

ESTUDOS II



FACULDADE de ECONOMIA da UNIVERSIDADE do ALGARVE

ESTUDOS II

Cidadania, Instituições e Património

Economia e Desenvolvimento Regional

Finanças e Contabilidade

Gestão e Apoio à Decisão

Modelos Aplicados à Economia e à Gestão



Faculdade de Economia da Universidade do Algarve

2005

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Título

Estudos II - Faculdade de Economia da Universidade do Algarve

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Capa e Design Gráfico

Susy A. Rodrigues

Compilação, Revisão de Formatação e Paginação

Lídia Rodrigues

Fotolitos e Impressão

Grafica Comercial – Loulé

ISBN

972-99397-1-3 Data: 26-08-2005

Depósito Legal

218279/04

Tiragem

250 exemplares

Data

Novembro 2005

RESERVADOS TODOS OS DIREITOS

REPRODUÇÃO PROIBIDA

Are markets efficient? The extreme case of corporate bankruptcy – A literature review ¹

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Abstract

In 1970, Fama presented the foundations of what was to become the central proposition in finance: the *Efficient Market Hypothesis (EMH)*. Under the EMH's framework, a market is efficient if prices always reflect all available information. Behavioural finance is an alternative perspective to understand financial markets, which incorporates the implications of psychological decision processes. This new framework is based on a well-developed theoretical body, which provides a better explanation to certain patterns of market behaviour that cannot be understood within the traditional approach.

The emergence of behavioural finance created a fundamental dilemma in the finance literature: which of the two competing theories best describes the actual behaviour of financial markets? This paper reviews existing knowledge on how markets behave when companies announce bankruptcy. This acute and economically significant bad news event constitutes an attractive scenario to explore the irrational pricing patterns that are motivated by market participants' biases and psychological defences in dealing with extreme bad news.

This paper starts by summarizing the theoretical frameworks of both the EMH and behavioural finance. Several papers that address the corporate bankruptcy issue in light of these competing theories are also reviewed. The paper concludes suggesting new areas of research that can be explored to deepen our understanding of how (in)efficient the market is in this extreme bad news context.

Keywords: Market Efficiency, Efficiency Market Hypothesis, Behavioural Finance, Bad News, Corporate Bankruptcy

¹ The financial support provided by the Fundação para a Ciência e Tecnologia is deeply acknowledged by the authors.

Resumo

Em 1970, Fama apresenta as fundações do que viria a tornar-se na proposição fundamental das finanças: a *Hipótese dos Mercados Eficientes (HME)*. De acordo com a HME, um mercado é eficiente se, a todo o momento, os preços reflectirem toda a informação disponível. As *finanças comportamentais* constituem uma perspectiva alternativa para entender os mercados financeiros, a qual incorpora a dimensão psicológica nos processos de tomada de decisão.

O aparecimento das finanças comportamentais criou um dilema fundamental na literatura financeira: qual das duas teorias concorrentes melhor descreve o comportamento dos mercados financeiros? Este artigo faz uma revisão da literatura sobre a reacção do mercado ao anúncio de falência por parte das empresas. Este importante evento económico constitui um atractivo cenário para explorar o efeito que o enviesamento e as defesas psicológicas dos participantes de mercado, motivados pela existência de más notícias extremas, têm sobre os padrões de preço dos activos transaccionados no mercado.

Este artigo começa por sumariar os conceitos teóricos da HEM e das finanças comportamentais. Também se apresenta uma revisão de literatura sobre um conjunto de artigos que se debruçam sobre a questão da falência financeira no contexto do debate entre a HEM e as finanças comportamentais. O artigo termina sugerindo áreas de investigação futura, as quais podem ser exploradas no sentido de aprofundar o nosso entendimento do quão (in)eficiente o mercado é no contexto das más notícias extremas.

Palavras-Chave: Eficiência de Mercado, Hipótese de Eficiência de Mercado, Finanças Comportamentais, Más Notícias, Falência Empresarial

1. Introduction

One of the dominant themes in the finance academic literature since the 1960s has been the concept of an efficient capital market. Although the term *efficient market* has been used to denote different phenomena at different times, finance scholars have given it a very specific meaning (Elton and Gruber, 1995). In fact, when someone refers to efficient capital markets they mean that *security prices fully reflect all available information* (Elton and Gruber, 1995; Blake, 2001; Lofthouse, 2001). This classical definition of an efficient market was presented for the first time in Fama (1970) and it sets the stage for the Efficient Market Hypothesis (EMH).¹ After the publication of this

¹ According to Blake (2001) there are several levels of economic efficiency. A market is said to be allocatively efficient if the highest bidder for any given (scarce) resource gets to use it. A market is said to be operationally efficient when the transaction costs of operating in that market are determined competitively. Finally, a market is said to be informationally efficient if the current price of any given asset traded in the market instantaneously and fully reflects all relevant available information. If a market is simultaneously allocatively, operationally and informationally efficient it is said to be perfectly efficient (Blake, 2001).

seminal work, several other theoretical and empirical contributions were made in this domain and the EMH became the central proposition of finance (Shleifer, 2000).

