



Distress Anomaly: An International Analysis

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Dissertation written under the supervision of Professor Ricardo Reis

Dissertation submitted in partial fulfilment of requirements for the MSc in International Finance, at the Universidade Católica Portuguesa, January 2025.

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ABSTRACT

The relationship between distress risk and returns has been puzzling and difficult to interpret, as distressed stocks have earned lower returns than expected throughout different years and geographical areas. This event has been labeled as the distress anomaly by practitioners. This study provides an in-depth analysis of the matter by dissecting more than 90 countries stock returns to find evidence and possible causes of the phenomenon. The results provide for contrasting evidence throughout the different levels of testing implemented, with traces of the anomaly found especially among emerging economies. country specific characteristics related to the private sector development and regulations seem to have an influence on the matter, as the lower the transparency and effectiveness of the measures is, the higher the probability is to find evidence of the anomaly.

Keywords: distress risk, analysis, returns, anomaly

Anomalia de risco financeiro: Uma Análise Internacional

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RESUMO

A relação entre o risco financeiro e os retornos tem sido intrigante e difícil de interpretar, uma vez que ações em situação de risco de falência têm registrado retornos inferiores ao esperado ao longo de diferentes anos e áreas geográficas. Este fenômeno foi denominado como a "anomalia de risco financeiro" pelos profissionais da área. Este estudo apresenta uma análise aprofundada do assunto, examinando os retornos de ações de mais de 90 países para encontrar evidências e possíveis causas do fenômeno. Os resultados fornecem evidências contrastantes ao longo dos diferentes níveis de testes implementados, com indícios da anomalia encontrados especialmente entre economias emergentes. Características específicas dos países relacionadas com o desenvolvimento do setor privado e regulamentações parecem influenciar o fenômeno, uma vez que, quanto menor for a transparência e a eficácia das medidas, maior é a probabilidade de encontrar evidências da anomalia.

Palavras-chave: risco financeiro, análise, retornos, anomalia

ACKNOWLEDGEMENTS

I take this opportunity to express all my gratitude towards a series of people that helped me pave my way throughout this beautiful journey and step in both my professional and personal life.

First and foremost I would like to thank Professor Ricardo Reis, who supported me throughout the development of this thesis. The way you conducted our meetings and expressed your opinions and counsel has been so helpful and direct, and this made all the difference in the world, calming me down and also guiding me down the right path. I did not have the chance to follow your courses, but I'm happy and grateful to have chosen you as my supervisor for this work.

Another heartfelt mention goes to all faculty members at Católica Lisbon. The way you welcomed and treated every single student coming through the university, myself included, has made all the difference in the world in making everyone feel like home.

A thank you also goes to my fellow students, as I shared a great journey with you, as well as an unforgettable experience. Same goes for my friends, the one I already had that visited me all the way from Italy, the ones that shared the journey with me and the ones I made along the way.

Finally, I would like to thank my family, my sister for always being there when I needed no questions asked, and my parents for allowing me to enjoy this opportunity to the fullest, I literally could have not done it without you and for that, and a billion other things, I will always be grateful to you.

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1. INTRODUCTION

Financial distress is a condition that is best defined as a state where a firm's ability to meet its financial obligations is compromised, and thus it represents a great concern within the corporate and financial world. Since this phenomenon can have huge implications for all the stakeholders, including shareholders, creditors, employees, and the broader economy in general, financial literature has described financial distress as a costly event and a key to determine firms' optimal capital structures.¹

Numerous factors have an impact on financial distress. For example, recessions or financial crises that can happen during the different economic cycles, can lead to a decreased demand for a firm's products or services, which subsequently cause to lower its prices, and eventually a reduced revenue. Moreover, human errors and behavioral biases, such as ineffective leadership, strategic errors, and operational inefficiencies can contribute to financial distress. External factors like increased competition, which shrinks market share and lowers profit margins, also can accelerate the collapse of a firm's financial position.

Finally, financial mismanagement, including poor accounting practices, fraud, and other irregularities, can lead to misleading financial statements and overstated assets.

Subsequently, understanding the causes, consequences, and implications of financial distress is essential for researchers, policymakers, and practitioners alike.

In this thesis, the focus is going to be put on the stock performance of distressed firms, as it has been a topic of several academic studies and discussions, dating back to 1992, when Fama and French suggested such financial distress risk as a potentially suitable driver for the value premium.²

However, even though the logical explanation would suggest that such stocks provide investors with a premium to compensate for the risk taken, equities characterized by financial distress obtained lower than expected returns more than once. Additionally, Campbell, Hilscher, and Szilagyi (2008) found out that most distressed stocks have negative excess returns. Such

¹ Opler, Tim C., and Sheridan Titman. "Financial distress and corporate performance." *The Journal of finance* 49.3 (1994): 1015-1040.

² Fama, Eugene F., and Kenneth R. French. "The cross-section of expected stock returns." *the Journal of Finance* 47.2 (1992): 427-465.

evidence, paired with the academic literature behind it, led to a research phenomenon referred to as “distress anomaly” or “distress risk puzzle”.³ This anomaly represents this paper’s main topic, as the following pages will try to dissect it and give potential answers and explanations on the phenomenon.

³ Campbell, John Y., Jens Hilscher, and Jan Szilagyi. "In search of distress risk." *The Journal of finance* 63.6 (2008): 2899-2939.

2. LITERATURE REVIEW

As previously mentioned in the introduction, the research topic of this study is the phenomenon known as distress anomaly, labeled as such due to the deviation of the realized returns of stocks from the expected outcome based on their level of financial stability. The research questions formulated from it aim to dig deeper on the existence and persistence of the phenomenon worldwide, in order to highlight any eventual trends and consistencies to give a potential explanation to the anomaly. This phenomenon has been the topic of various studies, which lay the foundation for the thesis.

An important and fascinating premise is the fact that no definitive explanation has proven completely effective and accurate thus far, as different theories and valid arguments have risen. One of the main contributions to the discussion comes from the study of Campbell, Hilscher, and Szilagyi (2008), as it states that distressed stocks don't have the returns theoretically expected, and they go as far as stating that excess returns to most distressed stocks have been found to be negative.⁴ Additionally, their findings also show high market betas, with high loadings on the Small minus Big and High minus Low factors for said stocks. The authors then argue that these loadings cannot be seen as compensation for the risk taken, as smaller stocks present a stronger presence of the anomaly. They conclude by stating that this situation derives from a series of events that investors did not and could have not anticipated, thus leading to the results indicated.

This thesis finds support in the paper of Chava and Purnanandam (2010), as it tries to explain such low returns with the fact that the relationship between realized returns and financial distress risk is only due to unanticipated events.⁵ In fact, the study states that the cross-sectional relationship between expected stock returns and default risk is actually positive, as they extend the period considered. This would mean that the anomaly is, in fact, non-existent or rather the product of an in-sample casualty, especially for a period limited to the 1980s and mostly evident in U.S. stocks, and as such it is unlikely to keep on going in the foreseeable future.

⁴ Campbell, John Y., Jens Hilscher, and Jan Szilagyi. "In search of distress risk." *The Journal of finance* 63.6 (2008): 2899-2939.

⁵ Chava, Sudheer, and Amiyatosh Purnanandam. "Is default risk negatively related to stock returns?." *The Review of Financial Studies* 23.6 (2010): 2523-2559.

Another possible explanation of the phenomenon again comes from Campbell, Hilscher, and Szilagyi (2008), as the paper points out that majority owners of such companies can benefit from these situations, for example by obtaining the company's assets at reduced prices.⁶ Furthermore, investors tend to prefer positively skewed stocks, such as the distressed stocks, so much that it compensates the lower returns.

