

A Service of

ZBW

Leibniz-Informationszentrum Wirtschaft Leibniz Information Centre for Economics

Stamatopoulos, Theodoros V.

### Article

# Cash holdings in the global hotel industry: Do managers act with bounded rationality when they cannot find optimal solutions?

**Contemporary Economics** 

**Provided in Cooperation with:** University of Finance and Management, Warsaw

*Suggested Citation:* Stamatopoulos, Theodoros V. (2022) : Cash holdings in the global hotel industry: Do managers act with bounded rationality when they cannot find optimal solutions?, Contemporary Economics, ISSN 2300-8814, University of Finance and Management in Warsaw, Faculty of Management and Finance, Warsaw, Vol. 16, Iss. 4, pp. 443-459, https://doi.org/10.5709/ce.1897-9254.493

This Version is available at: https://hdl.handle.net/10419/315552

#### Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.



https://creativecommons.org/licenses/by/4.0/

#### Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



## WWW.ECONSTOR.EU

## Cash Holdings in the Global Hotel Industry: Do Managers Act With Bounded Rationality When They Cannot Find Optimal Solutions?

Theodoros V. Stamatopoulos

#### ABSTRACT

The purpose of this paper is to contribute the relevant literature solving the puzzle of the excessive corporate cash. There are serious reasons to develop the falsifiable hypothesis "managers in the global hotel industry, act with bounded rationality in holding cash, when they cannot find optimal solutions". First, it is explained why it is logical to have deviations from the neoclassical expected utility theory, coming not to be fully rational behavior. Second, it is shown that in complex and uncertain hotel industry's environment, the decision making is better explained through the bounded rationality hypothesis (BRH), involving a search for alternatives, satisficing (satisfy + suffice), and adapting aspirations. Along with behavior-based economic theory, it seems that BRH can complete the trade-off and pecking order optimization-based models, that prevail the relevant literature, within the current economic "paradigm". From a global sample of panel data of hotel industry for the period 2001-2018, the paper detects bounded rational behavior statistically, by not rejecting the null of relevant variables' equal means in the tails of the cash distribution, and econometrically, by similarly estimated parameters to unrestricted and restricted models. Having found strong evidence in favour of the BRH for the "profitability" factor, balanced evidence for both boundedly and fully rational managers' behavior, for the "value" and "investments" factors, while, no-evidence for the BRH in the case of the "size" factor. Thus, the complementarity of optimal with Simon's satisficing solutions in the relevant cash management can benefit both investors and policy makers.

## **KEY WORDS:** cash holdings, hotel firms globally, bounded rationality hypothesis, Kuhn's paradigm, panel data econometrics.

#### JEL Classification: B4, C58, G03 G32, G34.

University of West Attica, School of Management, Economic and Social Sciences, Dept. of Accounting and Finance, Greece

#### 1. Introduction

Cash management is crucial to success in the hotel industry for many reasons. For instance, the seasonal effect on highly volatile cash flows not only influences firms with heavy leverage and exposure to interest rate risk (thereby fuelling financial constraints) but also raises uncertainty at the firm level (Gao & Grinstein, 2014). Such uncertainty, according to agency theory, is a leading driver of the behavior of chief financial officers (CFOs) who rely on cash holdings and probably against the wishes of shareholders (Opler et al., 1999). However, the high risk to firms that comes from cash flow volatility and near-zero working capital (demanding shortterm financing) could push firms to decrease current investments so as to save more cash for internal financing and (even when the agency conflicts or financial constraints are not issues) to reduce the uncertainty of future external financing (Im et al.,

Correspondence concerning this article should be addressed to: **Theodoros V. Stamatopoulos**, University of West Attica, Ancient Olive Grove, 250 Thivon & P. Ralli str., Egaleo 12241, Athens, Attica, Hellas, Greece. E-mail: stamth@uniwa.gr

Theodoros V. Stamatopoulos

#### 2017).

Precautionary theories such as the trade-off model also consider the volatility of cash flows as determining firm-specific uncertainty, which encourages managers to keep more cash holdings. Doing so generally minimizes transaction costs by either resorting to external financing or liquidating assets to carry out investments and thus reducing the risk of financing constraints (Ferreira & Vilela, 2004). The main shortcoming is the reduced return of cash. However, inefficient capital markets-due mostly to incomplete or asymmetric information between managers and investors-make external financing too expensive and force businesses to create financial slack accumulating cash. Thus, with no targeting of optimal cash holdings levels, CFOs often seem to follow the pecking-order model (Myers & Majluf, 1984). Under this model, firms are financed hierarchically: first through retained earnings, then through debt, and finally via share issuance. Such a scheme suggests that a firm's liquidity serves as a precautionary "buffer" covering the gap between investments and internal resources from retained earnings.

In a recent huge survey of Cash holdings literature Khatib et al. (2022) provide a summary of their determinants focusing on the firm-level. Their main five pillars include the corporation size, growth opportunities, leverage, liquidity substitutes and corporate governance (Weidemann, 2018). The theoretical basis is models such as the trade-off (which hypothesizes an optimal cash level as it emerges from the evaluation of cost-benefit analysis) or the pecking order (which hypothesizes cash as a result of inflows and outflows, and thus, no-optimal level) or these models focus on agency conflicts (Weidemann, 2018). The literature, spanning the period from 1947 to 2020, founding determinants with positive impact on corporate cash, the growth and investment opportunities (Opler, 1999; Ferreira & Vilela, 2004), R&D (research & development) expenditures if they face with financing frictions (Brown & Petersen, 2011), risky cash flows (Opler, 1999), credit risk (Acharya et al., 2012), lower financing deficits, longer cash conversion cycles and dividend payments (Bigelli & Sánchez-Vidal, 2012), and finally, well performed firms, more than the predicted (Opler, 1999). It is not surprising the evidence that public firms hold higher level of cash relative to private ones (Gao et al., 2013). In contrast, drivers that negatively affect cash were ascertained to be, the firms' size (Bigelli & Sánchez-Vidal, 2012), high credit rating (Opler, 1999), good cash-substitutes (such as financial leverage, net working capital, liquid assets) (Ferreira & Vilela, 2004; Ozkan & Ozkan, 2004; Bigelli & Sánchez-Vidal, 2012), capital market development, concentrated ownership and finally, institutions or legal status protecting investors (Ferreira & Vilela, 2004).

However, as far as we know, the literature has not paid yet the necessary attention to the theoretical deficiencies of optimization-based models by sufficiently explaining business data. The paper aims to fill up this gap, by showing that bounded rationality or satisficing (i.e., a portmanteau of satisfy and suffice) managers' behavior, can work as a complement to the extensively used models, and it can pretty well co-exist with them, as Simon their rapporteur, has already mentioned since 1979.

The motivation of the paper derives from the recent evidence that firms are increasing their cash holdings (Khatib et al., 2022; Kwan & Lau, 2020; Sanchez & Yordagul, 2013; Bates et al., 2009; Dittmar & Mahrt-Smith, 2007). Broadly speaking, the rise of uncertainty at the firm, country, or global level, especially after the financial crisis of 2008 (Morais & Silva, 2013) and during the current Covid-19 pandemic, invoked by "traditional finance", does not seem to be enough explanation for accumulating corporate cash, because firstly, it does not fit well the data (Subrahmanyam, 2007).

In addition, there are not only empirical but mainly theoretical reasons for which we should think "outside the box" of optimization-based neoclassical model (Harstad & Selten, 2013). Thus, the relevant explanatory theories in business economics (e.g., trade-off, pecking order, agency theory, etc) cannot avoid the criticism that economic agent behavior could deviate from micro-founded theoretical body. In this critic, the starting point is the institutionalist school of economic thought (Veblen, 1936) which is out of the scope of this paper. However, it seems that "behavioral" economics and finance, is the most influential discipline among economists in their attempt to improve the neoclassical theory to get closer to the human behavior as it can really be in everyday life, and not as it should be suggesting it by the utility maximization theory (Robb et al., 2015). Even though that the term "behavioral" is pleonasm for a theory belonging to Economics which in essence is a behavioral (and more accurately an ontological) science, in this paper for avoiding ambiguities, we use it as it is established (Thaler, 2016).