Recently, a new generation of financial economists has developed a different theoretical approach to explain how financial markets work (Shleifer, 2000; Montier, 2002; Shefrin, 2002; Barberis and Thaler, 2004). This new approach is known as behavioural finance and it sharply contrasts with the traditional EMH paradigm. In fact, this new framework suggests that any asset can systematically be traded in the market at a price that differs to its fundamental value² and that such deviation can persist for long periods of time (Shleifer, 2000; Lo and MacKinlay, 2002; Shefrin, 2002 and Barberis and Thaler, 2004). Not surprisingly, EMH proponents heavily criticized behavioural finance in the early years of its development³ and many academics foresaw its quick end (Thaler, 1999). However, the interest of the academic community in behavioural finance increased rapidly as a set of empirical papers documenting persistent cross-sectional and time series patterns in returns, which are not predicted by the EMH, started to be published in the finance journals (e.g., Shiller, 1981; De Bondt and Thaler, 1985; Harris and Gurel, 1986 and Shleifer, 1986; Jegadeesh and Titman, 1993). These empirical results were initially classified as anomalies (Hawawini and Keim, 1995). Nowadays they constitute the most relevant empirical challenge to the EMH.⁴

This paper revisits the ongoing discussion between EMH proponents and behavioural finance scholars in the context of the worst possible case of bad news: the announcement of corporate bankruptcy. This announcement is a significant economic event that should be associated with market activity since it provides material information about the potential reduction of the firm's fundamental value. In the most optimistic scenario, a bankrupt firm has to bear both the direct and indirect costs of this situation (Altman, 1984; Opler and Titman, 1994; Meggison, 1997; Gilson et al, 2000 and Grinblatt and Titman, 2002). We argue that, by understanding how the market behaves when dealing with this acute and unambiguous bad news event, it is possible to enhance our knowledge about the biases and psychological defences that affect investment decisions in extreme contexts.

The paper proceeds as follows. Section 2 briefly describes the theoretical foundations of both the EMH and behavioural finance. Section 3 presents a selected set of empirical papers that, having the market reaction to bankruptcy announcements as

² Technically speaking, this means that the price of any given asset (security) traded in the market will be equal to the net present value of its future cash flows, discounted at the appropriate risk rate (Elton and Gruber, 1995; Haugen, 2001).

³ Actually, behavioural finance is still a controversial subject in the finance literature (e.g., Fama, 1998). Nevertheless, the development of a theoretical body of literature explaining the market pricing from this new perspective and the abundance of empirical results challenging the EMH predictions facilitated its definitive implementation in the field. Today, behavioural finance is taught in major Universities around the world and is the basic framework within which several respectable finance academics develop their work (Shleifer, 2000).

⁴ Schwert (2004) offers an associated definition of an anomaly: anomalies are empirical results that seem to be inconsistent with maintained theories of asset pricing. This is important since testing the EMH directly is not possible because of the joint hypothesis problem (Fama, 1970). However, Schwert (2004) does acknowledge that the existence of anomalies indicates that markets are not efficient in the traditional sense.

background, address the question under revision. Further areas of research are also suggested in this section. Section 4 concludes.

2. Theoretical background

The EMH and behavioural finance differ in their assumptions about human behaviour. The classical approach assumes that investors are rational. EMH proponents also argue that, even if not all investors are rational, the existence of some rational investors (*sophisticated or smart investors*) and the use of the arbitrage mechanism will ensure that securities prices, on average, reflect their fundamental value. In contrast, drawing on previous knowledge from psychology, behavioural finance proponents argue that investors are not *fully* rational. Moreover, behavioural theorists posit that sophisticated investors cannot force markets back to fundamental values if prices go out of line since they face *limits to arbitrage*. This section describes briefly the theoretical framework of both approaches.

2.1 Efficient market hypothesis: theoretical foundations

Prior to the 1950s, financial economists claimed that traditional investment analysis could be used to outperform the stockmarket (Lofthouse, 2001). However, in the early 1950s and 1960s, a set of finance papers challenged previous ideas in this domain, suggesting that changes in security prices follow a random pattern (e.g., Kendall, 1953; Cowles, 1960; Alexander, 1961; Mandelbrot, 1963 and Fama and Blume, 1966). These studies provided the initial intellectual capital for the development of the EMH. Under this hypothesis, market prices are “*right*”, in that agents who understand Bayes Law⁵ and have sensible preferences set them. This means that, in an efficient market, there is *no free lunch*: no investment strategy can earn excess risk adjusted average returns, or average returns greater than those that are warranted for its risk (Pilbeam, 1998; Shleifer, 2000; Lofthouse, 2001; Barberis and Thaler, 2004).⁶

⁵ Reverend Thomas Bayes (1702-1761) developed Bayes’ Theorem, originally published after his death in 1763 and published again in 1958. Bayes’ Theorem provides a way of revising conditional probabilities by using available information. It also provides a procedure for determining how probability statements should be adjusted given additional information. For an introduction, see Wonnacott and Wonnacott (1990) and Newbold et al (2003).