Avramov, Chordia, Jostova and Philipov have produced two papers based on the distress risk and its correlated anomalies.⁷ In the more recent one, dated 2021, they provide evidence from stocks and corporate bonds that reinforce the existence of the anomaly. The study states that the mispricing of both distressed stocks and bonds can be an effect of excess investment and excess external financing. However, the paper also shows that the anomaly is still an unresolved puzzle, as they cannot provide a clear explanation and motivation of the persistence of this effect.⁸

Finally, arguments can be made that the anomaly could derive from a misevaluation, as investors could be wrong in their failure predictions and thus provoke such effect. This would explain the fact that the phenomenon was especially evident in a limited frame, represented by the 1980s U.S. stocks, but it fails to clarify why the anomaly is still detected across different studies and time windows.

Eisdorfer, Goyal and Zhdanov (2014) also tried to answer all those questions, through a detailed analysis and comparison of both U.S. and other international stocks.⁹ Starting from the U.S., the study expands the scope by including stocks from 34 different countries. Their main findings show that the anomaly seems to appear in developed countries, but not in emerging economies. To provide explanations of this effect, the paper also includes a breakdown of various potential drivers of the stocks' returns. Evidence suggests that various aspects of shareholders' risk do in fact play an important role in shaping distressed stocks returns.

This thesis proposes to replicate the base of the paper just mentioned, to test if such hypothesis still hold, and whether the financial distress anomaly is truly a mere in-sample casualty or an

⁶ Campbell, John Y., Jens Hilscher, and Jan Szilagyi. "In search of distress risk." *The Journal of finance* 63.6 (2008): 2899-2939.

⁷ Avramov, Doron, et al. "Anomalies and financial distress." *Journal of Financial Economics* 108.1 (2013): 139-159.

⁸ Avramov, Doron, et al. "The distress anomaly is deeper than you think: Evidence from stocks and bonds." *Review of Finance* 26.2 (2022): 355-405.

⁹ Eisdorfer, Assaf, Amit Goyal, and Alexei Zhdanov. "Distress anomaly and shareholder risk: International evidence." *Financial Management* 47.3 (2018): 553-581.

actual phenomenon. The choice derives from the completeness of the study, which tried to go beyond the simple finding of the existence of this effect by also studying the other plausible factors that have an impact on stock returns, as to see if financial distress plays only a marginal role. By replicating similar settings, it is possible to implement a cross-country comparison, as well as an analysis based on the economy classification of the countries included. This would ideally lead to an addition to the findings of preexisting literature, hence providing more clarity and information on the matter.

Thus, in the following pages the analysis of the distress anomaly will be conducted across a multitude of countries, also grouped based on the classification of their economy as either developed or emerging. Timewise, the selection includes up-to-date data, as to analyze the development of such effect over the years, in order to minimize the chance of results affected by in-sample biases and effects which have been indicated as a plausible cause of the phenomenon by the previous studies, as well as providing a continuation of the literature, as the Eisdorfer, Goyal and Zhdanov (2014) study used data ranging from 1992 to 2010. Through these choices, comparison of results is more direct and efficient, which helps identifying any common patterns and conclusions, making any eventual common findings more concrete and reliable.

3. METHODOLOGY

In order to get a complete overview and tackle the problem accordingly, the first stepstone needed was the financial distress measure. Different options were available, but the choice fell upon KMV distance-to-default. This method is one of the most well-known extensions of the Merton model and it follows a simple intuition, as it calculates the number of standard deviations that the asset price must change to trigger the default T periods in the future. This way estimates are made about the distance to default for a company, basing the calculations on tangible data such as debt structure and market capitalization.

The reasoning behind this choice is the fact that to estimate the measure, few inputs are needed and thus, it is more likely to be applicable for firms across different countries, as some accounting ratios and information are tougher to find. Moreover, other possibilities such as the Altman Z-Score need various accounting inputs and financial ratios, and sometimes may also need fixed numbers, such as the multipliers for each ratio in the case of the Z-Score, that should be country- and time-sensitive to have a more precise evaluation, making the cross-country comparison more difficult and less concise. On the other hand, simpler methods such as the implementation of credit rating also could not have been implemented, as only a small portion of non-U.S. firms have it available. Contrary to these methodologies, as long as the companies considered are public and thus have basic accounting data available, it should be possible to obtain the KMV measure, making it the most suitable financial distress measure for a cross-country comparison.

The KMV distance-to-default takes its name from a provider of quantitative credit analysis tools, which gave birth to such model in the late 1980s, as it was founded by three finance experts named Stephen Kealhofer, John McQuown and Oldrich Vasicek. Starting from the Merton model, they tried to make the theoretical model practical and actionable for assessing credit risk in real-world scenarios. This method relies on the estimation of two fundamental quantities: the distance-to-default and the Expected Default Frequency, or EDFTM (EDF from now on to simplify notation).

EDF, also known as Probability of Default, is best defined as the probability that a given firm will default within one year, whereas DD is the measure of the previously mentioned intuition of the number of standard deviations that the asset price must change to trigger the default T periods in the future.

Distance-to-default can be obtained through the following formula:

$$DD = \frac{V_0 - DP}{V_0 \sigma_V}$$

EQUATION 1: DISTANCE TO DEFAULT MEASURE

Where V_0 and σ_V stands for market value of Assets and the stock volatility respectively. DP is short for default point, which comprises the indebtedness situation of the firm and is calculated as:

$$DP = \text{Short Term Debt} + 0.5 \text{ Long Term Debt}$$

EQUATION 2: DEFAULT POINT MEASURE

Such equation has more weight on short term debt, as it is more relevant for distressed stocks rather than long term debt.

EDF is then computed as:

$$EDF = \phi(DD)$$

EQUATION 3: EDF MEASURE

As shown by the formulas, few inputs are needed to obtain these measures. This makes the inclusion of various countries and firms possible, as well as for a more linear and direct comparison of the results obtained.

The stock returns and accounting data needed was retrieved for both U.S. and international firms. Numbers were obtained through the Wharton Research Data Services, known as WRDS database for American firms, mainly from the Center for Research in Security Prices, or CRSP, and Compustat, in particular for returns and accounting information, respectively. Concerning the international side, Datastream was also implemented to integrate all data. A total number of 93 countries was included, with a different amount of firms for each one of them. The proper headcount of all the companies included in the study can be found in *Table 1*, as it contains the ISO country code of the various nations with the respective number of firms considered for the

study, with a geographical breakdown also provided in *Figure 1* and *Figure 2*. In total, almost 15,000 different stocks were integrated in the research. All returns were obtained in U.S. dollars, this way having a more homogeneous dataset, as well as having compatible numbers with the Kenneth French data library, which has been implemented later in the study. The numbers obtained span from 2005 all the way up to 2023. The choice of this timeframe derives from the will to adjourn the previous studies results, in order to see if those still hold or new evidence is found. Another reason is the fact that the time span is of exactly the same length as the referenced study, with the last year considered being the most recent one in terms of data availability, just so that the comparison can be more reasonable, and the results be as up to date as possible. Moreover, including a new range is supposed to debunk the hypothesis that the distress anomaly is simply a derived effect of an in-sample analysis, as if results match the previous findings, it should be fair to assume that they are not a consequence of an in-sample problem, but more of an actual observed event.