Considered as the founder of behavioral economics, Herbert A. Simon (1955, 1956) introduced bounded rationality as a modular notion, consisting of a "cognitive" (for economics) and an "environmental" (for psychology) module (Petracca, 2021). Adaptively continuing Simon (1959) showed the decision making in the "environment of organizations", as a process involving a search for alternatives, satisficing, and adapting aspiration (Harstad & Selten, 2013). Bounded rationality comes from the idea that individuals have limited rationality in making decisions within the organizations' economy they act. Limitations include cognitive capability of the human mind, agents' knowledge not only in the sense of available information but also of the ability to process it, because of probable computational intractability, as well as, availability of time to make the (optimal) decision. Criticizing fully rational Homo Economicus who ought to maximize his expected utility, Simon (1979) himself came to be assimilated to the neoclassical model when in his Nobel Prize in Economics speech (in 1978) stated "... decision makers can satisfice either by finding optimum solutions for a simplified world, or by finding satisfactory solutions for a more realistic world. Neither approach, in general, dominates the other, and both have continued to co-exist in the world of management science ... ".

There is also significant theoretical support for the bounded rationality notion from other scholars of behavioral economics such as Tversky and Kahneman (1974), Kahneman and Tversky (1979) and Kahneman (2013). They have shown the importance of cognitive human capabilities like a mental process far away of the assumed feasible from the Homo Economicus notion. They have proposed the prospect theory through which they have proven that human choices under risk appeared as bounded capabilities which are following basically mental processes. In addition, they discovered that individuals in decision making use "slow thinking system" which is compatible to fully rational behavior in simplified world, while "fast thinking system" in a complex and uncertain one, which is compatible to boundedly rational behavior in real complex and uncertain world.

Furthermore, this deviation from the neoclassical fully rational economic agent is already accepted to rebuilding macroeconomics as Vines and Wills (2020) explicitly stated "... We no longer think that this is an appropriate restriction of the macroeconomic research programme; structural economic models must be constructed alongside models of the NK-DSGE kind, in which behavior need not be fully microfounded. ..."

The rationale of the paper is founded on the development of our research hypothesis:

H1: Managers in the global hotel industry, act with bounded rationality in holding cash, when they cannot find optimal solutions.

First, its theoretical foundation starts with the acceptance that in strongly volatile and due to uncertain international tourism industry, the cash managers' preferences seem to be logical to be determined by changes of outcomes relative to a certain reference level (Wheeler, 2020; Sent, 2018). That is, they cannot usually be complete and transitive as the "ordering" condition of the expected utility theory (EUT) predicts (Neumann & Morgenstern, 1944). Second, the optimization-based models are logically expected to have poor predictive power, while, the bounded rationality hypothesis -BRH- (Simon, 1959, 1979) concerned "cognitive" and "environmental" managers' capabilities, seem to complement the EUT in the explanation of the business reality (Petracca, 2021). Third, these arguments are strengthened by recent research claiming that the complement to the neoclassical model is coming (Vines & Wills, 2020; Zhang et al, 2019; Robb et al., 2015; Harstad and Selten, 2013; Subrahmanyam, 2007), although the behavioral-based models (e.g., BRH) have not still been fully able to provide a

new "paradigm" of economics and finance in terms of Kuhn (1962). Fourth, as it will be shown in the empirical testing stage of the study, it will be offered significant evidence that is consistent with the affirmative answer of the falsifiable hypothesis H1.

Within the current economic paradigm, which even close to be but not yet overpassed, we approach (Andersen & Hepburn, 2020; Drakopoulos, Gotsis & Grimani, 2015; Kuhn, 1962) the paper's theme applying Whewell's hypothetico-deductive methodology (Snyder, 1997b). First, it is developed the aforementioned hypothesis H1 through theoretical analysis and synthesis. Second, this hypothesis is empirically tested. That is, it has been applied descriptive and inference statistics (mean comparison of the variables, of two samples in the tails of the cash distribution), along with, panel data econometric estimations for the full sample (unrestricted model) as well as for the subsets of the sample (quantile regressions).

We provide quite significant evidence supporting the developed hypothesis H1, this is, it has been found strong evidence in favor of the BRH for the profitability factor, balanced evidence for both fully and boundedly rational managers' behavior, for the value and investments factors, while, no-evidence for the BRH in the case of the size factor.

The paper contributes to the relevant literature with a triple way. First, we are conscious that the usual applied hypothetico-deductive methodology, just it aims only to "solve the puzzle" of excessive corporate cash holdings. There is no-issue to verify or falsify any theory within the current "paradigm", which shapes the "normal economic science", in the sense of Kuhn (1962). Second, recognizing that the relevant neoclassical theory offers no-optimal solutions in complex and uncertain organizational environments, we show that BRH can work as a satisficing complement. Third, this methodology has been applied to a global panel sample of the Hotel industry, which, as far as we know, is the first time used.

The rest of the paper is organized as following. In the next section we provide the flow of the theoretical arguments founding the paper. In the third section we describe the methodology used. In the fourth section is presented the empirical analysis, while in the fifth section the findings are discussed. The last sixth section refers to the concluding remarks of the paper.

#### 2. Theoretical Underpinnings

The relevant theories of firm (agency cost, tradeoff, pecking order, free cash flows, real options, etc.) presuppose idealizing conditions for the Homo Economicus model. As it has been analysed in depth by Wheeler (2020), this hypothetical agent is characterized by (a) complete information about the options available for choice, based on the agent's respective preferences; (b) perfect foresight of the consequences of choosing those options; (c) the wherewithal to solve an optimization problem identifying an option that maximizes the agent's personal utility. In total the characteristic assumption of the neoclassical economic agent is the infinite cognitive and willpower capabilities she got (Thaler, 2016). The meaning of this hypothetical economic agent has evolved since 1844, when J. S. Mill's self-interested individual aimed to maximize his personal utility, to a century later (1944), when von Neumann and Morgenstern (along with Samuelson) changed the focus of economic modelling from the field of reasonable behavior to the one of choice. However, maximizing the expected utility of any economic agent presupposes the structure of preferences through axioms in order to admit numerical representation (i.e., inequalities of mathematical expectations). This is the object of expected utility theory. Thus, Bernoulli's (1738) "expected utility hypothesis" states that (perfectly) rational agents ought to maximize expected utility, while von Neumann and Morgenstern (1944) have specified three mathematical constraints within an axiom system that, if satisfied, the preferences of this agent will maximize expected utility. These constraints are, namely, ordering, continuity, and independence. Following Wheeler (2020) in presenting an axiom system to derive expected utility theory, we consider, from probability theory, that a prospect P is simply the consequenceprobability pairs  $P = (x_1p_1, x_2p_2, ..., x_np_n)$  where  $X = (x_1, x_2, ..., x_n)$  is a mutually exclusive and exhaustive set of consequences (events) and  $p_i$ denotes the probabilities of  $x_i$  ( $p_i \ge 0$  and  $\sum_{i=1}^{n} p_i = 1$ ) . Analogous prospects could be Q and R.