⁶An interesting paradox in the concept of an efficient market was quickly noted (Lofthouse, 2001). Analysts are considered to be informed agents that collect and analyse data in order to release relevant information to the market (Schipper, 1991). This mechanism facilitates market efficiency. However, under the EMH framework, analysts cannot benefit from their research since all new relevant information is instantly reflected in market price. Fama (1991) acknowledges this issue and states that the extreme version of the EMH “*is truly false*”. A weaker and economically more sensible version of the EMH states that security prices reflect available information to the point where the marginal benefits of acting on this information do not exceed the marginal cost (Jensen, 1978).

The basic theoretical case for the EMH rests on three arguments, which rely on progressively weaker assumptions about the degree of market participants' rationality. These assumptions and their implications are discussed in the following paragraphs.

2.1.1 All market participants are fully rational

EMH proponents initially argued that all market participants are rational. Rationality means two things. First, when new information is released into the market, market participants update their beliefs correctly, particularly in the manner described by Bayes Law (Barberis and Thaler, 2004). Second, given their beliefs, agents make choices that are normatively accepted, in the sense that they are consistent with Savage's (1997) notion of Subjective Expected Utility (Barberis and Thaler, 2004).⁷ According to EMH proponents, rational investors value each security at its fundamental value and respond quickly to new information about it (Samuelson, 1965; Mandelbrot, 1966; Pliska, 1997; Le Roy and Werner, 2001 and Lo and MacKinlay, 2002). If all investors behave as the "*rational man*" described here, markets will be, by definition, informationally efficient.

2.1.2 The role of irrational agents in financial markets

Black (1986) suggests that some market participants trade on noise, not on news. The existence of these *noise traders* (or irrational agents) disputes the key assumption of the theoretical framework presented in the previous paragraph. As a result, EMH proponents moved to the position that financial markets can be efficient even when not all investors are fully rational (Elton and Gruber, 1995; Shleifer, 2000; Haugen, 2001). In this model, the assumption of full rationality is relaxed and the existence of noise traders is acknowledged. The crucial assumption of this alternative framework is that irrational agents trade randomly among themselves and thus have investment strategies that are not correlated (Sheifer, 2000). In this case, no price bias is expected to exist since opposite positions will cancel out. Consequently, the market value of any given security will converge, on average, to its fundamental value. In this framework, even in the presence of irrational agents, the market should be efficient and the EMH should hold in practice (Shleifer, 2000; Le Roy and Werner, 2001).

2.1.3 The role of arbitrageurs in financial markets

Psychological evidence shows that people do not deviate randomly from rationality but rather most deviate in the same way (Kahneman and Tversky, 1973). As a result, noise traders' investment strategies are expected to be highly correlated since these

⁷ The Theory of Subjective Expected Utility is the central element of the neoclassical theory of rational economic behaviour (Mas-Colell et al, 1995, Varian, 1999). Its basic assumptions are that choices are made among a fixed and given set of alternatives, with a subjectively known probability distribution of outcomes for each possible alternative and in such a way as to maximize the expected value of a given utility function. For further references, see Mas-Colell et al (1995), Varian (1999) and Geoffrey and Reny (2003).

investors form their demand for securities based on their common beliefs (Shiller, 1984). A systematic bias in security prices is then likely to exist. Interestingly, EMH proponents argue that markets can still be efficient even when trading strategies of irrational investors are correlated. The key factor in this approach relates to the role of arbitrageurs⁸ in the market-place and their exploitation of arbitrage opportunities (Fama, 1965).⁹ Arbitrageurs collect and analyse relevant information in order to check for any possible misalignment between the current market price of a security and its fundamental value. Given the existence of transactions costs, the market price of any security will wander around the asset's fundamental value and within an arbitrage band (Blake, 2001).¹⁰ As soon as the security price wanders outside this band, an arbitrage opportunity exists and it becomes profitable for the arbitrageur to act.¹¹ By exploiting the arbitrage opportunity, the arbitrageur aligns the security price once again with its fundamental value.

It is worth noticing three important characteristics of this process. The first is that the arbitrageur does not have to invest any money to earn a sure profit. In fact, in the classical arbitrage strategy, the arbitrageur always short sells a similar asset (in terms of risk) to the one that is being apparently mispriced by the market. This is crucial, since it makes the arbitrage *riskless* for the arbitrageur. The second aspect is that by buying and selling large quantities of these similar assets, the arbitrageur is modifying their market demand. The buying and selling behaviour will influence the market price of the two securities involved in the arbitrage strategy and the price movement will only end when the market value of both assets has converged to its fundamental value. Finally, according to EMH proponents, competition between arbitrageurs for superior returns ensures that the price adjustment mechanism produces results very quick (Shleifer, 2000). In short, it takes just one rational investor acting as an arbitrageur to justify why the EMH should hold even when irrational investors use correlated investment strategies to operate in financial markets.