To have a deeper understanding of the impact of financial distress and highlight plausible elements that enhance or reduce the anomaly, country-specific characteristics concerning regulations transparency for the private sector, which impacts shareholders' risk, were retrieved to be implemented in the process. Unfortunately, this study could not include the same ones as the referenced paper, which could have been useful for a more direct comparison of results, as Eisdorfer, Goyal and Zhdanov (2014) had the opportunity to use a major portion of indicators coming from a previous study of Andrei Shleifer, which reported its data in his own website.¹⁰ However, said data was only available up until 2008, making it of little to no use in the timeframe selected. The alternative has been found in the Worldwide Governance Indicators provided by The World Bank. They are defined to: “*describe broad patterns in perceptions of the quality of governance across countries and over time.*”¹¹

In particular, two key factors have been chosen, as they could have an actual impact over the possible default fluctuations and results. The discussed factors are Regulatory Quality and Rule of Law. The first one expresses the perception on the countries governments' ability to implement proper policies to develop and promote the private sector, hence a higher score could also mean that a general help to stocks and especially financially distressed ones. Rule of Law instead is concerned about confidence and quality of contract enforcement and property rights. This could also influence distress factors, as more clear and uptight rules have a direct impact

¹⁰ Andrei Shleifer website: <https://scholar.harvard.edu/shleifer/publications/type/working-paper>

¹¹ World Bank website: <https://www.worldbank.org/en/publication/worldwide-governance-indicators>

on distress situations management. Both estimates have ranges that span from -2.5 to +2.5, which indicate respectively the worst and best possible performance there is for said measures.

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Starting from this data, the first step was to obtain stock volatility, as it is a needed input for the calculation of the default measures introduced before. Volatility was annualized, based on *Equation 4*, starting from daily volatility for U.S. stocks and monthly volatility for international ones, as a way to get more precise indicators of fluctuations, as well as reducing the risk of possible outliers in the data.

$$\sigma_{Annualized} = \sigma_T * \sqrt{T}$$

EQUATION 4 - VOLATILITY ANNUALIZED

Through the formulas introduced before, the distance to default and the probability of default were also retrieved for every stock on a quarterly basis. From these outputs the analysis of distress anomaly was carried out.

Following the footsteps of the Eisdorfer, Goyal and Zhdanov (2014) paper, the anomaly was checked for through various levels.¹³ A first quick overview was given by reporting descriptive statistics of the data found and retrieved, as to see eventual trends related to the level of distress across the different countries. In *Table 1* averages for the distress measure are reported for each country.

Countries were then grouped based on their economy's classification into Developed or Emerging, as well as a more general international category, opposed to the USA single country analysis. This way a direct comparison to the aforementioned study was possible and, within a broader scope, U.S. results were isolated to also ensure a level of comparison to the other studies mentioned, which had focused only on said nation. The classification followed the Morgan Stanley Capital International (MSCI going forward) categorization. The framework for such

¹² World Bank Economic Indicators description manual:
<https://documents1.worldbank.org/curated/en/630421468336563314/pdf/WPS5430.pdf>

¹³ Eisdorfer, Assaf, Amit Goyal, and Alexei Zhdanov. "Distress anomaly and shareholder risk: International evidence." *Financial Management* 47.3 (2018): 553-581.

classification has been introduced by MSCI in 1988 and it is based on three main economic dimensions consisting of economic development, size and liquidity of equity markets and market accessibility for foreign investors.¹⁴ From the analysis of these variables, each country is then classified as either an Emerging or Developed economy.

Using this grouping, four different portfolios were formed on the distance-to-default measure, containing firms from Emerging and Developed markets, as well as an international portfolio containing worldwide stocks and lastly a U.S. specific portfolio. The construction was made possible by subdividing stocks into five different quintiles based on the distress measure, and then the zero-cost portfolio for each categorization was constructed by buying the D5 quintile, which represents the quintile of stocks with the higher distance-to-default, hence the least distressed ones, and selling the D1 quintile, containing the most distressed stocks. This choice should yield positive returns if the anomaly is present throughout the different areas of interest, as it would mean that the performance of the least distressed stocks is better than the distressed counterpart. Every portfolio contains equal-weighted returns of the respective stocks, and the number of firms included in the construction varies over time due to data availability of the sample of firms selected as well as based on the categorization used, as there are different number of firms for Developed, Emerging International and U.S. pools.

The portfolios' excess returns were then confronted against the Capital Asset Pricing Model, CAPM going forward, and the Fama-French 3-factor model. The CAPM factor model tries to capture the excess returns' variance by only using the market excess returns factor, whereas the 3-factor model also includes two additional factors, consisting of Small Minus Big, known as SMB factor, and High Minus Low, or HML factor. These additional components represent the size and value factors, using market capitalization and book-to-market respectively as proxies. The base for the birth of the 3-factor model was laid down by a study from Fama and French, which underlines the failure of the CAPM and also proposes an alternative two-factor model that includes a value factor. The need of considering more than a single factor model comes in this study from the fact that there is no consensus regarding the appropriate model. Additionally, the inclusion of the 3-factor model was made purposefully to test the hypothesis proposed by Campbell, Hilscher, and Szilagyi (2008) that distressed stocks have high loadings on these factors¹⁵, as by including the portfolios containing the most distressed stocks, evidence should

¹⁴ MSCI website: <https://www.msci.com/our-solutions/indexes/market-classification>

¹⁵ Campbell, John Y., Jens Hilscher, and Jan Szilagyi. "In search of distress risk." *The Journal of finance* 63.6 (2008): 2899-2939.

also be there to confirm it. It is also worth noting that there is no consensus over the appropriate method of factors construction, hence the inclusion of multiple models should account for any theoretical errors of said models. This study, however, does not propose itself to take part in asset pricing methods, so, similarly to Eisdorfer, Goyal and Zhdanov (2014), it does not deep dive into the technicalities of the proposed methods and instead uses a stripped down approach.

A first assessment of the existence of the anomaly can be made through the analysis of the excess returns over the selected period, as a glimpse of the eventual existence of the effects can be found in the case of positive yields of the portfolio, as it would underline a better result of the least distressed stocks when compared to the most distressed ones. To dig deeper, it is useful to dissect the factor models results, with the main focus being on the presence of an eventual positive alpha deriving from the difference between realized and theoretical returns, which would show the first signs of a possible existence of the distress anomaly in the different geographical areas. Through the regressions, which expressions can be found in *Equation 5* and *Equation 6*, alphas can be retrieved and analyzed. Positive alphas would underline a higher realized result than the one expected from the theoretical model. This would imply that the portfolio has outperformed its theoretical returns, thus suggesting that distress risk has a positive impact on the performance, as the construction was made by buying the most distressed firms and shorting the more stable ones. Data for both the risk free and the model factors was obtained through the Kenneth French data library, as it contains datasets already subdivided into Developed and Emerging countries, as well as USA specific data.¹⁶ Results of this procedure can be retrieved in *Table 2*, as it contains the various alphas with the respective t-stats, categorized based on the grouping and model used.

$$R_p - r_f = \alpha + \beta \text{ MRP}$$

EQUATION 5 - CAPM MODEL

$$R_p - r_f = \alpha + \beta_1 \text{ MRP} + \beta_2 \text{ HML} + \beta_3 \text{ SMB}$$

EQUATION 6 - FAMA-FRENCH 3 FACTOR MODEL

The last step was to check if distance-to-default, and subsequently distress levels, can be used to eventually predict stock returns, which would lead to believe that distress is a significant market predictor, and its eventual beta would deny or confirm the hypothesis of a distress

¹⁶ Kenneth French Data Library website: <https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/index.html>

anomaly, as a positive estimated beta would underline a negative relationship between returns and the distress risk, as the higher the value of the distance-to-default is, the less likely it is for a firm to encounter distress and default. In order to do so, every country's quarterly stock returns were regressed only against the lagged distance-to-default variable at first, which showed the winsorized equal-weighted average of such indicator, and afterwards with the two country's characteristics introduced beforehand. Thanks to the two separate regressions, a first assessment can be made of the beta of the distance-to-default factor, which can then be tested for its robustness by including the two country sensitive characteristics. Moreover, the inclusion of said factors is meant to also highlight eventual correlations between geographical areas and the distress anomaly. In both cases, the lagged factor consists of one period, which is a calendar quarter. Expressions of said regressions can be found below under the name *Equation 7* and *Equation 8*.

