). For Akinlo (2012) the purpose of the WC is not only to overcome financial crises, but it can also be managed strategically to gain a competitive position. Berk and DeMarzo (2017) explained that the existence of WC stems from the company's need to maintain the level of its operational activity undisturbed. The WC arises from mismatches in the exploration cycle, and the company must address these shortfalls to continue operations without cash flow difficulties. According to Berk and DeMarzo (2017), Bin et al. (2019), Li et al. (2022) and Šeligová and Koštuříková (2022), the amount of WC that a company must maintain can be calculated in accordance with Equation 2.

$$WC = Current\ Assets - Current\ Liabilities \quad (2)$$

According to Desai (2021), the effective management of current assets and current liabilities plays a key role in the company's financial performance and value. WC is essential for meeting the needs related to the time lag between accounts payable, accounts receivable and the inventory conversion

period (Boisjoly et al., 2020). The WC consequently serves as a financial means to cover the exploration cycle's financial shortfalls, allowing it to continue without interruption. Within this context, the WC can assume different values.

A substantial stream of the WC management literature adopts an efficiency-based perspective, typically operationalised through dynamic indicators such as the cash conversion cycle (CCC) and its components, namely, days sales outstanding (DSO), days inventory (DI), and days payables outstanding (DPO). Seminal studies argue that shorter cash conversion cycles reflect more efficient WC management and are associated with improved firm performance (e.g., Shin & Soenen, 1998; Deloof, 2003; García-Teruel & Martínez-Solano, 2007). More recent evidence has applied this framework extensively in hospitality and tourism contexts (e.g., Chambers & Cifter, 2022), reinforcing its relevance for sectoral analysis. While this efficiency-based framework is widely adopted, it primarily emphasises operational cycle optimisation rather than the direct implications of WC dynamics for FCF generation, which motivates the alternative perspective adopted in this study.

3. METHODOLOGY

Drawing on corporate finance theory and cash flow-based valuation frameworks, this study conceptualises WC components as short-term liquidity absorbers or releasers that directly affect FCF generation. In capital-intensive, highly seasonal industries such as accommodation, these mechanisms are expected to be particularly pronounced, as firms face irregular cash inflows, long investment cycles, and greater reliance on short-term financing. This theoretical perspective underpins the formulation of the research hypotheses, which examine how changes in WC and its individual components influence FCF in the Portuguese accommodation sector.

The target population for this study is the Portuguese tertiary sector, specifically companies operating in Division 55 Accommodation (Portuguese Classification of Economic Activities, Revision 4.0). The economic and financial data needed to develop this study were collected from the System Analysis of Iberian Balance Sheets (SABI) database for the period 2011-2023. The sample comprises 5,744 companies, yielding 27,689 observations. Regarding the legal forms of the companies, the sample comprises private limited companies, sole proprietorships, public limited companies, co-operatives, and individual limited companies. In terms of company size, the

sample is unrestricted and includes all types: micro, small, medium, and large. The following research hypotheses were formulated:

- RH₁: The variation in WC has a significant impact on the determination of FCF.
- RH₂: EBIT*(1-T) has a significant impact on determining FCF.
- RH₃: The company's debts to the state have a significant impact on determining FCF.
- RH₄: The company's debt to shareholders has a significant impact on determining FCF.
- RH₅: Current bank financing has a significant impact on determining FCF.
- RH₆: Other short-term payables have a significant impact on the determination of FCF.
- RH₇: Suppliers have a significant impact on determining FCF.
- RH₈: Inventories have a significant impact on determining FCF.
- RH₉: Customers have a significant impact on determining FCF.
- RH₁₀: State debts to the company have a significant impact on determining FCF.
- RH₁₁: The debt owed to the company by shareholders has a significant impact on determining FCF.
- RH₁₂: Cash and cash equivalents have a significant impact on determining FCF.

To validate the research hypotheses, a linear model was estimated for unbalanced panel data companies (2011-2023) with fixed company and year effects. To control for unobserved heterogeneity over time at the company level, within transformation (variables centred by company) was applied, and annual dummies were included as fixed time effects. The estimation was performed using generalised estimating equations (GEE), which are appropriate for correlated/longitudinal data (Liang & Zeger, 1986). To accommodate intra-company autocorrelation, specified an AR (1) working correlation structure. The inference was based on robust standard errors; therefore, the Durbin-Watson statistic was not used, as it is not suitable for fixed-effects panel models (Drukker, 2003; Wooldridge, 2010).

4. RESULTS

The model adjustment criteria were evaluated using the quasi-likelihood under the independence model criterion (QIC) and its finite-sample correction, the corrected quasi-likelihood under the independence model criterion (QICC), calculated from the quasi-likelihood under the independence model. For the specification presented (FCF as the dependent variable and financial covariates, with annual dummies), QIC = $8.4888467918289968 \times 10^{16}$ and QICC =

$8.4888467918289488 \times 10^{16}$ were obtained. In GEE, these criteria are mainly used to compare alternative specifications estimated on the same sample, with lower values indicating better relative fit; therefore, QIC/QICC indicate that the model is considered robust.