⁸ Arbitrageurs are considered to be rational agents, usually specialist financial intermediaries, who act to ensure both that securities' prices do not move out of line with their fundamental value and that prices of identical securities traded in different market-places do not move out of line with each other (Blake, 2001).

⁹ There is an arbitrage opportunity when an investor operating in a financial market has a positive probability of achieving a positive return with no risk of loss (Pliska, 1997; Cochrane, 2001; Le Roy and Werner, 2001; Cvitanic and Zapatero, 2004). Blake (2001) defines the process of arbitrage as the simultaneous purchase and sale of the same, or essentially similar securities in two different markets at advantageously different prices.

¹⁰ Transaction costs define the width of the arbitrage band for every security traded in the market. The higher the transaction costs the wider the band.

¹¹ For instance, if the market price of a given security falls below the lower band, it becomes profitable for the arbitrageur to buy this security in large volumes since it is now underpriced compared with its theoretical value. However, the arbitrageur will only make his or her profit when the market corrects itself. This will happen when the security price increases to the point when it starts to wander inside the arbitrage band once again. At that time, the arbitrageur closes the position and makes his or her profit. The opposite strategy will be implemented by the arbitrageur if the security price rises above the upper limit of the arbitrage band.

2.2 Behavioural finance: an alternative approach

The traditional efficient markets framework is appealingly simple and it would be very satisfying if its predictions were confirmed in practice (Barberis and Thaler, 2004). However, in the last two decades, several empirical papers have suggested that basic facts about the aggregate stock market behaviour, the cross-section of average returns and individual trading activities cannot be fully understood within classical market pricing theory. Behavioural finance is a new approach to financial markets that has emerged, in part, as a response to the difficulties faced by the EMH. According to Thaler (1993), behavioural finance is simple “*open minded finance*” and is based on two pillars: the existence of limits to arbitrage and investor psychology (Shleifer and Summers, 1990). The following paragraphs discuss these two points.

2.2.1 Limits to arbitrage

In the EMH world, if mispricing occurs, smart investors will immediately take a position to exploit it for a profit using a *riskless* arbitrage strategy as described in subsection 2.1.3. Behavioural finance argues that this is *not* true since such strategies are, in fact, very risky and thus they cannot be considered to be arbitrage opportunities (Shleifer, 2000; Montier, 2002; Barberis and Thaler, 2004).

The behavioural finance literature presents three different reasons why arbitrage should not be considered a riskless process:

i. *Fundamental risk*: the basic idea of a riskless arbitrage strategy is that the arbitrageur always hedges his or her position. In order to this, the arbitrageur shorts a security that is similar to the one that is being apparently mispriced by the market. However, substitute securities are *usually highly imperfect*, making it impossible to remove all the fundamental risk of such investment strategy (Shleifer, 2000; Montier, 2002; Barberis and Thaler, 2004);

ii. *Noise trader risk*: De Long et al (1990) and Shleifer and Vishny (1997) introduce and explore the concept of noise trader risk. The basic idea behind this concept is that the risk of the mispricing being exploited by the arbitrageur can increase in the short run. For instance, a profitable investment opportunity can arise if a set of pessimistic irrational investors pushes the market price of a given security down to a value that is below its fundamental value. In this case, arbitrageurs can exploit this opportunity by buying this security and shorting a substitute one. However, this position is not hedged: the irrational investors can remain pessimistic about that security and trade in a way that lowers even further its market price. In this case, arbitrageurs have a *potential gain* (if the security price returns to its fundamental value) but have to deal with an *effective financial loss* in the short run. Noise trader risk matters because it can force arbitrageurs to liquidate their positions earlier, bringing them potentially steep losses (Shleifer, 2000; Montier, 2002; Barberis and Thaler, 2004).

iii. Implementation costs: bid-ask spreads, commissions and price impacts are examples of transaction costs that make it less attractive to exploit a mispricing opportunity (Barberis and Thaler, 2004). Merton (1987) also suggests that the substantial cost of finding a mispricing as well as the cost of the resources needed to exploit it have to be considered as implementation costs. However, the main constraints in the context of the implementation of an arbitrage strategy are the ones associated with short selling a security. The simplest constraint that can be found is the fee charged for borrowing a stock. In general terms, it can be argued that these fees are small. However, it is worth noticing that, in some cases, arbitrageurs cannot find securities to borrow at any price (Barberis and Thaler, 2004). Moreover, many professional money managers are simply forbidden by law to short sell securities.

The overall argument presented here is that, in contrast with the arbitrage mechanism suggested by EMH proponents, real world arbitrage entails both costs and risks, which can significantly limit the ability of arbitrageurs to exploit an eventual market mispricing (Shleifer, 2000; Montier, 2002; Barberis and Thaler, 2004). As such, persistent price deviations from fundamental value can continue to exist in the long term.