$$R_{it} = \alpha + \beta \text{ } dd_{t-1}$$

EQUATION 7 - PREDICTIVE REGRESSION WITH DISTANCE-TO-DEFAULT MEASURE

$$R_{it} = \alpha + \beta_1 \text{ } dd_{t-1} + \beta_1 \text{ } RegQ_t + \beta_2 \text{ } Law_t$$

EQUATION 8 - PREDICTIVE REGRESSION WITH THE INCLUSION OF COUNTRY CHARACTERISTICS

Results were grouped using the economical classification provided before to have a detailed overview of the regressions' outputs, which facilitates the reading of eventual trends and significance. These results can be found in *Table 3*, containing values for intercepts and the distance-to-default coefficient, with their relative t-stat in parenthesis to highlight the eventual significance. Every group will have two different values for each invoice, as the two cases with or without Regulatory Quality and Rule of Law are considered and reported, giving a more complete analysis and facilitating the visualization of the difference in estimates between the two approaches. Note that for country characteristics, coefficients will not be reported, as they are out of the scope of the study, but instead any relevant trend will be reported in the results section, as to underline any significant and robust output that could deepen the knowledge of the phenomenon and the eventual relationship with returns. Moreover, average estimates for

the characteristics over the years, grouped for Developed and Emerging countries, are reported in *Table 4*.

Thanks to the different steps reported, the anomaly can be tackled through various tests and checks, as well as making a direct comparison to past results possible. This way an exhaustive analysis of the phenomenon can be made possible, which would ideally lead to robust and clear patterns and results.

4. RESULTS

The first outputs to highlight concern the average distance-to-default across all countries. As shown in *Table 1*, the measure stands between 2.5 and 3 for most of the nations, with some outliers. It is worth mentioning that such values correspond to a probability of default of less than 1%. This means that, on average, less than one public traded firm out of 100 is facing financial distress across the globe, per the sample selected. Using the distinction between Developed and Emerging markets, the winsorized average is also very similar, which excludes possible differences in base distress levels as an eventual cause of the different results obtained for the two regions.

Country	N° Firms	Average DD
NLD	51	2.98084115
GBR	341	2.82104467
JPN	1931	3.49466292
SWE	121	2.57713781
AUS	434	2.0071952
DNK	41	2.92743223
ISR	165	2.40924629
NOR	45	2.36511995
FRA	255	2.93603275
ESP	53	2.94274484
JEY	8	3.39364686
BMU	328	3.5606892
ITA	74	2.59200418
HKG	89	3.42686678
CHE	97	3.55038022
DEU	231	2.8866957
SGP	187	2.88133341
LUX	11	2.9238759
FIN	70	2.87175661
IRL	16	2.89610038
KOR	867	2.10865321
PRT	27	2.54334714
NZL	20	3.14551484
TWN	933	2.83010324
BEL	43	3.33970823
AUT	29	2.90967231
GRC	97	1.96341786
POL	74	2.30370641
QAT	12	3.44258973
VGB	2	1.94503086
CZE	6	4.85488695
SVK	2	2.88121291

HUN	8	3.01940344
SVN	7	3.7164652
IMN	2	1.37826756
EST	5	3.38509676
MCO	1	3.91545871
ROU	40	2.70810837
CYP	26	4.12333742
LTU	14	3.38701029
LVA	5	2.9502517
HRV	19	3.39183138
MLT	6	3.99878798
KWT	26	3.43772725
GGY	1	2.11440912
ISL	1	3.1324273
ARE	13	2.68155659
ARG	11	1.74996406
BGR	29	3.28975714
BHR	1	5.83692847
BRA	54	1.94962822
BWA	2	7.33712964
CHL	33	2.98573035
CHN	1117	2.09058433
CIV	18	2.7303157
CYM	161	4.14893924
EGY	37	2.24889305
GAB	1	3.28891495
GHA	2	1.55591263
IDN	192	3.04604277
IND	1228	1.80974884
JOR	50	5.89911833
KAZ	1	2.39973493
KEN	22	2.77953033
LBN	1	4.32967149
LBR	1	2.47114973
LKA	98	2.33735898
MAR	19	3.70501387
MEX	24	2.71951115
MKD	1	2.36886968
MUS	25	4.12334362
MYS	462	2.84094576
NAM	1	4.10956208
NGA	54	6.46496431
OMN	44	312.893339
PAK	233	2.12037868
PER	9	2.20020833
PHL	102	2.76590173
PNG	3	2.81081415
PSE	1	5.10682858

RUS	19	2.36467954
SAU	53	2.84662683
SDN	1	3.38656535
SEN	1	4.17227943
SRB	1	3.08675303
THA	223	2.76095587
TUN	17	3.2470014
TUR	167	1.76677668
VNM	12	2.29752063
ZAF	83	2.45795458
ZMB	3	2.72757538
ZWE	7	1.38427528
USA	3568	2.088546638

TABLE 1 - N° FIRMS AND AVERAGE DD BY COUNTRY

In *Table 2*, findings concerning the distress sorted portfolios are available. These portfolios are obtained by shorting the fifth quintile of stocks in terms of distance-to-default, which contains the stocks with the highest measure, hence the least distressed ones as they are further away from default when compared to the others, and buying the first quintile, containing the most distressed stocks. The table reports the average quarterly excess return, as well as alphas from factor models. T-stats of the measures are reported in parenthesis. Concerning raw excess returns, by using quarterly data for a span of 19 years makes the number of observations large enough to assume a normal distribution of such returns. This way a hypothesis can be made, which in this case is:

H₀: the portfolio's excess returns are equal to 0

The t-stat reported is then used to reject the null hypothesis, signaling an expected difference in returns between the two different categories of stocks. The values of the t-statistics are also high enough to reject a unilateral test on top of the bilateral one just formulated, so it can be assumed that excess returns are, in fact, showing the correct sign. At first glance, it is immediately evident that there is only a single portfolio carrying a positive excess return and alpha, which is the international one. This would mean that only when looking at a global standpoint, the distress anomaly does not hold, as a positive alpha underlines a better realized performance as opposed to the theoretical one by the constructed portfolio, which consequently means that either the most distressed stocks have outperformed their expected return or the more stable firms have underachieved compared to the expectations, or a combination of the

two factors. The negative factor is less pronounced in the Emerging grouping, signaling a lesser presence of such phenomenon in those countries. When compared to the results of Eisdorfer, Goyal and Zhdanov (2014), this table shows significant differences. Firstly, international results had the opposite conclusion, as the alphas across both factors were in fact negative, whereas the Emerging economies showed no presence of the distress anomaly. On the other hand, coherently with previous literature, both the U.S. and Developed economies still show presence of such anomaly.¹⁷ Moreover, when looking at both averages and t-stats, it seems that the Emerging economies tend to be less impacted by such phenomenon, which is also in line with previous findings. Lastly, when focusing solely on the 3-factor model results, results are in line with Campbell, Hilscher, and Szilagyi (2008) conclusion that distressed stocks tend to have high loadings on the Small Minus Big factor, as for every grouping the factor shows a positive beta with t-stats of 2.12, 2.18, 3.04 and 2.88 respectively for USA, Developed Emerging and International.