Table 1. Linear regression model, with the dependent variable FCF and the multicollinearity diagnosis

| Model | B | Standard Erro | 95% Wald Confidence Interval | | Sig. |
|--------------|-----------|---------------|------------------------------|------------|------|
| | | | Lower | Superior | |
| (Intercepto) | 90359,922 | 27670,5438 | 36126,653 | 144593,192 | ,001 |
| Δ_WC | -,981 | ,0337 | -1,047 | -,915 | ,000 |
| EBIT*(1-Tax) | 1,858 | ,0944 | 1,673 | 2,043 | ,000 |
| State_CL | ,767 | ,3522 | ,077 | 1,458 | ,029 |
| D_S | -,018 | ,0484 | -,113 | ,077 | ,714 |
| C_B | -,050 | ,0431 | -,134 | ,035 | ,249 |
| O_C_P | -,174 | ,0733 | -,317 | -,030 | ,018 |
| Suppliers | -,513 | ,2011 | -,907 | -,119 | ,011 |
| Stocks | ,070 | ,0786 | -,084 | ,224 | ,376 |
| Customers | ,486 | ,1667 | ,159 | ,812 | ,004 |
| State_CA | -,522 | ,3934 | -1,292 | ,249 | ,185 |
| R_S | ,098 | ,0575 | -,015 | ,211 | ,089 |
| Cash | ,130 | ,0845 | -,036 | ,295 | ,125 |

Source. Own Elaboration. [Obs. Δ WC - Variation in Working Capital; EBIT*(1-Tax) - Earnings Before Interest net of tax; State_CL - State Current Liabilities; D_S - Debt to shareholders; C_B - Current borrowings; O_C_P - Other current payables – Current liabilities; State_CA - State Current Assets; R_S - Receivables from shareholders]

The results reported in Table 1 allow evaluation of the research hypotheses regarding the determinants of free cash flow (FCF). The estimated coefficients indicate that changes in working capital (ΔWC) have a negative and statistically significant effect on FCF ($\beta = -0.981$; $p < .001$), providing support for RH₁. This finding suggests that increases in net WC are associated with lower levels of FCF. Additionally, (EBIT(1-T)) reveals a positive and statistically significant impact ($\beta = 1.858$; $p < .001$), supporting RH₂. Regarding debts to the State (State_CL), a significant positive effect is observed ($\beta = 0.767$; $p = .029$), validating RH₃. In contrast, shareholder debt (D_S) and current bank financing (C_B) are not statistically significant ($p = .714$ and $p = .249$, respectively), which does not support RH₄ and RH₅. The items other current liabilities (O_C_P)

and suppliers (Suppliers) show negative and significant effects ($\beta = -0.174$; $p = .018$; $\beta = -0.513$; $p = .011$), supporting RH₆ and RH₇. Inventories (Stocks) do not show a statistically significant effect on FCF ($p = .376$), and therefore RH₈ is not supported. Customers exhibit a positive and significant effect ($\beta = 0.486$; $p = .004$), supporting RH₉. State debts to the company (State_CA) are not significant ($p = .185$), so RH₁₀ is not supported; similarly, shareholder debts to the company (R_S) show only marginal evidence ($\beta = 0.098$; $p = .089$), offering weak support for RH₁₁ at the 10% level. Finally, cash and cash equivalents (Cash) show no statistically significant effect ($p = .125$), thus not supporting RH₁₂.

The estimated model is represented by Equation 3:

$$\begin{aligned}
 \widehat{FCF}_{it} = & 90,359.922 - 0.981\Delta WC_{it} + 1.858EBIT(1 - Tax)_{it} + 0.767State_CL_{it} - \\
 & 0.018D_S_{it} - 0.050C_B_{it} - 0.174O_C_P_{it} - 0.513Suppliers_{it} + \\
 & 0.070Stocks_{it} + 0.486Customers_{it} - 0.522State_CA_{it} + 0.098R_S_{it} + \\
 & 0.130Cash_{it} + \gamma_{-t} + \varepsilon_{it}
 \end{aligned} \tag{3}$$

where i denotes the company and t the year; γ_{-t} captures year fixed effects (annual dummies), and ε_{it} is the idiosyncratic error term.

Overall, the results reveal a differentiated impact of WC components on FCF generation, indicating that not all short-term assets and liabilities contribute equally to firms' liquidity outcomes.

5. DISCUSSION

It is important to emphasise that this study adopts an FCF-based perspective rather than a conventional WC efficiency framework based on ratios such as the cash conversion cycle. This approach allows a direct assessment of how WC dynamics influence FCF generation and a company's financial flexibility.

The empirical contribution of this study lies in demonstrating that, in a highly seasonal, capital-intensive sector, WC dynamics play a central role in shaping FCF generation, thereby reinforcing the relevance of cash flow-based approaches in tourism-related industries.