2.2.2 Investor psychology

Behavioural models assume that not all investors are *fully* rational. However, stating that investors do not behave in line with the “*rational man*” suggested by classical finance theory is not enough. In order to explain why investors are not fully rational, behavioural finance proponents use extensive experimental evidence compiled by cognitive psychologists (Shleifer, 2000; Montier, 2002; Barberis and Thaler, 2004). In fact, drawing on the cognitive psychological literature, behavioural models use concepts such as overconfidence, optimism, representativeness, anchoring, conservatism, availability biases and belief perseverance to explain how investors are likely to form their expectations and thus why there is no evident reason why they should act rationally (Montier, 2002 and Barberis and Thaler, 2004). In practical terms, this approach simply recognizes that the average investor cannot collect all the relevant information and process it rigorously as is required by classical finance theory. Instead, investors use *rules of thumb* to deal with the deluge of information available to market participants (Shleifer, 2000 and Montier, 2002).

Kahneman and Tversky (1979) and Tversky and Kahneman (1992) provide a further psychological contribution to the finance literature. These two articles present what is known as *prospect theory*, which questions whether or not investors state and evaluate preferences according to the expected utility theory (Shleifer, 2000, Montier, 2002 and Barberis and Thaler, 2004). In general, Kahneman and Tversky (1979) and Tversky and Kahneman (1992) suggest that individuals tend to use cognitive heuristics when they have to deal with the complex task of assigning probabilities to uncertain outcomes. Moreover, by manipulating the decision frame, Kahneman and Tversky (1986) demonstrate that individuals make “consistently inconsistent” decisions, something that is also not predicted by the expected utility theory.

In short, the literature on cognitive psychology provides a promising framework for analysing investor behaviour in the stock market. The breakthrough achieved with this approach is that the stringent assumption of rationality used in conventional market models can finally be relaxed. This leads to a new context in which several persistent anomalous findings can be better understood (Shleifer, 2000, Montier, 2002 and Barberis and Thaler, 2004).

2.3 Behavioural finance, the EMH and bankruptcy

Traditionally, finance literature distinguishes between three major categories of market efficiency: weak form efficiency, semi-strong form efficiency and strong form efficiency. This classification was initially presented in Fama (1970) and it is based on the type of information that is reflected in the security prices (Elton and Gruber, 1995; Blake, 2001):

1. A market is said to be *weak form efficient* if current security prices instantly and fully reflect all information conveyed by prior security price history. The inconsistent performance of technical analysts suggests that this form of market efficiency holds in practice (Elton and Gruber 1995; Lofthouse, 2001). In 1991, Fama expanded the concept of weak form efficiency to include predicting future returns with the use of accounting and/or macroeconomic variables. Several empirical papers provide an argument against this new definition of the weak form market efficiency (e.g., Basu, 1977; Banz, 1981; Reinganum, 1981; Campbell and Shiller, 1988);
2. A market is said to be *semi-strong form efficient* if the current prices of securities instantly and fully reflect all publicly available information. Financial economists use event studies (both long and short window) and cross-sectional tests of return predictability to explore to what extent the semi-strong definition of an efficient market holds in practice (Kothari, 2001). Interestingly, published results are mixed and thus no consensus exists on whether or not markets are semi-strong form efficient (Kothari, 2001);
3. A market is said to be *strong form efficient* if current securities prices instantly and fully reflect all information, both public *and private*. Seyhun (1986, 1988) shows that insiders profit from trading on information that is not already incorporated in stock prices. Hence, these results suggest that the strong form of an efficient market does not hold in practice.

The semi-strong form of an efficient market is the most relevant one for the studies that explore the market reaction to corporate bankruptcy announcements. In fact, the majority of the studies in this domain tests whether the information relating to the bankruptcy announcement is fully incorporated into the company's stock price on a timely basis. Two possibilities exist. If the equity market is semi-strong efficient, no under or overreaction to bankruptcy announcement is expected to exist and, consequently, rational investors should not be able to exploit arbitrage opportunities. There is, in fact,

some evidence that the market for distressed company's stock is fairly efficient (e.g. Altman, 1969; Aharony et al, 1980; Clark and Weinstein, 1983). However, studies documenting that stock prices only react partially to new information events offer an alternative possibility (e.g. Ball and Brown, 1968; Bernard and Thomas, 1989; Michaely, Thaler and Womack, 1995; Ikenberry and Ramnath, 2002; Taffler et al, 2004 and Kausar et al, 2004). In this case, information associated with the bankruptcy announcement should only be partially incorporated in the stock price, creating an investment opportunity for rational investors.

The next section presents a brief review of studies that explore this question in the context of the debate between the EMH and behavioural finance.