	Excess Return	CAPM alpha	3-factor alpha
U.S.	-0.1053698 (-3.96)	-0.1114078 (-4.40)	-0.1211375 (-4.79)
Developed	-0.1032203 (-5.64)	-0.1049364 (-5.79)	-0.1080694 (-6.06)
Emerging	-0.0680083 (-3.23)	-0.0746453 (-3.66)	-0.0683595 (-3.37)
International	0.1679161 (9.25)	0.1671982 (9.12)	0.1687776 (9.61)

TABLE 2 - ALPHAS OF DISTRESS-SORTED PORTFOLIOS

Deepening the analysis of the results, dissecting *Table 3* provides insights on the beta estimates for the distance-to-default measure for each country, in a context of predictive regressions. This means that, in case of significance of such estimates, the measure can be used to predict the market, and the sign of the beta highlights the relationship between distress and market returns, furthering the analysis of the distress anomaly eventually present. In particular, a positive estimate would underline that there is a positive relationship between the distress measure implemented and the country's returns, which would implicate that there is in fact a distress anomaly, as an increase in the measure indicates an improvement of the financial structure and thus less probability of default. It is then arguable that, if an improvement of the financial conditions leads to an increase of returns, distress risk is not present, but it is instead assumable the presence of a distress anomaly. Focusing only on statistically significant results, highlighted by a number of asterisks based on the relative significance, it is evident that almost all countries

¹⁷ Eisdorfer, Assaf, Amit Goyal, and Alexei Zhdanov. "Distress anomaly and shareholder risk: International evidence." *Financial Management* 47.3 (2018): 553-581.

have negative loadings on the coefficient related to the distance-to-default measure. The negative sign suggests that the higher the value of the distress measure is, the lower the returns will get, implicating that stocks under pressure to meet their financial obligations should get higher returns, hence aligning with the Fama and French suggestions and, most importantly, going against the existence of the anomaly in question. Overall, the findings suggest that the anomaly is not in fact present, with some exceptions in emerging countries, contrasting the evidence found in the previous study. It is interesting to underline that some countries, such as the Philippines, have a negative loading coefficient-wise in the regression without the inclusion of country characteristics, whereas it becomes positive once the two variables are included. This suggests that, for a country such as the Asiatic one, low levels of regulatory quality and law transparency impact the relationship between financial distress and returns. These results also show contrasting evidence when compared to the findings of *Table 2*, as a negative alpha on the portfolio would suggest the presence of the distress anomaly, whereas the coefficient just reported indicate otherwise. It also signals that the characteristics included do have an impact on the anomaly, and the general perception of distress risk. To find evidence of the statement, it is necessary to deep-dive into the table results, which are sorted so that Developed countries are showed first, followed by the emerging counterparts. Looking at the Developed markets sample, the coefficient related to distress seems to constantly increase in its negative exposure once regulatory quality and rule of law are included in the regressions, whereas the emerging market grouping tends to have a positive increase in the loading once the country specific characteristics are factored in. Considering that both rule of law and regulatory quality have a positive average across Developed countries, as opposed to a negative one for Emerging ones, it is fair to assume that they have a positive correlation with distress risk, as higher levels of country characteristics lead to a more distinct negative relationship between the distance-to-default and the country's returns. Including the intercept results in order to develop a wider overview of results, it is evident that Developed countries have a much higher value than the Emerging counterpart when considering the regression with both country characteristics. This finding also backs up the possibility of a much clearer absence of the distress risk puzzle in the first grouping, as the intercept represents the theoretical value of a certain country's returns when values of distance-to-default, as well as rule of law and regulatory quality, are equal to 0. Regarding the distress measure, zero equals the meeting of the default point, whereas for the country characteristics it indicates the neutral and median value, as the two qualities range from -2.5 to 2.5. Hence, this setting indicates a hypothetical scenario where every country has the same quality of policies for the private sector and every firm has reached default. Having a higher

return indicates that distress has a higher impact and relationship with returns, and the table signals that this is the case for Developed countries rather than Emerging ones. Lastly, it is important to mention that the U.S. do not have any significant results, and as such no assumptions can be made about the distress anomaly in said country.

Table 3 – Predictive Regressions with Country Characteristics

Country	Intercept		Coefficient	
	Without Characteristics	With CC	Without CC	With CC
USA	0.041 (0.75)	0.254 (0.244)	-0.011 (-0.45)	-0.008 (-0.32)
NLD	0.025 (0.35)	2.749*** (2.37)	-0.002 (-0.11)	-0.014 (-0.62)
GBR	0.108 (1.4)	2.544** (1.99)	-0.03 (-1.16)	-2.241*** (-2.35)
JPN	0.081 (1.37)	1.304 (1.59)	-0.02 (-1.19)	-1.284** (-2.19)
SWE	0.052 (0.64)	2.238 (1.6)	-0.009 (-0.31)	-1.645 (-1.6)
AUS	0.331*** (2.36)	3.187 (1.53)	-0.123* (-1.81)	-2.337 (-1.58)
DNK	-0.022 (-0.29)	3.206*** (2.62)	0.016 (0.61)	-2.26*** (-2.54)
ISR	-0.587 (-0.56)	5.295 (0.3)	0.34 (0.79)	0.158 (0.01)
NOR	0.112 (1.27)	3.416*** (2.4)	-0.038 (-1.04)	-1.89* (-1.83)
FRA	0.018 (0.25)	2.382** (2.09)	-0.001 (-0.05)	-1.629** (-2.01)
ESP	0.004 (0.06)	3.851*** (3.06)	0.002 (0.09)	-2.512 (-2.74)
JEY	0.049 (0.84)	-0.243 (-0.15)	-0.006 (-0.39)	0.147 (0.12)
BMU	0.081 (1.21)	1.19 (0.66)	-0.012 (-0.67)	-1.708 (-1.28)
ITA	0.017 (0.24)	3.307*** (2.45)	-0.003 (-0.13)	-2.123** (-2.28)
HKG	-0.009 (-0.21)	0.654 (0.5)	0.006 (0.53)	-0.874 (-0.95)
CHE	0.005 (0.08)	1.976* (1.9)	0.005 (0.3)	-1.506* (-1.95)
DEU	0.025 (0.38)	2.508*** (2.32)	-0.001 (-0.03)	-1.892*** (-2.33)
SGP	0.169*** (2.39)	4.331*** (2.85)	-0.049** (-2.06)	-3.1*** (-2.77)
LUX	0.05 (0.84)	2.564** (2.24)	-0.011 (-0.56)	-1.518* (-1.78)
FIN	0.038 (0.48)	2.237* (1.84)	-0.01 (-0.37)	-1.464* (-1.67)
IRL	0.095 (1.43)	2.787*** (2.32)	-0.024 (-1.08)	-2.211** (-2.55)
KOR	0.146 (1.38)	0.949 (0.51)	-0.056 (-1.12)	-1.352 (-0.97)
PRT	0.012 (0.08)	0.448 (0.14)	0.018 (0.35)	12.15 (0.56)
NZL	0.061 (0.97)	1.996* (1.69)	-0.014 (-0.72)	-1.904** (-2.18)
TWN	0.104 (1.62)	2.28* (1.76)	-0.025 (-1.11)	-1.338 (-1.43)
BEL	0.038 (0.56)	2.232** (2.03)	-0.007 (-0.37)	-1.722** (-2.18)
AUT	0.009 (0.13)	2.504** (2.14)	0.003 (0.13)	-1.765** (-2.06)
GRC	0.008 (0.09)	5*** (2.58)	0.016 (0.38)	-1.837 (-1.54)
POL	0.217** (2.11)	6.197*** (3.49)	-0.077* (-1.76)	-3.837*** (-2.98)
QAT	-0.035 (-0.88)	-1.42 (-1.31)	0.014 (1.23)	0.583 (0.72)
VGB	0.114 (1)	5.043 (1.11)	-0.042 (-0.86)	-2.068 (-0.63)