Thus, the "ordering" condition states that preferences are both complete and transitive; for all prospects P and Q completeness entails that either  $P \ge Q$  or  $Q \ge P$  or both  $Q \ge P$ , written  $P \sim Q$ ; for all prospects P, Q, and R transitivity entails that if  $P \ge Q$  and  $Q \ge R$ , then  $P \ge R$ . The continuity condition states that for all prospects P, Q, and R such that  $P \ge Q$  and  $Q \ge R$ , then there is some  $p \in (0,1)$ such that  $(P, p; R, (1-p)) \sim Q$ , when (P, p; R, (1-p))is the compound prospect that yields the prospect *P* as a consequence with probability *p* or yields the prospect *R* with probability *l*-*p*. The independence condition states that for all prospects P, Q, and R, if  $P \ge Q$  then  $(P, p; R, (1-p)) \ge (Q, p; R, (1-p))$ for all *p*. Thus, if all three of these constraints hold, then there is a real-valued function  $V(\cdot)$  of the form  $V(P) = \sum_{i} (p_i \cdot u(x_i))$ , where P is a prospect and  $u(x_i)$  is is (as per von Neumann & Morgenstern) a utility function defined on the consequences' set X, such that  $P \ge Q$  if and only if  $V(P) \ge V(Q)$ . This means that if your qualitative comparative judgments of prospects satisfy all three constraints (ordering, continuity, and independence) at a given time, then, they are numerically representable by inequalities of the above real-valued functions  $[V(\cdot)]$ , yielding a logical calculus on an interval scale for determining respective consequences.

We can reasonably claim that the expected utility theory's (EUT) framework could be invalid in the highly volatile hotel industry worldwide. It is considered that a logical way of understanding managers' behavior in their uncertain organizational hotel environments is that one has been predicted by Simon's (1955, 1956, 1957, 1959, 1979) idea of satisficing stakeholders when they cannot maximize firms' utility. This means that relevant theories of cash holdings based on the restrictive Homo Economicus properties they cannot be expected to fit the data sufficiently, as it has already proven many times so far, for traditional finance theories (Subrahmanyam, 2007). In other words, we can reasonably claim that not all of von Neumann and Morgenstern's (1944) constraints apply to our case, and thus, none of these theories could be expected to satisfactory explain the variability of hotel industry cash holdings globally.

Thus, dropping the completeness or decisiveness

constraint allows an economic agent to be in a position not to prefer one option to another but still not to be indifferent to either choice. More generally, this is equivalent to our economic agent (the hotel CFO) overseeing comparison of at least a pair of alternative options. The idea of incomplete preferences has been studied extensively in the literature since Keynes and Knight in 1921 (see Wheeler, 2020). Uncertainty, information asymmetries, cognitive limitations, and poor management are some of the reasons that could justify indecision due to incomplete preferences. Due to uncertainty, detected through the high volatility of the sample's cash flows, managers' incomplete preferences could be a reason for imperfect rationality, which results in not maximizing utility. Thus, within this framework, the hotel managers worldwide seem to prefer satisficing stakeholders rather than maximizing their expected profits or

other financial targets; as a result, no firm theory

could fully explain their behavior or choices as they

are reflected in the sample's observations. The term "bounded rationality" has been defined by Herbert A. Simon (1955) as "the kind of rational behavior that is compatible with the access to information and the computational capacities that actually possessed by organisms, including man, in the kinds of environments in which such organisms exist." However, Simon was adapting the meaning of the term over time as a result of the academic debate with the economists and psychologists, at least until 1978 when he won the Nobel Prize in Economics. Considered as the founder of behavioral economics, Simon (1955, 1956) introduced bounded rationality as a modular notion, consisting of a "cognitive" (for economics) and an "environmental" (for psychology) module (Petracca, 2021). It is pivotal to be noticed that both modules of cognitive capabilities and organizational environment are essential for Simon's idea of bounded rationality. So, it is crucial to not downgrade the environmental module to that of information-processing approach to bounded rationality, that is, the individuals' information space, because it can be easily mistaken as a cognitive category, excluding the organizational or business environment from the bounded rationality term (Petracca, 2021; Mirowski and Nik-

Theodoros V. Stamatopoulos

Khah 2017; Lipman 1995). Adaptively continuing Simon (1959) has shown the decision making in the "environment of organizations", as a process involving a search for alternatives, satisficing (this is, a portmanteau of satisfy and suffice), and adapting aspiration (Harstad & Selten, 2013). Simon's bounded rationality hypothesis (BRH) refutes the neoclassical Homo Economicus assumptions: (a) the agents have well-defined preferences and unbiased beliefs and expectations and (b) they make optimal choices based on these preferences, beliefs and expectations, and equivalently they have infinite cognitive and willpower abilities (Thaler, 2016). More precisely, bounded rationality comes from the idea that individuals have limited rationality in making decisions within the organizations' economy (in terms of Simon) they act. Limitations include, (a) the cognitive capability of the human mind, (b) the agents' knowledge that it is not only the available information but also the ability to process it, given the probable computational intractability, as well as, (c) the availability of time to make the (optimal) decision. Thus, individuals proceed with a "satisficing" strategy or cognitive heuristic (in terms of psychology) which comes to searching among alternatives until an acceptable threshold is met. So, individuals' preferences are determined by changes in outcomes relative to a certain reference level (Sent, 2018), that is, they cannot usually be complete and transitive as the "ordering" condition of the EUT predicts (Neumann & Morgenstern, 1944).

It is worth noticing, that BRH a behavior-based theory is rather a complement than an opposition to optimization-based neoclassical model, as Simon himself stated in his Nobel Prize in Economics speech, in 1978, "... decision makers can satisfice either by finding optimum solutions for a simplified world, or by finding satisfactory solutions for a more realistic world. Neither approach, in general, dominates the other, and both have continued to co-exist in the world of management science..." (Simon, 1979).

The other two pillars of behavioral economics, Tversky and Kahneman, have decisively strengthened Simon's BRH starting from the attempt to criticize EUT but at the end proposing a solid behavior-based model for decision making under uncertainty the prospect theory. In the seminal paper Tversky & Kahneman (1974) showed that it isn't the emotions like hate, fear, or love, the reasons that individuals' behavior deviate from the model of rational economic agent. They have documented that "irrationality" (in neoclassical terms) is due to a human mental process which is incompatible to that of the Homo Economicus. Furthermore, Kahneman & Tversky (1979) proposed, the innovative "prospect theory", grounded on long standing experiments about the human choices under risk, in which value is assigned to gains and losses and probabilities are replaced by decision weights. Prospect theory explains the decision making under risk based on either the "certainty effect" or the "isolation effect". The former has been founded on the observation that people underweight the probable outcomes in comparison to the certain ones. Thus, the certainty effect contributes to either risk aversion in choices involving sure gains or risk seeking in the opposite, that is, in choices involving sure losses. The isolation effect results in inconsistent preferences when the same choice is depicted in different forms while it has been emerged from the observation that people discard components that are shared by all prospects under consideration. In addition, Kahneman (2013) discovered that individuals in decision making use "slow thinking system" as compatible to fully (neoclassical) rational behavior in simplified world, while "fast thinking system" in more complex and uncertain one. This seems to be very close to the concept of BRH. All in all, Tversky & Kahneman with the prospect theory strengthened the behavioral school of economic thought, part of which is the Simon's BRH.

Finally, but not the least, even other scholars of economic branches, namely, in macroeconomics, like Vines & Wills (2020) have also shown that it is an urgent need for better understanding of the dynamically acting relationships in the real world to go ahead completing the Homo Economicus model. They have already accepted the deviation from the neoclassical fully rational economic agent in the attempt to rebuild macroeconomics in response to global financial crisis 2007-2009 (GFC-2008). They have explicitly stated "... *These models* (they mean New Keynesian dynamic stochastic general equilibrium – NK-DSGE-) claim that macroeconomic outcomes can be understood in a 'microfounded' manner: as the outcome of optimizing behaviour by representative agents who understand what they are doing, and act freely, apart from particular, clearly specified frictions. We no longer think that this is an appropriate restriction of the macroeconomic research programme; structural economic models must be constructed alongside models of the NK-DSGE kind, in which behaviour need not be fully microfounded. As outlined in section IV of this paper, many people also now agree with this...." (Vines & Wills, 2020, p. 430).