3. Empirical Research on the Market Reaction to Corporate Bankruptcy Announcements: Implications for the EMH and Behavioural Finance

The announcement of a bankruptcy filing should be associated with market activity since it provides material information about the potential reduction of the firm's value. Even in the most optimistic scenario, a bankrupt firm still has to pay the legal and other costs associated with bankruptcy administration, which will reduce its fundamental value (e.g. Altman, 1984; Opler and Titman, 1994; Gilson et al, 2000; Branch, 2002). Furthermore, firms filing for bankruptcy will usually have to bear indirect costs such as the diversion of scarce management time while bankruptcy is underway, additional lost sales during and after bankruptcy, constraints on capital investment and R&D spending, and the loss of key employees after the bankruptcy becomes effective. These costs also affect the firm's fundamental value (Meggison, 1997 and Grinblatt and Titman, 2002). Accordingly, it is reasonable to expect a market reaction to bankruptcy announcements. The next sub-sections summarize what empirical research has uncovered about this issue.

3.1 Evidence consistent with markets reacting efficiently to corporate bankruptcy announcements

Academic literature largely suggests that securities traded in the high yield bond market are efficiently priced (e.g. Friedson and Cherry, 1990; Blume et al, 1991; Cornell and Green, 1991; Buell, 1992; Eberhart and Sweeney, 1992 and Altman and Eberhart, 1994). Several researchers have also provided evidence that equity markets are efficient in the more restrictive context of corporate bankruptcy.

One of the first studies addressing this issue is Altman (1969). The paper presents a model that measure stockholders' performance and examines the post-bankruptcy experience of approximately 70 US corporations that filed for bankruptcy before the implementation of the Bankruptcy Reform Act of 1978. After controlling for risk factors, Altman (1969) finds an insignificant difference between the bankrupt firm sample returns

and the average return on common stocks listed on the New York Stock Exchange. He concludes that bankrupt companies' stock "*is not an attractive investment*". Warner (1977) uses a sample of 20 US railroads that went bankrupt between 1930 and 1995 to analyse the behaviour of bond returns in the context of corporate failure. He concludes that, on average, bondholders have a negative abnormal return of 9.2 percent in the bankruptcy filing month.

Aharony et al (1980) analyse the risk and return characteristics of 45 US industrial firms that declared bankruptcy around the event announcement date. Their findings demonstrate that the differential portfolio return turn negative approximately four and a half years before bankruptcy and declines increasingly thereafter. Aharony et al (1980) also report a further sharp decline seven weeks before the actual filing date. This paper highlights an increase of bankrupt firm returns variance, leading to the conclusion that non-systematic risk increases as the date of bankruptcy filing approaches.

Clark and Weinstein (1983) also examine market anticipation of bankruptcy filings before implementation of the Bankruptcy Reform Act of 1978 in the US. This paper similarly presents evidence of shareholder losses long before bankruptcy announcement. These losses are especially acute for the month in which the bankruptcy occurs and are particularly concentrated in the three-day interval surrounding the bankruptcy filing. Based on these findings, Clark and Weinstein (1983) conclude that bankruptcy filings convey important unanticipated information to the market and that the market reacts in a timely manner to this news. In the same year, El Hennawy and Morris (1983) examine the price behaviour of 20 British companies that failed between 1960 and 1971. Consistent with Clark and Weinstein (1983), this paper suggests that, on average, the UK equity market begins to perceive a firm's difficulties as early as five years prior to bankruptcy.

Morse and Shaw (1988) empirically test the impact of the Bankruptcy Reform Act of 1978 (made in the US law) in the risk and return characteristics of the stock of bankrupt firms. This paper contributes to finance literature in several ways. Firstly, the paper verifies that firms going into bankruptcy prior to 1978 experience the same degree of financial distress as firms going into bankruptcy after that date. Morse and Shaw (1988) also suggest that a firm systematic risk is not significantly affected by the bankruptcy announcement. However, stock total risk does increase during the bankruptcy period. In addition, the authors conclude that although the three-year average returns for firms that have entered bankruptcy appear large, they are not significant. Additionally, there is evidence suggesting that stock prices of firms in bankruptcy react favourably to both the announcements of the reorganisation plan's filing and to creditor approval of the plan.

Lang and Stulz (1992) use a sample of US enterprises to examine the impact of a bankruptcy announcement on other firms in the same industry. They examine two intra-industry effects: the contagion effect and the competitive effect. Lang and Stulz (1992) find that the value-weighted portfolio of common stock of industry competitors falls by 1 percent. Moreover, these effects were greater for a sub-sample consisting of industries that were highly levered and faced a high degree of competition, while the effects were

significantly positive for industries with low leverage and lower degree of competition. This study also presents evidence of significant negative abnormal returns for the firms entering into bankruptcy proceedings in the days surrounding the bankruptcy announcement itself. In fact, Lang and Stulz (1992) document an average loss of 28.5 percent for the bankrupt firms from five days before to five days after the announcement date. In a complementary study, Datta and Iskandar-Datta (1995) use a sample of 37 US firms that filed for bankruptcy between 1980 and 1989 to examine the information content of bankruptcy announcements on stockholders and three classes of debtholders. The study provides further evidence that stock prices decline sharply near the bankruptcy date. More interestingly, Datta and Iskandar-Datta (1995) report that different classes of debtholders react differently to the information revealed by the bankruptcy announcement. On the one hand, secure debtholders are unaffected by it. On the other hand, the announcement that a firm is going to file for bankruptcy produces a significant adverse price reaction in the unsecured and the convertible debt classes.

