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CORPORATE BONDS AND STOCK PRICES: A COHERENCY ANALYSIS IN EUROPE

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Abstract

This paper aims to find a coherent relationship between stock prices and bond yields on the day of issue. We show that stock prices seem to have a weak positive relationship with yields as investors seem to consider the underlying health of a firm before investing their money in either security. This contrasts with earlier research and falls in line with later research. The findings show that one percentage increase in share price on date of issue has the potential to raise yields by 0.20% given the near-zero interest environment of the euro.

Keywords: *Corporate Bonds, Stock Market, European Market*

1. Introduction

As stocks' overlooked cousin, corporate bond issues do not get much academic attention. Yet, as a business' way of raising funds issuing corporate bonds stands as the most popular option with the US Bond market, the world's biggest by a far margin, valued at a $9.3 trillion , to the institutional investor bonds remain profitable and popular investment vehicles.

Therefore, US corporate bond yields, studied plainly as securities, have been perhaps the only example of a well-researched academic topic. Earlier research tried to explain the variation in yields solely based on the risk of a particular issue. (Sharpe, 1964) (Ross, 1976) Later research however, contradicts these earlier findings entirely as risk seems to have no impact on yields, and past stock return performance seems to explain the variation of excess returns more. (Fama & French, 1992)

Yet, any comprehensive paper that seems to link corporate bond yields with stock prices seems to lacking in all non-US markets. A great deal of this can be explained by the sheer unavailability of data for underdeveloped financial markets – this seems to incentivise researchers to study the US. This captures our interest.

The EU bond market, valued at $410.8 billion during Q3 2019 , while small compared to its US counterpart, is the second choice for investors globally. Since there is no indication that these two markets would behave in the same way due to the different makeup of investors investing in them, this area seems ripe for fresh research producing fresh insights.

We will also take a moment here to note the differences between the money markets of US and EU. The current US Federal Funds rate stands at %1.75 whereas the EU equivalent base rate stands at a negative %0.50 . These different rates have different impacts on the excess returns of papers in their respective markets, presenting us with another unanswered question that this paper will seek to shed some light upon.

We are especially interested in the impact of stock prices, especially the opening stock price on the date of the issue on yields – as both types of investors essentially wager on the fundamentals of a company. Yet bond yields are pre-determined, meaning positive news will not impact their returns unlike shareholders. It will be interesting to see if these differences will mean that stocks and bonds are not substitutes of each other – perhaps even complements.

Bonds are also graded according to their risk by major ratings agencies. For our research purposes, we will be taking Moody's grading system into account and try to observe its impact on yields as our measure of risk. We believe this in itself will be adequate without delving into more complicated ways of measuring this risk associated with corporate bonds unlike some modern research. (de Jong & Drissen, 2006)

Without digressing, our paper will be as follows. Section 2 will include a significantly more comprehensive Literature Review in which we compare and contrast research findings. Section 3, our Methodology Section, will include our econometric model and the paper we took inspiration from to construct it. Section 4, we will be discussing our data, how we collected it and where from, and how it was filtered for our purposes. Section 5, as you might expect, will include our results, findings and discussion on the limitations of our aforementioned findings and finally, in Section 6, we will be recapping all we have discovered and concluding.

2. Literature Review

While retained earnings present themselves as a source of potential funds for such projects most of the times they remain insufficient for massive undertakings and have been shown to be generate less return as opposed to external financing. (Whittington, 1972).