#### 3. Methodology

Within the current economic "paradigm", which, even though closes to be but it has not overpassed yet, we approach (Andersen & Hepburn, 2020; Drakopoulos et al., 2015; Kuhn, 1962) the paper's theme by applying Whewell's hypothetico-deductive methodology (Snyder, 1997b).

First, based on the BRH as well as the aforementioned theoretical underpinnings the following hypothesis (H1), is considered well-founded.

H1: "Managers in the global hotel industry, act with bounded rationality in holding cash, when they cannot find optimal solutions."

Considering the weaknesses of the rigid neoclassic economic agent who ought to follow the axioms of the optimization-based EUT it should be reasonably acceptable that the necessary conditions are satisfied in favor of the Hotel managers' bounded rationality, if at least even one of its presuppositions is not valid. As it has already been shown, in the previous section, the behavior-based models' argumentation seriously contributes to the foundation of the paper's hypothesis (H1). Let us not forget that H1 is lying within the current research programs' direction in economics, as for instance, it is invoked by macroeconomists (Vines & Wills, 2020).

Second, empirical testing of the H1 is applied. Using data from the "Refinitve" database (ex-Reuters/ Eikon) for Hotels-Motels worldwide, it is tested if the sample structure is consistent with the H1, then, the puzzle of excessive cash holdings can be solved. Besides descriptive, it has even been applied the inference statistics (variables' mean comparison of two samples in the tails of the cash distribution), along with, the panel data econometric estimations for the full sample (unrestricted model) as well as for its subsets (quantile regressions). Thus, the reasoning of the tests chosen for the H1 are statistical and econometric of the form: if we cannot reject the null of equal means or even if the estimations of the unrestricted model are similar to those of the restricted, then, we detect boundedly rational behavior of the managers (Robb et al., 2015). It is logical to assume that if determinants of cash holdings (like firms' size, investments, cash flows, leverage, debt structure, book-to-market value, growth opportunities, etc., we use in the empirical models) present approximately the same pattern in the estimated models either unrestricted or restricted then, it is provided a strong argument for BRH being at work in the respective decision making, and that is, not rejected the H1 (Robb et al., 2015). It should be noticed that in the restricted model the managers' cash behavior is controlled.

In other words, it is reasonable to assume that, cash management should be different in extremely low from high levels of reserves, or in full sample vs. subsamples' estimations. Otherwise, we have good reasons to detect boundedly rational behavior of CFOs in the global hotel industry, which is consistent with no-rejection of the paper's H1, since we cannot reject the null of equal means or the estimations of the unrestricted are similar of those of the restricted models. Finally, if the designed tests, provide outcomes that could have run contrary to the BRH but they cannot, then, it is corroborated the behavior-based theory.

Third, we examine whether the empirical findings are consistent with the research hypothesis H1 in order to come to a general conclusion through deduction.

#### 4. Empirical Analysis

We gathered the panel data for this study from the "Refinitve" database (ex-Reuters/Eikon), filtering the "SIC Primary Industry Type Code" to equal 7011, which represents "Hotels and Motels" in the "SIC Primary Industry Groups Name." The time period spans 2001–2018 and includes 354 firms worldwide; that is, a maximum of 4,310 firm-year observations of the unbalanced dataset with an average of 12.71 firms per year. Definitions of the variables, commonly used in the literature, are provided in that follows. We've carried out data-cleaning procedures to exclude firms with total book assets of less than US\$5 million and firms with no positive values of total assets, cash holdings, or capital expenditures. We then Winsorized all variables from both tails the 0.05th percentiles coming to 1% of the total tails of the distribution. After having done these procedures, we arrived at the aforementioned unbalanced panel dataset.<sup>1</sup>

To understand the univariate properties of the data, first, we proceeded with descriptive statistics. Then, we performed a correlation analysis of the dependent cash versus all other variables. Next, we investigated whether the firm specifics varied according to their levels of cash holdings (as reported in Table 1).

After those steps, we entered the main part of the analysis using panel data econometrics (PDE) and Hendry's approach from general-to-specific (GETS; Campos et al., 2005) so as to identify an empirical model based on the relevant theory so as to estimate and test it for all four factors affecting cash, namely, the size, value, profitability and investment (Fama and French, 2015). We used three different estimators for robustness reasons tests, the fixed effects (FE), feasible generalized least-squares (FGLS), and least-squares dummy variable correction of bias (LSDVC). We focused on LSDVC, which tackles all three sources of possible endogeneity (Flannery & Hankins, 2013). We applied the same empirical model to quantile regressions (Q1, IQ, Q3) in order to test if the same pattern can be detected in the subsamples, something that could be interpreted as an indication of BRH, as it has been explained in the methodology section. All estimations are reported in Table 2.

The structural form of our model is specified as follows

$$y_{it} = \beta y_{it-1} + \gamma X_{it} + \delta D_{it} + \alpha_i + \nu_{it}, \quad (1)$$

$$u_{it} = \alpha_i + v_{it} \tag{2}$$

Where  $y \equiv cash$ , the dependent variable, is the ratio of cash and short-term investments to total assets; i = 1, ..., n firms (hotels and motels, sic

= 7011); t = 2001, ..., 2018 years; X is the vector of j = 1, ..., k independent variables. In this study, the mentioned four factors (A-D) could be expressed through the following Xj determinants: A. SIZE: X1  $\equiv$  *Size*, is the logarithm of total assets; *X*2 $\equiv$  *Tangible*, is the ratio of tangible book value to total assets. B. VALUE:  $X3 \equiv Mkt$ -to-Book, is the ratio of market capitalization of the firm to total shareholder's equity (= total assets - total liabilities); X4 = Mkt-to-TotAss, is the ratio of market capitalization of the firm to its total assets. C. PROFITABIL-ITY:  $X5 \equiv Leverage$ , is the ratio of total debt of the firm to its total assets;  $X6 \equiv Leverage2$ , is the leverage squared; X7 = Debt structure, is the ratio of the shortterm debt to the total debt, while the short-term debt is provided by the abstraction of the long-term debt from the total debt;  $X8 \equiv CFlow1$ , is the net cash flow ratio to total assets of the company;  $X9 \equiv CFlow2$ , is the ratio of EBITDA to its total assets;,  $X10 \equiv LIQ$ , is the liquid assets defined as the NWC minus Cash and short-term investments scaled by total assets;  $X11 \equiv NWC$ , is the ratio of current assets minus current liabilities to total assets;  $X12 \equiv Growth \ Opp$ . stands for growth opportunities, and it is defined as the annual growth rate of the firm's net sales. D. IN-

VESTMENT:  $X13 \equiv Capexp1$ , is the ratio of capital expenditures to total assets;  $X14 \equiv Capexp2$ , is the ratio of annual variation in tangible and intangible assets plus depreciation and amortization to total assets. *D* stands for the dummy variables.  $\alpha_i$  is the usual fixed time effect parameter indicating the firm's non-observable individual effects, while  $u \sim i.i.d.$ , and

 $v_{it}$  is the remaining disturbance. We have also used the following level or multiplicative dummy variables: *crisis0811* takes the value 1 if 2008  $\leq$  year  $\leq$  2011, and 0 otherwise; *crisis0809* takes the value 1 if 2008  $\leq$  year  $\leq$  2009, and 0 otherwise; *crisis08* takes the value 1 if year = 2008, and 0 otherwise; *Size-Crisis* = *size-crisis0811*; *Capexp-Crisis* = *capexp1-crisis0811*; dividend takes the value 1 if the company pays dividends to common shares, and 0 otherwise; \* indicates that, in Table 1, Spearman's correlation coefficients (case-wise) are significant at the 5% level or lower, while *p-value* refers to two-sample (two-sided) t-tests for equal means.