Dawkins and Rose-Green (1998) examine the relation between prior *Wall Street Journal* announcements of possible bankruptcy filings and price reaction to subsequent bankruptcy filings in the US domain. In the EMH world, it is expected that the magnitude of observed price reaction to announcements of economic events will be inversely related to the amount of unexpected information or surprise contained in these announcements. In this context, Dawkins and Rose-Green (1998) argue that firms being mentioned in the *Wall Street Journal* as possibly bankrupt should experience a smaller price fall around the date that they actually file for bankruptcy when compared to other similar firms not previously mentioned as likely to be going bankrupt by the same newspaper. The study results suggest that the EMH holds in this case. After controlling for a set of relevant variables, Dawkins and Rose-Green (1998) conclude that firms with a prior announcement in the *Wall Street Journal* do experience a smaller price reaction to bankruptcy filing when compared to the other group of firms. In another study, using US data, Rose-Green and Dawkins (2000) investigate if, at the time of bankruptcy filing, the market differentiates between firms that are subsequently liquidated and firms that are subsequently reorganized. Their results show that liquidated firms have significantly larger negative price reaction at the bankruptcy filing date than those firms subsequently reorganized. The authors thus conclude that the equity market is efficient, in the sense that it has a high degree of insight into subsequent bankruptcy resolution.

Drawing on Tavakolian's (1994, 1995) argument that the US bankruptcy law enables economically viable firms to file bankruptcy petitions for strategic reasons, Rose-Green and Dawkins (2002) suggest that under the EMH, strategic bankruptcy filings should be accompanied by smaller stock price declines than financial bankruptcy filings. The authors then test this hypothesis using a sample of 245 US firms that filed for bankruptcy between 1981 and 1996. The overall results presented in the paper support the predictions of the EMH: in the period around the bankruptcy filing date, firms that file financial bankruptcy have significantly larger price declines than firms filing strategic bankruptcy.

A final paper of relevance to this literature review is that of Bi and Levy (1993). This study explores how bond downgrades affect stock returns. Bi and Levy (1993) use a set of US companies to compare the market reaction to bond downgradings followed by Chapter 11 filings and similar bond downgrades which are not followed by Chapter 11 filings. Their results show that shareholders of firms receiving a bond downgrade and that subsequently file for Chapter 11 bear negative abnormal returns on the announcement date. On the other hand, shareholders of similar firms that also receive a bond downgrade but do not file for Chapter 11 do not experience such abnormal returns. Bi and Levy (1993) conclude that the stock market differentiates between two apparently identical downgrading events, presenting evidence in favour of the EMH.

Overall, these studies indicate that both the announcement of bankruptcy and the anticipation of the announcement are accompanied by significant market activity. Stock prices tend to decline years before the formal announcement of corporate failure and especially around the bankruptcy announcement date. The empirical evidence presented above is thus consistent with the market for bankrupt firms being efficient in the manner described in Fama (1970).

3.2 Evidence inconsistent with markets reacting efficiently to corporate bankruptcy announcements

Prior research suggests that the market sometimes either underreacts or overreacts to corporate announcements. For example, there is a widespread consensus that prices underreact to earnings announcements (e.g., Ball and Brown, 1968; Bernard and Thomas, 1989; Freeman and Tse, 1989; Mendenhall, 1991) dividend cuts (Michaely et al, 1995) analysts reports (e.g. Womack, 1996), stock splits (e.g. Ikenberry et al, 1996; Ikenberry and Ramnath, 2002), announcements of insider trades (e.g. Lakonishok and Lee, 2001) and value stocks share repurchases (e.g., Ikenberry, et al, 1996). Odean (1998) and Bloomfield et al (2000) characterize these types of corporate announcements as aggregating a large amount of underlying detail about the firm's past operations and future prospects into individual statistics. They suggest that potential market underreaction to such announcements is consistent with the evidence from the psychology literature that people tend to underweight abstract statistical information that is less salient but nonetheless highly relevant because it summarizes a large amount of underlying data. On the other hand, the psychology literature concludes that people overreact to salient, anecdotal, extreme evidence (e.g. Kahneman and Tversky, 1973; Griffin and Tversky, 1992). Odean (1998) points out that this latter conclusion is consistent with prior research in finance documenting overreaction to relatively uncommon and attention-grabbing news stories (e.g., Pari, 1987; Liu et al, 1990; and Barber and Loeffler, 1993).