CZE	0.029 (0.96)	1.208 (1.51)	-0.003 (-0.5)	-0.492 (-0.86)
SVK	-0.073** (-2)	0.566 (0.27)	0.031*** (3.02)	-0.169 (-0.12)
HUN	-0.013 (-0.21)	2.261 (1.43)	0.014 (0.68)	-0.925 (-0.81)
SVN	-0.055 (-1.02)	3.512*** (3.22)	0.019 (1.33)	-2.344*** (-2.97)
IMN	0.129 (0.65)	2.461 (0.5)	-0.094 (-0.69)	-5.512 (-1.23)
EST	0.04 (0.26)	8.886 (1.54)	0.025 (0.62)	-2.609 (-0.6)
MCO	0.04 (0.92)	1.954 (1.4)	-0.008 (-0.71)	-0.733 (-0.75)
ROU	0.096* (1.67)	3.475** (2.14)	-0.021 (-0.96)	-1.815 (-1.54)
CYP	0.022 (0.89)	2.691*** (2.72)	-0.002 (-0.41)	-1.26* (-1.76)
LTU	0.043 (0.8)	2.62* (1.83)	-0.012 (-0.82)	-1.807* (-1.8)
LVA	0.106* (1.77)	4.1** (2.12)	-0.029 (-1.5)	-2.371* (-1.93)
HRV	0.043 (0.76)	4.858*** (3.31)	-0.008 (-0.48)	-2.875*** (-2.76)
MLT	0 (-0.01)	1.448* (1.68)	0.004 (0.46)	-1.442** (-2.31)
KWT	0.075** (2.02)	0.607 (0.6)	-0.022** (-1.99)	-0.238 (-0.33)
GGY	0.199*** (2.61)	2.707 (0.92)	-0.062* (-1.94)	-0.576 (-0.27)
ISL	-0.004 (-0.08)	0.865 (0.53)	0.01 (0.69)	-1.301 (-1.11)
ARE	0.089 (1.41)	0.356* (1.82)	-0.028 (-1.24)	-0.053* (-1.81)
ARG	0.038 (0.41)	0.183 (1.01)	-0.003 (-0.07)	0.465 (0.42)
BGR	0.299 (1.06)	2.33** (2.11)	-0.036 (-0.41)	4.335 (0.89)
BHR	0.018 (0.35)	0.252* (1.8)	-0.004 (-0.44)	0.169 (0.28)
BRA	0.213 (1.51)	0.03 (0.13)	-0.083 (-1.17)	-0.256 (-0.25)
BWA	0.007 (0.31)	-0.017 (-0.17)	-0.001 (-0.25)	1.541*** (2.97)
CHL	0.032 (0.44)	-0.042 (-0.29)	-0.004 (-0.16)	0.059 (0.08)
CHN	0.171 (1.96)	0.172 (0.76)	-0.061 (-1.49)	0.643 (0.71)
CIV	0.067 (1.54)	-0.096 (-0.53)	-0.006 (-0.48)	0.157 (0.16)
CYM	0.05 (1.4)	-0.027 (-0.16)	-0.001 (-0.15)	1.271 (1.22)
EGY	0.189*** (2.38)	0.068 (0.26)	-0.073 (-2)	0.222 (0.22)
GAB	-0.006 (-0.1)	-0.068 (-0.35)	-0.001 (-0.08)	-0.067 (-0.07)
GHA	-0.022 (-0.44)	-0.194 (-0.6)	-0.005 (-0.26)	-1.048 (-0.53)
IDN	0.074*** (2.61)	0.053 (0.48)	-0.008 (-1.07)	0.871 (1.32)
IND	0.317*** (4.12)	0.518*** (2.53)	-0.111*** (-2.97)	-0.342 (-0.38)
JOR	0.002 (0.25)	-0.005 (-0.09)	0 (0.5)	0.09 (0.29)
KAZ	0.091 (1.13)	-0.703** (-2.11)	-0.019 (-0.63)	-3.039** (-2.19)
KEN	0.114* (1.77)	-0.043 (-0.26)	-0.04* (-1.75)	0.266 (0.39)
LBN	0.059 (1.05)	-0.319 (-1.62)	-0.011 (-1.02)	-2.966*** (-2.52)
LBR	0.06 (0.67)	1.242* (1.92)	-0.006 (-0.18)	-2.281 (-0.65)
LKA	0.233*** (3.16)	0.562** (2.21)	-0.085*** (-2.81)	1.261 (1.21)
MAR	0.07 (1.25)	-0.154 (-1.11)	-0.014 (-0.94)	-0.319 (-0.76)
MEX	0.174*** (2.36)	0.032 (0.23)	-0.051* (-1.95)	0.002 (0)
MKD	0.185*** (2.64)	0.211 (1.18)	-0.061** (-2.19)	-1.509 (-1.23)
MUS	0.069** (2.16)	-0.074 (-0.8)	-0.014* (-1.87)	0.253 (0.6)
MYS	0.25*** (3.32)	0.355*** (2.66)	-0.079*** (-3.03)	0.746 (1.24)
NAM	0.075 (1.6)	0.065 (0.39)	-0.009 (-0.88)	0.186 (0.23)

NGA	0.065 (0.88)	-1.071*** (-2.36)	0.004 (0.57)	-1.484 (-0.55)
OMN	0.028** (2.02)	-0.164** (-2.23)	0 (-0.83)	0.241 (0.56)
PAK	0.075*** (2.33)	0.16 (1.23)	-0.018 (-1.54)	2.185*** (2.78)
PER	0.181** (2.12)	0.017 (0.08)	-0.061 (-1.63)	-0.346 (-0.34)
PHL	0.348*** (3.49)	0.278 (1.24)	-0.103*** (-2.91)	1.65** (2.01)
PNG	0.089 (1.39)	-0.084 (-0.49)	-0.02 (-0.97)	-0.019 (-0.02)
PSE	0.004 (0.11)	-0.005 (-0.03)	-0.002 (-0.29)	-0.144 (-0.19)
RUS	20.98 (0.44)	-20.796* (-1.91)	-0.363 (-0.18)	-103.5** (-2.01)
SAU	0.08 (1.19)	-0.016 (-0.07)	-0.021 (-0.88)	-0.112 (-0.12)
SDN	0.009 (0.18)	0.115 (0.89)	-0.014 (-1.08)	-0.107 (-0.13)
SEN	-0.023 (-0.46)	-0.402 (-1.38)	0.005 (0.45)	0.486 (0.52)
SRB	-0.056 (-0.61)	-0.428 (-1.41)	0.016 (0.55)	1.159 (0.86)
THA	0.169* (1.71)	0.145 (0.75)	-0.046 (-1.29)	1.428* (1.89)
TUN	0.05 (1.28)	-0.067 (-0.88)	-0.015 (-1.29)	-0.047 (-0.12)
TUR	0.208* (1.89)	0.248 (1)	-0.086 (-1.42)	-0.106 (-0.09)
VNM	0.112 (1.37)	0.042 (0.18)	-0.027 (-0.8)	-0.215 (-0.21)
ZAF	0.127 (1.57)	0.16 (1.04)	-0.044 (-1.37)	0.77 (1.06)
ZMB	0.044 (0.61)	-0.546* (-1.8)	0.004 (0.18)	-1.382 (-0.91)
ZWE	7.363** (2.04)	-1.461 (-0.06)	-3.136 (-1.42)	-123.415 (-1.09)

It is interesting to notice that distress sorted portfolios and country-specific regressions provide for very different results, as at first it would seem that the distress anomaly is present and persistent throughout all groupings, with a slightly higher impact on the Developed portfolio, but when looking at the latter findings, Emerging markets seem to be the only grouping with traces of the anomaly, with significant evidence scattered through the results reported.

5. CONCLUSIONS

On the basis of the results just provided, we can conclude that the so-called distress risk puzzle still remains unsolved. This is motivated by the evidence gathered in this study, which does not completely align with the conclusions provided by Eisdorfer, Goyal and Zhdanov (2014), thus not permitting a confirmation of previous literature. In fact, although country-specific regressions suggest the substantial non-existence of the distress anomaly with only few significant exceptions, when looking at the performance of the portfolios constructed based on the distance-to-default measure the anomaly seems to persist throughout both different pricing models and groupings. A plausible explanation can be reconducted to the fact that, when focusing on the portfolios, they are created based on a larger pool of stocks as opposed to the single countries returns, and from this grouping of firms, only the top and bottom-ranked stocks in terms of distance-to-default are included, hence the list includes polar opposite situations from a financial standpoint with the widest gap possible in terms of distress.