From the main descriptive statistics (Table 1), it can be seen that the mean (median) cash ratio of 10% (6%) in our worldwide sample is much higher (up to 27%) than generally reported.<sup>2</sup> We strongly reject the null of normality<sup>3</sup> for the set of variables due to the high relative variance (with the exception of the size) along with excess asymmetry and kurtosis. This very high volatility for *NWC*, cash flows, *LIQ*<sup>4</sup> and the highest one for market-to-book reflects well known from the literature analogous "Hotel business uncertainty."

The statistical significance of Spearman's correlation coefficients of the dependent variable Cash with the relevant ones for all four factors are either positive and low for *size, value,* and *investment,* or positive and mid but also negative and high for *profitability.* Based on these findings, our data could be said to support the trade-off model. For instance, we could interpret the LIQ coefficient as evidence of the "substitution effect" (liquidity versus cash), whereas, in combination with Cash flows and NWC, they could strongly suggest an "internal financing" scheme. The latter seem to be relevant with, on the one hand, with the pecking order model. Interesting findings are presented in the last column of Table 1 concerning the mean comparison of two samples — the first and fourth quartile of *Cash*— for each independent variable. The results have shown that hotels and motels worldwide, located in the two tails of *Cash* distribution, in *Mktto-Book* (referred to "value" factor), *Debt Structure*, *Growth Opp.* (referred to "profitability" factor) and *Capex1*, *Capex2* (referred to "investment" factor) do not statistically differ, on average, or it is not rejected the  $H_{o}$ :  $\mu_1=\mu_2$ . In other words, it seems that hotel managers act under the same strategy, on average, concerning three out of four main factors (excluding "size") of their firms' efficiency, no matter how much

(Zwan, 2014; Besedovsky, 2018) the industry prefers

"internal financing" tools. This indication, is in line

Table 1

Basic Statistics and T-tests (Spearman and Two Samples Mean Comparison)

Variable	Mean	Std. Dev.	25th perc.	Median	75th perc.	Spearman's corr. coeff. for cash	Firms' characteristics by cash ratio extreme quar- tiles p-values $(H_0; \mu_1=\mu_2)$
Cash	0.10	0.14	0.02	0.06	0.13		
Size	18.51	1.93	17.50	18.55	19.85	0.22*	
Tangible	0.53	0.35	0.40	0.58	0.77		
Mkt-to-Book	1.55	11.94	0.49	0.91	1.73	0.25*	0.615
Mkt-to-TotAss	0.88	1.65	0.28	0.51	0.93	0.26*	
CFlow1	0.05	0.22	0.02	0.05	0.08	0.23*	
CFlow2	0.08	0.12	0.04	0.07	0.11	0.27*	
NWC	0.03	0.22	-0.05	0.02	0.12	0.58*	
LIQ	-0.05	0.08	-0.06	-0.02	0.00	-0.64*	
Leverage	0.24	0.25	0.06	0.20	0.36	-0.09*	
Debt	0.37	0.33	0.11	0.26	0.53		0.711
Structure							
Capex1	0.04	0.20	0.01	0.03	0.06	0.12*	0.840
Capex2	0.02	0.04	0.00	0.01	0.03		0.714
Growth Opp.	0.29	3.29	-0.08	0.03	0.18	0.04*	0.987

Note: See Section 4. "Empirical Analysis" for the definition of variables.

Theodoros V. Stamatopoulos

cash they hold. However, it is not logical to accept that full rational Hotel managers, as the neoclassical model predicts, would have on average the same behavior concerning value, profitability and investment factors, in the tails of the cash distribution. Thus, this finding is considered as an evidence for both BRH (for these three factors) and full rationality (for the size factor), that is, it is consistent with the paper's hypothesis H1. Further research is necessary so as to document logical theoretical understanding as far the mechanisms producing these results.

In Table 2, we present the estimations of equation (1) distinguishing between the entire sample "baseline regressions" or unrestricted model (UnrM) and the "quantile" ones or restricted model (ResM). In the baseline regressions, we focus on the aforementioned LSDVC model 3 (UnrM) because this consistently resists to all the sources of endogeneity. The findings generally favour the hypothesized "managerial view" of the bounded rationality (Simon, 1979) of the cash holdings function, considering that the Trade-off and Pecking Order theories are complimentarily supported by the present evidence. That is, the estimated (unrestricted and restricted) models, do not exclusively support either of the two theories, but complementary both. The measures of size and profitability factors have strongly proved significant in either the unrestricted or the restricted model, while investment has been found only in the first model and "value" only in the second one. The global financial crisis 2007-2009 (GFC-2008) dummy variable or its multiplicative forms have not proved significant in either baseline or quantile regressions, indicating that the transaction motive is the most prominent.

Firstly, the unrestricted model (# 3, LSDVC), document a significant and positive first-order autoregressive coefficient reflecting habit or short memory of hotel managers, worldwide, for cash holdings. The size effect on cash, as determined by the relative tangible (*Tangible*), is found to be positive. This is in line with pecking-order theory predictions (larger and more successful firms hold more cash to mainly fund investments).<sup>5</sup> Cash flows (*CFlow2*) also have proved to positively affect cash holdings (pecking order scheme); this evidence could be perceived under a business decision mechanism such as "financial constraints," which predicts that firms facing higher uncertainty6 may have higher Cash holdings7 or "agency conflicts," which are mitigated by market discipline referring to the higher-risk imposition of Cash. Moreover, the strongly significant negative estimated coefficient of investments (Capexp1) is in line with the pecking order theory while it could be also be understood through a "real option" decision mechanism, according to which the high level of uncertainty causes reduced current investments and increased Cash in preparation for postponing the following period's investment plans. In contrast, liquid assets (LIQ) have been confirmed as viable substitutes for Cash (negative estimated coefficient), a prediction in line with the theoretical trade-off scheme.

Secondly, considering the "size effect" in restricted model (quantile regressions Models 4-6), we can see that only the investment factor, measured here by the Capex1 variable, was not found to be significant. Thus, the negative relationship of Cash with Tangible confirms the trade-off decision mechanism. As firms become larger9, they find it easier to obtain external financing or tend to be more diversified, which explains their efforts to reduce treasury risk. The analogous explanation for a positive relation of Cash to Mkt-to-TotAss is valid. Internal financing schemes through either CFlow2 for small firms (Model 4) or NWC for medium and large ones (Models 5 and 6, respectively) are also confirmed in our estimations and are in line with the pecking order theory. Dividend also varies, with the size of firms having been proved consistent with the negative predictions of trade-off literature for medium-sized companies (Model 5).

However, a remarkable finding from the estimations stage is that Leverage (the ratio of firm's total debt to its total assets) affects *Cash* through a quadratic form (U-shape) both the unrestricted and the restricted model. That is, this is true for whatever part of the cash distribution, confirming the strong nexus of the hotels with the banking system. This evidence could be understood through the common Hotel market discipline. Specifically, in the first part of the cash function, *Leverage* is still on low or sustainable levels (e.g., lower than 50% of total assets, as estimations from Model 5 indicate). CFOs rely