Research in the domain of corporate bankruptcy has also provided some evidence that the market does not react efficiently to such announcement. One interesting contribution in this context can be traced to Johnson (1989). The EMH suggests that systematic risk should increase as firms approach bankruptcy or/and financial leverage increases, assuming that the other influential factors are held constant (Hamada, 1972;

Galai and Masulis, 1976; Kim, 1978; Dejong and Collins, 1985). Johnson (1989) uses a shifting regression model that accounts for the problem of nonsynchronous trading to analyse the risk behaviour of a sample of 60 US companies in financial distress in the period of 1972 to 1986. Contrary to what the EMH suggests, his results show that equity betas are nonstationary, but the nonstationarity is unique to the individual firm and cannot be assumed *a priori*. Johnson (1989) also presents evidence that the time-series behaviour of equity betas over the five years preceding the bankruptcy filing is invariant with respect to the bankruptcy outcome, something that is also not predicted by EMH.

Another study by Hotchkiss (1995) examines the performance of 197 US public companies that emerged from Chapter 11 in the period of 1979 to 1988. The results show that a large number of these firms are simply not viable or, at least, need further restructuring. This leads to the conclusion that there are economically important biases toward reorganization under the US bankruptcy law. Hotchkiss (1995) also suggests that retaining pre-bankruptcy management is strongly related to worse post-bankruptcy performance. Moreover, the paper also presents evidence that firms often fail to meet cash flow projections prepared at the time of reorganization, particularly when pre-bankruptcy management remains in office through the time these projections are made. In a related piece of research, Eberhart et al (1999) investigate market efficiency for firms emerging from bankruptcy in the US. Their conclusion suggests that this market is highly inefficient in that, after controlling for transaction costs and risk characteristics, there is strong evidence that investors of firms emerging from bankruptcy are able to earn positive abnormal returns in the longer-term (200-day window). Eberhart et al (1999) also show that the market is surprised by the performance of this type of firm, something that is not in line with the conclusions of Hotchkiss (1995). In fact, investors in such firms also earn positive abnormal returns around subsequent earnings announcements.

Dawkins and Bamber (1998) examine the timing of market reaction to corporate failure in the US. In the EMH framework, the market is expected to react as soon as new relevant information about the fundamental value of any security is released. However, Dawkins and Bamber (1998) argue that the market can overlook or disregard some of the publicly available information in their assessment of securities' fundamental value even in the case of relevant economic events like corporate bankruptcy filing. The authors test this proposition by comparing the market reaction at the date of formal bankruptcy filing with the market reaction on the date that corporate bankruptcy is disclosed via the Broadtape. Contrary to what is predicted by the EMH, Dawkins and Bamber (1998) find that most of the market reaction occurs on the Broadtape disclosure date rather than the bankruptcy petition filing date, when this information becomes publicly available in the first place. This result holds after controlling for firm size, exchange listing and prediscovered information.

A final relevant paper is Gilson (1995). This paper surveys the theory and practice of investing in distressed situations. The author concludes that investors that are skilful in valuing firms' assets, that have superior negotiating and bargaining skills and understand the risk of investing in distressed situations can consistently earn money in this market by

using standard investment techniques. This situation is inconsistent with the notion of *no free lunch* predicted by the EMH framework.

3.3 Discussion of the empirical evidence and suggestions for further research

The previous literature review suggests that, despite all the work that has been undertaken in the area of market reaction to the announcement of corporate bankruptcy, finance scholars have not yet been able to provide a clear answer to whether the market is efficient or not in this extreme context. In fact, several papers provide evidence in favour of the EMH predictions but many others provide a solid basis for challenging this conclusion. Research in similar areas of knowledge has been able to make a considerable contribution to the finance literature from a behavioural finance perspective. Consequently, it is expected that further research on this issue will enhance our knowledge about the way markets work in the extreme bad news domain.

Several particular research projects seem interesting to explore at this stage. One of the most promising ones is to replicate existing studies using non-US data since almost all of the existing studies in this domain use exclusively US data. It would be particularly interesting to explore the German and French cases due to the legal differences that exist between these two countries and the US. Another possible extension of the existent research would be to analyse the market reaction after the bankruptcy has become effective. Virtually all of the existent studies explore the market reaction *prior* to the bankruptcy announcement or after the firms emergence from that situation. What happens between these two moments is still fairly unexplored in the literature. A final research idea is to verify to what extent is possible to forecast which firms will successfully emerge from Chapter 11. Existing literature does not provide a clear answer to this important question.

4. Conclusion

This paper presents a brief review of the existing literature related with one of the most researched questions in finance: are financial markets informationally efficient? The paper begins by contrasting two different theoretical perspectives in this domain: the efficient market hypothesis and behavioural finance. The authors argue that a particularly interesting research area to explore the competing predictions of these two theoretical frameworks is the market reaction to worst possible case of bad news: the announcement of corporate bankruptcy. A review of the empirical work on this subject shows that the empirical results nowadays available are contradictory and thus finance literature has not yet provided a clear answer about the degree of market (in)efficiency in the context of this extreme bad news event. This presents an opportunity for further research. In the last part of the paper, the authors suggest some research topics that can be explored in order to explore the existent gaps in the literature.

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