Because of this construction method of the portfolios, it is fair to assume that the alpha observed in the results is affected by these characteristics, that could eventually lead investors to believe that the financially distressed stocks contained are put into a position so difficult and intricate that they won't be able to make ends meet and, thus, make it not worth investing in regardless of the return provided, leading the firms to a continued downfall and, consequently, to a lesser return than the one that should be provided for a risky stock of this caliber. On the other hand, the more stable stocks tend to have a general outlook that is considered so well-rounded and solid that confidence about the performance is constant, and it is also backed-up by the actual results.

An empirical confirmation of this theory could also be found in the present-day situation where among the most important stocks in terms of capitalization, such as the so-called "Magnificent 7" of Apple, Microsoft, Alphabet, Amazon, Nvidia, Meta, and Tesla many have continued their positive trend in performance in the last fiscal periods due to several reasons, including their solidity and the position of dominance they occupy in the current markets. It is important to mention however that the performance of these companies, and any stock in general, is not only driven by the respective market position as many other factors such as profitability, or other factors affecting the economic landscape, for example the rise in importance of technology sector in the past decades that has positively influenced the uprise of the Magnificent 7.

On the other hand, a potential driver of the worse results relative to the expected outcome for the firms under distress could be that since the start of the new millennium, various crises have impacted the financial landscape, such as the 2008 crash and the Covid situations. This led investors to lose confidence in the financial markets, making the more solid stocks more appetible as in case of disastrous events, firms with a great deal of stability and with an overall great foundation should be able to survive and adapt more efficiently to any event. A similar outlook is still present today, as unfortunately conflicts have been on the rise on different parts of the world, causing various disruptions in the markets as well.

Regarding country characteristics, it is worth noting that both regulatory quality and rule of law had lower estimates in the Emerging markets group when compared to the U.S. and the Developed economies, with negative values on average throughout the years in the scale ranging from -2.5 to 2.5. When considering that through the country-specific regressions, evidence of the distress anomaly was found only on such countries, a statement can be made that those characteristics also have an impact on the matter. Specifically, countries with low levels of transparency in terms of norms and regulations tend to be more exposed to the anomaly rather than the ones with higher transparency regarding the private sector development. This leads to believe that, even if strictly relegated to a minor subset of cases, country characteristics have an impact on the consideration of financial distress. A plausible explanation could be that, given low levels of contract enforcement and disclosure of clear rules and procedures, it is much more difficult to distinguish and highlight the various levels of distress, making the investment much more riskier than it actually is and thus shifting the public to a safer option, represented by the more robust firms, which eventually leads to a higher return on the latter.

A practical example is Pakistan, where levels of both regulatory quality and rule of law fluctuate between -0.6 and -0.8 for the whole period considered, with a 2.185 coefficient value of distance-to-default in the regression with the country characteristics, compared to a negative and non-significant value in the simple regression. In *Table 5* a close-up is presented of eight countries with some of the highest values in terms of significance for the loadings on the distress measure beta when factoring in the country characteristics in the regression. The first four countries having a negative loading and the other four a positive one. The table also reports Pakistan, and the reported evidence seems to back up the explanation reported, as the first four countries have high averages on both measures, whereas the bottom four have at least one negative loading, with the exception of Botswana which still has low values when compared to

the Developed economies shown. It is also interesting to see that the more polarized the average is, the higher the significance of the loading becomes, as both Singapore and Pakistan have the higher significance. Once again Botswana is an exception, due to the small sample of firms included in the study and their distance-to-default values higher than the international average. These findings confirm that countries' policies for private sector development and regulatory transparency have an influence on the eventual existence of the anomaly.

	Regulatory Quality	Rule of Law
GBR	1,69169334	1,65051626
DNK	1,76021875	1,91092859
DEU	1,615861	1,64961345
SGP	2,006625	1,72027565
THA	0,11674869	-0,0819665
PHL	-0,0166823	-0,5039587
PAK	-0,6614652	-0,7957077
BWA	0,62276037	0,49825216

TABLE 5 – SELECTED SAMPLE OF COUNTRIES' CHARACTERISTICS AVERAGES

Overall, it appears that financial distress has a puzzling relationship with market returns, as it shows contrasting evidence depending on various factors such as time, sample-selection, regulations transparency. The only certainties are that, in line with pre-existing literature, this study cannot rule out the existence of a distress anomaly that implicates higher return for financially stable stocks as opposed to a worse performance than the one expected for distressed ones, but it can also not give a clear explanation as to why. It seems that Emerging countries tend to have more explicit evidence of the effects of such anomaly, as even if the portfolio had a slightly less negative alpha when compared to the Developed grouping and the USA, there were only certain Emerging countries that had a positive loading on the distance-to-default coefficient. When confronting this evidence with the referenced paper, it is immediately evident that the conclusions just provided indicate an inversion of the trend highlighted by Eisdorfer, Goyal and Zhdanov (2014), where the distress anomaly appeared to exist in developed countries but not in emerging ones. It is also important to underline that the U.S., which have been the

main focus for a major part of the literature, do not show any significant result, making it impossible to detect the eventual presence of the anomaly.

Country characteristics concerning regulatory quality and clarity seem to also have an influence on the presence of such anomaly, as the clearer the regulations and the higher the trust is on the ability of the different governments to administrate the private sector, the more difficult it becomes to find clear traces of the anomaly. Once again, these findings place themselves in the opposite direction of the evidence gathered by previous literature as, even if not directly comparable due to the use of different metrics, Eisdorfer, Goyal and Zhdanov (2014) suggested that: *“the distress anomaly is stronger in countries with stronger takeover legislation, lower barriers to arbitrage, higher information transparency, and easier access to new loans.”*¹⁸

It would seem then that the sample choice has a great deal of influence over the results, as the general market conditions, as well as the economic landscape and cycles would appear to be so polarizing for this issue that evidence can be reversed in a span of simply eighteen years. This statement is also in line with the many theories of an in-sample problem concerning the anomaly, although, based on the fact that traces of it have been consistently found throughout every referenced study in the literature section as well as this one, it would appear that the chosen sample is affecting the significance of the distress risk puzzle, as well as its geographical presence.

These elements are the reason why such anomaly is fascinating and also why it is called an anomaly in the first place, as they are defined as *“something that deviates from what is standard, normal, or expected.”*¹⁹

There could not be a more fitting description of the problem, as it has been tackled in a various amount of ways, without a definitive conclusion and reasoning behind it.

¹⁸ Eisdorfer, Assaf, Amit Goyal, and Alexei Zhdanov. "Distress anomaly and shareholder risk: International evidence." *Financial Management* 47.3 (2018): 553-581.

¹⁹Oxford dictionary website:

[https://www.oxfordlearnersdictionaries.com/definition/english/anomaly#:~:text=%E2%80%8Banomaly%20\(in%20something\)%20a,what%20is%20normal%20or%20expected](https://www.oxfordlearnersdictionaries.com/definition/english/anomaly#:~:text=%E2%80%8Banomaly%20(in%20something)%20a,what%20is%20normal%20or%20expected)

6. LIMITATIONS & FURTHER RESEARCH

To amplify and increase the knowledge regarding this topic a series of adjustments and possible improvements can be introduced. As shown in the results, there is still a wide margin of possible upgrades on the robustness and significance side of the evidence, as most results were not statistically significant. This can be increased by using different ranges of samples, as a wider time span could help practitioners have a more complete overview of the problem, which would also minimize the effects of eventual crises and outliers in both the stock returns and the distress measure. It would also allow for an analysis of the anomaly in different subsets of timeframes, using decades as an example, which could lead to an explanation of the importance of the different economic cycles and their impact on the distress anomaly. All of these additional features would factor in and account for a more robust and complete overview of the issue.