#### Table 2

Estimations

		Baseline re- gressions			Quantile re- gressions	
VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	FE	FGLS	LSDVC	Q(.25)	IQ(.25 .75)	Q(.75)
L.Cash	0.429***	0.509***	0.498***			
	(8.704)	(49.98)	(26.91)			
Tangible	0.0509***	0.00794***	0.0457***	-0.0154***	-0.0703***	-0.122***
	(2.732)	(3.955)	(3.333)	(-2.627)	(-3.803)	(-11.23)
Mkt-to-TotAss	0.00209	0.000574	0.00176	0.00384***	0.0104***	0.0154***
	(0.744)	(1.545)	(0.992)	(6.434)	(2.753)	(14.29)
CFlow2	0.123***	0.0792***	0.126***	0.0579***		
	(6.756)	(13.93)	(6.645)	(7.177)		
LIQ	-0.520***	-0.610***	-0.501***			
	(-9.054)	(-56.16)	(-25.23)			
NWC					0.371***	0.592***
					(15.50)	(62.63)
Leverage	-0.107***	-0.0447***	-0.0988***	-0.0548***	-0.261***	-0.315***
	(-3.236)	(-6.599)	(-2.899)	(-3.717)	(-5.186)	(-11.72)
Leverage <sup>2</sup>	0.162***	0.0549***	0.149***	0.0413**	0.497***	0.505***
	(4.081)	(5.992)	(3.712)	(2.140)	(6.327)	(14.33)
Debt Structure	0.0111**	0.00235**	0.0107**			
	(2.196)	(2.032)	(2.552)			
Capexp1	-0.0820***	-0.0520***	-0.0912***			
	(-4.063)	(-9.261)	(-4.467)			
Growth Opp.	-0.00102**	-0.00134***	-0.00121**	0.00244***		
	(-2.085)	(-3.316)	(-2.359)	(3.939)		
Dividend	0.00265	0.00227***	0.00168	0.0171***	-0.00968***	0.00573*
	(0.719)	(3.031)	(0.963)	(9.570)	(-2.723)	(1.747)
Size·Crisis	-6.29e-05	0.000120***	-5.22e-05	-6.14e-05		-0.000207
	(-0.513)	(3.186)	(-0.414)	(-0.579)		(-1.034)
Capex·Crisis					-0.0253	
					(-0.615)	
Constant	-0.00285	0.00272		0.0241***	0.139***	0.200***
	(-0.200)	(1.301)		(4.509)	(7.458)	(20.50)
Observations	2,919	2,894	2,919	3,399	3,663	3,663
R-squared	0.517					
# of firms	310	285	310			

Note: See Section 4. "Empirical Analysis" for the definition of variables. FE model 1; Feasible generalized least squares (FGLS) Model 2; Bias corrected least-squares dummy variables (LSDVC) dynamic panel data Arellano-Bond model; Robust t-statistics in parentheses \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1. L.Cash = Casht-1.

T

on bank loans for either transactions or precautions purposes, decreasing their own Cash holdings, representing the downturn part of this action. However, when Leverage increases (up to either 137.5% for small firms or 62% for large ones) the banks likely demand from the managers to raise Cash only to alleviate the interests of the rising debt. This discipline required by lenders to hoteliers is reflected in the positive side of the cash function with respect to leverage. Hotel cash management could also use an optimization strategy as the trade-off model claims, but we believe that because of the incomplete competition in services and inefficient capital markets globally, producing bounded rational behavior, it merely reflects the managers' decisions under market discipline imposed by the banks. Thus, Hotel managers choose to satisfice their stakeholders, among them the bankers who ensure the smoothness of their high volatile cash flows.

Moreover, the leverage estimations are strongly consistent with the BRH because it is logical to be expected that those of the restricted model should be different from these of the unrestricted ones. In terms of the EUT, it should be reasonable that the "leverage effect" to be similar to the "size effect", namely, a negative relationship between cash and leverage. However, the insistence of the estimated concave cash function in leverage whatever full sample or sub-samples it is used, should be considered as a strong evidence in favour of satisficing behavior (BRH). The paper assumes a common Hotel market discipline which forces the hotel managers to satisfice the bankers for many reasons. However, the holistic view which this study adopts within the high level of environmental uncertainty the managers face (Simon, 1979), could be a good reason for further research to investigate the aforementioned "certainty effect" of Tversky & Kahneman (1979). That is, it seems reasonable for this effect to be estimated, during euphoria periods when hotel managers act with risk aversion in choices involving sure gains, thus, they hold less cash, while, in the downtrend of the cycles with bad market sentiments they could be transformed to risk seekers for choices involving sure losses, and to hold more cash. Thus, the certainty effect could be reflected in a concave cash function in leverage, as it is estimated here.

#### 5. Discussion

The second column of Table 3 summarizes the findings of Table 2 concerning the drivers of the cash predicted by the optimization-based theory. As it has been explained in the previous section the estimations are consistent with the trade-off and pecking order schemes but neither of them seems to dominate. The next two columns are dedicated to the findings which seem compatible to the behavior-based model of BRH. The criteria selected in order to characterize a factor as consistent with the BRH are either the null of equal means (Table 1) not to be rejected, or the estimated unrestricted (UnrM) and restricted (ResM) models (Table 2) to be the similar pattern, plus the optimization-based models (Table 2 as well) to be mixed or poor.

This is the case of the "profitability" factor. It is to be noticed once again, the reasoning of the used criterion so as to reach the verdict supporting the BRH, that is, firstly, it is not logical to observe the same results of the managers' behavior either in the UnrM or in the ResM. In other words, it is not logic to find the same pattern, regarding, for example, the leverage, in firms with extreme low cash and in the opposite case, with extreme high. Thus, it makes no-sense in EUT terms, to find the same evidence in the full sample (LSDVC, Table2) as in its subsets (quartile regressions, Table2). Secondly, this finding in favor of BRH in the profitability factor has been strengthened by the evidence concerning the equal means (complementary criterion to the relation UnrM-ResM) in debt structure variable which is considered as a component of the same factor. Thirdly, the two above evidences have been supported by the poor or mixed estimations of the optimization-based models (trade-off, pecking order).

The opposite evidence, namely, supporting EUT, has been found in the case of "size" factor, where having the mixed findings concerning the trade-off (TO) and pecking order (PO) schemes, the rest ones concerning the BRH are not satisfied. The "verdict" for the last two factors, of "value" and "investments" affecting cash, is referred to mixed or balanced, because it has not been found a clear picture in favor of neither the optimization (EUT) nor the behavior (BRH) based models.

#### Table 3

Summarizing the Findings: Satisficing (BRH), Homo Economicus (HE) or Mixed.

	Indication for optimiza- tion-based model (Homo Economicus)	Indication for behavior- (Bounded Rationality Hy	Verdict	
Factors	Trade-off (TO) or Pecking	Similar patterns in UnrM	Acceptance of the	
SIZE, VALUE,	Order (PO) models (Table 2)	& ResM (Table 2)	H0: µ1=µ2 (Table 1)	
PROFITAB.,				
INVESTMENT				
A. SIZE	Mixed (PO, TO)	No	No	HE
Size				
Tangible	UnrM+PO, ResM-TO	No		
B. VALUE	only ResM-PO	No	YES	Mixed
				(HE or
				BRH)
Mkt-to-Book			YES	
Mkt-to-TotAss	ResM+PO	No		
C. PROFITABILITY	Mixed	YES	YES	BRH
CFlow1				
CFlow2	UnrM+PO, ResM+PO	YES		
NWC	Only ResM+PO			
LIQ	Only UnrM-TO			
Leverage	Concave UnrM & ResM	YES		
Debt Structure	Only UnrM+TO		YES	
Growth Opp.	Only UnrM+TO,PO		YES	
D. INVESTMENT	Only UnrM-PO	No	YES	Mixed
				(HE or
				BRH)
Capex1	Only UnrM-PO	YES		
Capex2		YES		

Notes: UnrM = unrestricted model (Table 2, LSDVC); ResM = restricted model (Table 2, quartile regressions); HE = Homo Economicus; BRH = Bounded rationality hypothesis; ResM-PO = restricted model's significant and negative estimation, in line with the pecking order model; UnrM+TO = unrestricted model's significant and positive estimation, in line with the trade-off model;

The final whole verdict is favorable of the BRH and consistent with the paper's hypothesis H1. The BRH has been significantly detected in the main target factor of any firm, which with no-doubt is the profitability. Furthermore, in the value and investment factors, the picture is balanced between EUT and BRH, while in the size one the findings are clearly consistent with the neoclassical model. Thus, the overall evidence of the paper is consistent with the hypothesis H1, that is, "*managers in the global hotel*  *industry, act with bounded rationality in holding cash, when they cannot find optimal solutions*".