The results in Table 1 show that the variation in working capital (Δ WC) is associated with a statistically significant reduction in FCF ($\beta = -0.981$; $p < .001$), which is consistent with the idea that increases in short-term operating needs tend to tie up liquidity and put pressure on FCF

generation. This interpretation is widely discussed in the WC management literature and, in an applied sense, is also emphasised in recent benchmarking reports that underscore the importance of optimising the cash conversion cycle to protect liquidity and free up cash in contexts of greater uncertainty (Morgan, 2021; PwC, 2023; Wang, 2024).

In parallel, the positive and highly significant coefficient of (EBIT(1-Tax)) ($\beta = 1.858$; $p < .001$) confirms that the ability to generate after-tax operating results is a key determinant of free cash generation, in line with the framework of FCF as a measure of resources available after operating and investment needs (Bancel & Tierny, 2010; Jensen, 1986).

At the sectoral level, recent evidence specific to the hotel industry also points to the relevance of WC efficiency drivers, reinforcing the importance of analysing its dynamics and components in accommodation companies (Sharma, 2025). Methodologically, the choice of a GEE-estimated panel model with an AR(1) structure and robust standard errors accommodates intra-company temporal dependence and heteroscedasticity, thereby increasing the reliability of statistical inference in a longitudinal context (Liang & Zeger, 1986).

It can be concluded that WC management should be viewed simultaneously as a liquidity control tool and as a strategic instrument for maximising economic value. Emphasis should be placed on balancing adequate operating liquidity with minimising negative impacts on FCF generation.

From a marketing and communication perspective, FCF generation plays a critical enabling role by shaping firms' capacity to sustain market-oriented activities, invest in brand development, and support consistent communication strategies. In service-based industries such as accommodation, liquidity constraints may directly affect marketing expenditure, digital presence, pricing communication, and the ability to engage effectively with customers and other stakeholders. By highlighting how WC dynamics influence FCF availability, this study provides insights relevant not only to financial decision-making but also to marketing strategy and communication planning, particularly in increasingly competitive, digitally mediated tourism markets.

From a managerial perspective, the results indicate that WC management should be understood as a strategic enabler rather than a purely operational or financial function. In accommodation firms, tighter control over receivables, payables, and inventory directly affects the availability of FCF, which in turn affects managers' capacity to sustain marketing investments, maintain consistent communication strategies, and allocate resources to digital and new media channels.

These findings underscore the importance of coordination between financial, marketing, and communication functions, particularly in highly seasonal contexts where liquidity constraints may limit the timing and scale of market-facing activities. By linking WC dynamics to FCF generation, the study provides actionable insights for managers seeking to balance financial discipline with competitive positioning and stakeholder engagement.

This study is subject to several limitations, namely that it focuses exclusively on companies in division 55 - Accommodation, which limits the generalisability of its conclusions to other areas of the tourism sector. To further explore this topic and improve the results, it is suggested that different sections of Division 55 - Accommodation be compared as a line of future research. For example, comparing subdivisions such as 55111 - Hotels with restaurants; 55112 - Hotels without restaurants; 55201 - Furnished tourist accommodation; 55202 - Rural tourism; 55300 - Campsites and caravan parks; 55900 - Other accommodation, or even analysing the subdivision Division 56 - Restaurants and similar establishments.

6. CONCLUSION

The FCF is a method of evaluating companies and projects that represents the income available to companies after removing expenditure on fixed assets and investment in WC. WC is a financial tool that aims to ensure the company's operational activities continue without fail, thereby constituting a financial and strategic component of management. Nevertheless, while investing in WC is necessary, doing so reduces each company's FCF.

Therefore, this study aims to understand the scale of the impact of investment in WC on the FCF of companies in the Portuguese Accommodation sector and to answer the research question: "Does WC have a significant impact on a company's FCF?".

To validate the research hypotheses, a panel data model with fixed company and year effects was developed to determine whether WC has a significant impact on FCF. After analysing the data, it was concluded that variation in WC investment has a negative, significant impact on FCF value. Beyond their financial implications, WC and FCF dynamics also play a strategic role in shaping firms' competitive positioning and market performance. Recent studies emphasise that liquidity generation capacity influences strategic flexibility, investment timing, and resilience to competitive and macroeconomic pressures, particularly in service-based and tourism-related industries (e.g., Wang, 2024; Matias et al., 2024). By linking WC decisions to FCF generation,

this study contributes to an integrated perspective that connects financial management with strategic outcomes and performance considerations, aligning with recent interdisciplinary research at the intersection of finance and strategy.

Despite the robustness of the empirical results, this study is subject to limitations that open avenues for future research. In particular, further studies could strengthen causal identification by exploiting sector-specific shock periods, such as the COVID-19 crisis, by conducting sub-sectoral analyses within Division 55, or by exploring regional heterogeneity across Portuguese tourism regions. Such extensions would allow for a deeper understanding of how WC dynamics interact with external shocks and structural differences within the accommodation sector.

Therefore, WC influences firms' FCF generation, directly affecting their liquidity and financial flexibility rather than traditional profitability measures. These findings also have implications for marketing and communication management, as firms' ability to generate FCF conditions their capacity to invest in market-facing activities and sustain coherent communication strategies.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the author(s) used ChatGPT to improve language, grammar, or structure. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

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