To tackle the phenomenon, it could also be useful to introduce multiple measures of distress level, as the distance-to-default measure alone is subject to market conditions, and it does not capture the systemic risk. It would also enhance the robustness of the results, because the presence of the distress anomaly would be captured through different measures.

The biggest challenge in this study was the retrieval of country characteristics, as only two were implemented due to data availability, a lesser number when compared to the referenced study of Eisdorfer, Goyal and Zhdanov (2014). If tailor-made datasets can be implemented, a better explanation of the impact of various aspects of shareholders' risk that play an important role in shaping distressed stocks returns could be obtained. In particular, takeover legislation, barriers to arbitrage, information transparency and loans access regulations have been demonstrated to impact the anomaly levels, hence an in-depth analysis and the use of specific datasets could enhance the results and the knowledge on the topic.

Lastly, the selections and the following grouping of countries can be done differently, to explore different options and test if they present better results. Different subsets can be explored, such as grouping countries based on the continent, and then used to test if there is any hidden correlation with the distress risk puzzle. Concerning the groupings done, the selection of countries used here was not entirely symmetrical to the Kenneth French data library one for both Developed and Emerging economies, which could have had an impact on the results, as

the datasets retrieved were not tailor-made on the selection implemented. A suggestion could be to either restrict the sample to make it match the data library, thus having more accurate results, or better still create an appropriate dataset for the asset pricing models with an expanded number of countries, making the analysis more complete and detailed.

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APPENDIX

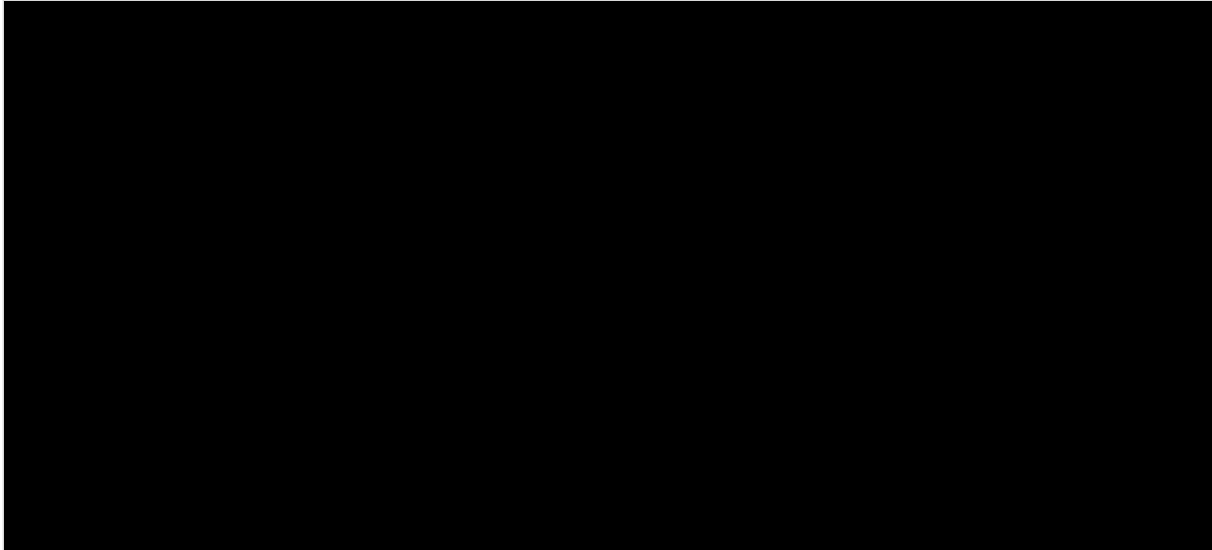


FIGURE 1 - GEOGRAPHICAL REPRESENTATION OF DEVELOPED MARKETS STOCKS

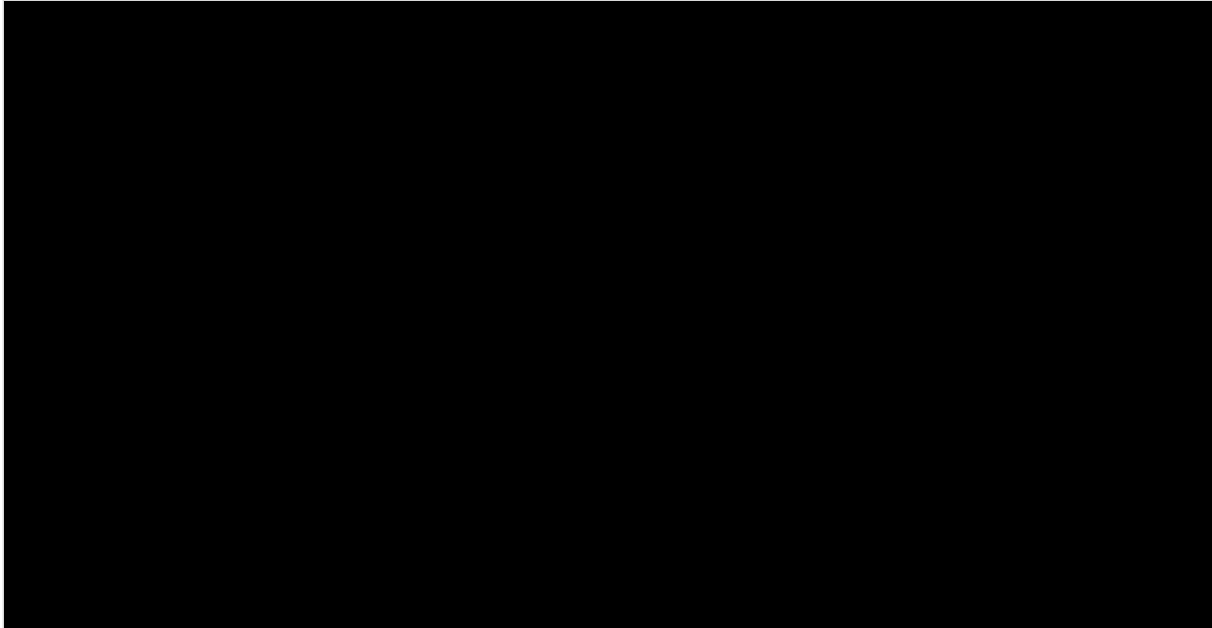


FIGURE 2 - GEORGRAPHICAL REPRESENTATION OF EMERGING STOCKS

Regulatory Quality		Rule of Law	
Developed	Emerging	Developed	Emerging
1.23873728	-0.1428467	1.20788935	-0.3040583
1.24026504	-0.1106527	1.22465267	-0.2986519
1.28105003	-0.1003563	1.23384565	-0.3027784
1.29209612	-0.0956675	1.2473171	-0.2899256
1.27017003	-0.0860409	1.24751894	-0.2753771
1.26301797	-0.0748509	1.26143264	-0.2720623
1.24522716	-0.0749475	1.26571285	-0.2754862
1.24643983	-0.0639663	1.26640431	-0.258832
1.24971573	-0.0694961	1.26470378	-0.2528332
1.24396143	-0.0585173	1.31480321	-0.1840255
1.25551691	-0.0869298	1.27279	-0.2135268
1.24949393	-0.0902409	1.23327153	-0.1995076
1.25162127	-0.0893039	1.22894567	-0.208727
1.26592848	-0.1078499	1.22583856	-0.2033896
1.2829452	-0.1156105	1.22763362	-0.2074264
1.24370091	-0.0898503	1.21544072	-0.2019981