The investors of the global accommodation industry should take account of the evidences of this study which finds them to be consistent with the BRH and the hypothesis H1. That is, they have to consider that the respective managers are forced not to always follow optimization (EUT) principles, and then, they seem to prefer to satisfice (BRH) their stakeholders resulting in less profitability. The latter is expected to have analogous implications in dividend policy of the hotel industry.

The paper also has policy implications for governments which have to ensure competitive conditions in all markets focusing on information disclosure, which under the cognitive capabilities in organizational (see business) environments is considered of great importance in Simon's BRH, detected here. Moreover, policy makers should pay the necessary attention to the strong nexus of the hotels with the banking system so as to alleviate their financial destress confirmed (debt structure, leverage) in this study.

Basic limitation of any study, including of course the present one, is the so-called Whewell's "fundamental antithesis", concerning the knowledge as a product of the "objective", namely, what we see in the world around us, as well as, the "subjective", i.e., the contributions of our mind to how we perceive and understand what we experience, which he called the Fundamental Ideas (Andersen & Hepburn, 2020). Moreover, due to the lack of data, another limitation of the paper could be that identified, estimated and tested an empirical model drawn from the EUT, while we are interested mainly in the BRH. However, it is believed that based on the very strict methodology and criteria used, the paper managed to detect the behavior that Simon (1959, 1979) describes as bounded rational one (BRH).

#### 6. Concluding Remarks

It is believed that the paper's objective to contribute the literature solving the puzzle of the excessive cash holdings in the case of the global hotel industry has been accomplished. We have proven the serious reasons that justify the development of the falsifiable hypothesis H1, that is, "managers in the global hotel industry, act with bounded rationality in holding cash, when they cannot find optimal solutions".

Through Whewell's hypothetico-deductive methodology, as well as, having in mind the temporary nature of any theory (Popper's critical rationalism) and Kuhn's idea on "normal science" and "paradigm" (holistic view), the paper has been articulated in three stages. First, it has been explained how deficiencies of the expected utility theory (EUT) could be complemented by the bounded rationality hypothesis (BRH). This has been able after a comprehensive analysis of the main elements for both of them. Only then, it has been possible to be grounded the research hypothesis H1. The latter, has been tested in the second stage of the methodology. Thus, based on this theoretical underpinnings, statistical analysis and econometric modeling has been used, on a global sample of panel data on hotel-motels for the period 2001-2018, so as to be tested the paper's hypothesis H1. The findings can be summarized firstly, in the strong evidence in favor of the BRH for the "profitability" factor, secondly, in the balanced evidence for both boundedly and fully rational managers' behavior, for the "value" and "investments" factors, and thirdly, in no-evidence for the BRH in the case of the "size" factor. In the third stage of the methodology, the final verdict states that the empirical analysis is consistent with the H1 paper's hypothesis.

Thus, in reference with the main characteristic of the tourism, the highly volatile cash flows, confirmed in the descriptive statistics of the sample, is considered that force the managers to a common Hotel discipline versus their bankers. Then, the debt structure and the leverage components are used so as to smooth the variability of cash flows of the accommodation industry. This can be feasible through searching alternatives, satisficing, and adapting aspirations, an overall behaviour predicted by Simon's BRH. The paper has detected the BRH through strict criteria used on the testing procedure.

Policy implications could be summarized: "The cash management in the global hotel industry can achieve the goals of profitability, firm's value or investments through the complementarity of optimal solutions with Simon's satisficing ones". Finally, academicians could carry out the BRH more formally in the further research.

#### Acknowledgment

The author would like to thank the University of West Attica for their overall assistance to this paper including the funding of registration fees to the ICABE-2020 or any other fees concerning the Journal of Contemporary Economics. I would also like to thank the participants of the ICABE-2020 and especially Prof. El. Thalassinos, Prof. G. Bitros, Prof. M. Cristea, and of course my colleagues from the Hellenic Mediterranean University, Prof. D. Terzakis and Assoc. Prof. S. Arvanitis for our valuable discussions on the paper. The usual disclaimer applies.

#### References

- Acharya, V., Davydenko, S. A., & Strebulaev, I. A. (2012). Cash holdings and credit risk. *The Review* of *Financial Studies*, 25(12), 3572-3609. https://doi. org/10.1093/rfs/hhs106
- Andersen, H., & Hepburn, B. (2020). Scientific method. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy*. https://plato.stanford.edu/archives/ win2020/entries/scientific-method/.
- Ahmad, W., & Adaoglu, C. (2019). Cash management in the travel and leisure sector: evidence from the United Kingdom. Applied Economics Letters, 26(7), 618-621. https://doi.org/10.1080/13504851.2018.14 88050
- Bates, T. W., Kahle, K. M., & Stulz, R. M. (2009). Why do US firms hold so much more cash than they used to? *The Journal of Finance*, 64(5), 1985-2021. https://doi. org/10.1111/j.1540-6261.2009.01492.x
- Besedovsky, N. (2018). Financialization as calculative practice: the rise of structured finance and the cultural and calculative transformation of credit rating agencies. *Socio-economic Review*, 16(1), 61-84. https://doi.org/10.1093/ser/mwx043
- Bigelli, M., & Sánchez-Vidal, J. (2012). Cash holdings in private firms. *Journal of Banking & Finance*, 36(1), 26-35. https://doi. org/10.1016/j.jbankfn.2011.06.004
- Brown, J.R., & Petersen, B.C. (2011). Cash holdings and R&D smoothing. *Journal of Corporate Finance*, 17(3), 694–709. https://doi.org/10.1016/j.jcorpfn.2010.01.003
- Campos, J., Ericsson, N.R., & Hendry, D.F. (2005). General-to-specific modelling: An overview and selected bibliography. *International Finance Discussion Papers*, 383. http://dx.doi.org/10.2139/ssrn.791684
- Dittmar, A., & Mahrt-Smith, J. (2007). Corporate governance and the value of cash holdings. *Journal of Financial Economics*, 83(3), 599–634. https://doi. org/10.1016/j.jfineco.2005.12.006
- Drakopoulos, S., Gotsis, G., & Grimani, K. (2015). Μεθοδολογία Κοινωνικών και Οικονομικών Επιστημών [Methodology of Social and Economic

Sciences]. Association of Greek Academic Libraries.

- Fama, F.E., & French, R.K. (2015). A five-factor asset pricing model. *Journal of Financial Economics*, 116(1), 1–22. https://doi.org/10.1016/j.jfineco.2014.10.010
- Ferreira, M.A., & Vilela, A.S. (2004). Why do firms hold cash? Evidence from EMU countries. *European Fi*nancial Management, 10(2), 295–319. https://doi. org/10.1111/j.1354-7798.2004.00251.x
- Flannery, M.J., & Hankins, K.W. (2013). Estimating dynamic panel models in corporate finance. *Journal of Corporate Finance*, 19, 1–19. https://doi. org/10.1016/j.jcorpfin.2012.09.004
- Gao, H., Harford, J., & Li, K. (2013). Determinants of corporate cash policy: Insights from private frms. *Journal of Financial Economics*, 109(3): 623–639. https://doi.org/10.1016/j.jfneco.2013.04.008
- Gao, R., & Grinstein, Y. (2014). Firms' cash holdings, precautionary motives, and systematic uncertainty. SSRN. http://dx.doi.org/10.2139/ssrn.2478349
- Harstad, R. M., & Selten, R. (2013). Bounded-rationality models: tasks to become
- intellectually competitive. *Journal of Economic Literature*, 51(2), 496-511. https://doi.org/10.1257/jel.51.2.496
- Im, H.J., Park, H., & Zhao, G. (2017). Uncertainty and the value of cash holdings. *Economics Letters*, 155, 43-48. https://doi.org/10.1016/j.econlet.2017.03.005
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2), 263-292. https://doi.org/10.2307/1914185
- Kahneman, D. (2013). *Thinking fast and slow*. Farrar, Straus & Giroux.
- Khatib, S. F., Abdullah, D. F., Hendrawaty, E., & Elamer, A. A. (2022). A bibliometric analysis of cash holdings literature: current status, development, and agenda for future research. *Management Review Quarterly*, 72(3), 707-744. https://doi.org/10.1007/ s11301-021-00213-0
- Kuhn, T. S. (1962). The structure of scientific revolutions. University of Chicago Press.
- Kwan, J.-H., & Lau, W.-Y. (2020). Do firm characteristics and industry matter in determining corporate cash holdings? Evidence from hospitality firms. *Journal* of Asian Finance, Economics and Business, 7(2), 9-20. https://doi.org/10.13106/jafeb.2020.vol7.no2.9
- Lipman, B. L. (1995). Information-processing and bounded rationality: A survey. *The Canadian Journal of Economics*, 28(1), 42–67. https://doi. org/10.2307/136022.
- Mirowski, P., & Nik-Khah, E. (2017). The Knowledge We Have Lost in Information: The History of Information in Modern Economics. Oxford University Press.
- Morais, F., & Silva, P. (2013). Determinants of cash hold-

ings in the accommodation industry. *Tourism and Hospitality International Journal*, 1, 95–136.

- Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), 187–221. https://doi. org/10.1016/0304-405X(84)90023-0
- Neumann, J., & Morgenstern, O. (1944). Theory of Games and Economic Behavior. Princeton University Press.
- Opler, T., Pinkowitz, L., Stulz, R., & Williamson, R. (1999). The determinants and implications of corporate cash holdings. *Journal of Financial Economics*, 52, 3–46. https://doi.org/10.1016/S0304-405X(99)00003-3
- Ozkan, A.,& Ozkan, N. (2004). Corporate cash holdings: An empirical investigation of UK companies. *Journal of Banking & Finance*, 28(9), 2103–2134. https:// doi.org/10.1016/j.jbankfn.2003.08.003
- Petracca, E. (2021). On the origins and consequences of Simon's modular approach to bounded rationality in economics. *The European Journal of the History of Economic Thought*, 28(5), 708-732. https://doi.org/1 0.1080/09672567.2021.1877760
- Robb, C. A., Babiarz, P., Woodyard, A., & Seay, M. C. (2015). Bounded rationality and use of alternative financial services. *Journal of Consumer Affairs*, 49(2), 407-435. https://doi.org/10.1111/joca.12071
- Sanchez, J. M., & Yurdagul, E. (2013). Why are U.S. firms holding so much cash? An exploration of crosssectional variation. *Federal Reserve Bank of St. Louis Review*, 95(4), 293–325.
- Sent, E.-M., (2018). Rationality and bounded rationality: You can't have one without the other. *The European Journal of the History of Economic Thought*, 25(6), 1370-1386. https://doi.org/10.1080/09672567.2018 .1523206
- Simon, H. A.As below Simon (1957) A behavioral model of rational choice. *Quarterly Journal of Economics*, 69(1), 99–118. https://doi.org/10.2307/1884852.
- Simon, H. A. (1956). Rational choice and the structure of the environment. *Psychological Review* 63(2), 129– 138. https://doi.org/10.1037/h0042769.
- Simon, H. A. (Yes there are, pls see https://scholar. google.com/citations?hl=en&user=tk2qT34AAAAJ &view\_op=list\_works&sortby=pubdate ). Models of Man. John Wiley.
- Simon, H. A. (1959). Theories of decision-making in economics and behavioral science. *American Economic Review* 49,(3), 253–283.
- Simon, H. A. (1978). Rationality as process and as a product of thought. *American Economic Review*, 68(2), 1–16.

- Simon, H. (1979). Rational Decision Making in Business Organizations. The American Economic Review, 69(4), 493-513. Retrieved May 14, 2021, from http:// www.jstor.org/stable/1808698
- Simon, H. A. (1987). Behavioral economics. In J. Eatwell, M. Milgate, & P. Newman (Eds.), *The New Palgrave:* A dictionary of economics. Palgrave Macmillan.
- Simon, H. A. (2000). Bounded rationality in social science: Today and tomorrow. *Mind & Society*, 1(1), 25–39.
- Snyder, L. J. (1997). The Mill-Whewell debate: Much ado about induction. *Perspectives on Science*, 5(2), 159-199.
- Subrahmanyam, A. (2008). Behavioral finance: A review and synthesis. *European Financial Management*, 14(1), 12-29. https://doi.org/10.1111/j.1468-036X.2007.00415.x
- Thaler, R. H. (2016). Behavioral economics: Past, present, and future. American Economic Review, 106(7), 1577–1600. http://dx.doi.org/10.1257/ aer.106.7.1577
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: heuristics and biases. *Science*, New Series, Vol. 185, No. 4157. (Sep. 27, 1974), pp. 1124-1131.
- Weidemann, J.F. (2018). A state-of-the-art review of corporate cash holding research. *Journal of Business Economics*, 88, 765–797. https://doi.org/10.1007/ s11573-017-0882-4
- Wheeler, G. (2020). Bounded rationality. In E. N. Zalta (Ed.), The Stanford encyclopaedia of philosophy. https://plato.stanford.edu/archives/fall2020/entries/ bounded-rationality/
- van der Zwan, N. (2014). Making sense of financialization. Socio-Economic Review, 12(1), 99–129. https:// doi.org/10.1093/ser/mwt020
- Veblen, T. (1936). What Veblen taught: Selected writings of Thorstein Veblen. A. M. Kelley.
- Vines, D., & Wills, S. (2020). The rebuilding macroeconomic theory project part II: multiple equilibria, toy models, and policy models in a new macroeconomic paradigm, Oxford Review of Economic Policy, 36(3), 427–497. https://doi.org/10.1093/oxrep/graa066
- Zhang, Y. Y., Nayga Jr, R. M., & Depositario, D. P. T. (2019). Learning and the possibility of losing own money reduce overbidding: Delayed payment in experimental auctions. *PloS one*, 14(5), e0213568. https://doi.org/10.1371/journal.pone.0213568

#### Footnotes:

- <sup>1</sup>The econometric analysis was done using STATA v.14.2 software.
- <sup>2</sup>For example, in a study of the accommodation industry in four Mediterranean countries, Morais and Silva (2013) reported 7.9%; for US-listed hotel firms Woods et al. (2011) and Koh and Jang (2011) reported average cash holdings of 8.8% and 8.6%, respectively. Our findings are in line with those of Duchin (2010) for the US-listed firms and in general with the survey of Khatib et al (2021).
- <sup>3</sup>The results of the relevant tests are not reported but are available upon request.
- <sup>4</sup>The coefficients of variation (CV = sd/mean) are well above 1.0 for measures of "profitability" like NWC (7.3), cash flows (4.4 or 1.5), and LIQ (-1.6), as well as of "value" like market-to-book value (7.7).
- <sup>5</sup>This is also true for the free cash flow scheme, which assumes that size and cash holdings act as deterrent factors for aggressive acquisitions.
- <sup>6</sup>Such is the case here. See the high relative variability of Cflow2 in Table 1.
- <sup>7</sup>Pecking-order or free cash flow (FCF) schemes for internal investment financing priority seem to be verified.

<sup>8</sup>Such is the case here with Capex1t.

<sup>9</sup>See also Models 4–6, which are growing the measure of estimated coefficients from small (Q.25) to medium (IQ) and large (Q.75) companies.