Stock prices and bonds can essentially be seen as betting on the company's future. Therefore, it is not a stretch of imagination to think these two instruments are substitutes. There is some evidence that seems to suggest that this is indeed the case. Empirically, one can observe that as corporations issue new bonds, their market value, and therefore their share price, goes down. (Huberman, 1984)

It has been observed that as, the risk premium on its corporate bonds, and therefore, it's corporate bond yield would increase, as it's share prices fell. (Davydenko, 2012)

However, movements in prices do not always seem to fit this counter-pattern that theory dictates we should observe. Sometimes prices seem to be sticky (Dichev & Piotroski, 2001) and sluggish to move, and more complicated factors at play might complicate what should be this 'straight forward' price relationship. (Amihud, et al., 2005)

Drawing on the pricing model outlined by their predecessor to price corporate debt (Merton, 1974), recent papers have indeed found correlation that despite this substitution effect in prices, as both securities draw their value from the underlying 'inherent' value of the firm in question, prices seem to have a tendency to move in the same direction. (Bao & Hou, 2013)

Recent papers have a tendency to find that, these two indicators do indeed move in the same direction. (Shiller & Beltratti, 1990) The same relationship also seems to extend beyond corporate bonds, with government bonds also exhibiting a similar relationship. (Baker & Wurgler, 2012).

The best metric for the risk of default, is of course, a rating from a ratings agency such as Moody's or Standard & Poor's. These ratings announcements impact both equity prices and bond yields. (Kliger & Sarig, 2000) It has been observed that positive ratings changes by these major agencies has the potential to create abnormal returns. (Grier & Katz, 1976) These impacts can be observed even in municipal bond markets. (Ingram, et al., 1983)

It is again here that the research consensus breaks down. While a downgrade in ratings is definitely warrants an increase in corporate yields, we observe a negative downwards pressure in prices just as theory predicts as these investment vehicles are substitutes.

Sometimes, a downgrade in ratings is widely expected in the market consensus and cannot be observed as impacting common stock prices and therefore common stock holders as (Goh & Ederington, 1993) finds. This lends credibility to common stock being a substitute to corporate bonds as they can be seen as more robust in terms of earnings to rating changes. Both (Holthausen & Leftwich, 1986) and (Zaima & McCarthy, 1988) find similar results, while also casting doubt on the idea that bond rating changes actually convey any new information to investors at all or argues that these changes are priced in, more of than not.

Another drawback of previous research is that the vast majority of papers, including the ones cited and will be cited in this paper are very US-centric. As financial centres grow more integrated in the world, they have been wide varying impact on all real sectors of the economy, from consumption (Smith, et al., 1994) to government spending. (Hasan & Taghavi, 2002) As such, we note the lack of research into other markets, something we hope to remedy in our more European-centric paper.

However, we digress. While research does lack in less studied markets, it is not completely absent. Stocks are seen to be impacted in the UK corresponding to ratings changes for their respectively companies, as well as both short- and

long-term corporate bonds. (Barron, et al., 1997) It seems, regardless, that mainly stock purchasing investors seem to interpret the ratings as a source of information about the firm's health in itself – this does not seem to project itself onto a stronger co-movement in yields and stock prices. (Ohmi & Okimoto, 2006) (Campbell & Ammer, 1993)

3. Methodology

Our approach is rather simple. We consider a potential investor who has a lump sum to invest, and has to pick between a stock of a publicly traded company and its corresponding bonds. Therefore, our analysis is restricted to the date of issue – we compare the yield to maturity and the respective ECB with the closest matching maturity to calculate excess returns.

Our econometric approach draws heavy inspiration from previous research, especially the two-term model laid out in (Gebhardt, et al., 2004) – we modified it to fit our approach as we hope to capture the impact of stock prices. Therefore, we will outline our model as follows;

$$r\_cb-r\_f=z+\beta\_1\ p\_i+\beta\_2\ t\_i+\beta\_3\ g\_i+u\_i$$

where r_cb-r_f represents excess returns on our selected corporate bonds, p_i being the opening stock price of the company issuing the bond on the date of issue, t_i as the number of days until the bond matures, and g_i representing the Moody's ratings for that specific paper.

The Moody's ratings and the maturity date should represent adequate controls for the illiquidity and risk associated with purchasing these papers. With three independent variables, we also have the added benefit of being able to work with limited points of data – as is the case with the European bond market, for which data is scarce.

4. Data

We have obtained assorted corporate bond data, courtesy of Bloomberg LLC, – all denominated in euros. Then we proceeded to filter our results to fit the needs of our research. Firstly, any bond with a Moody's rating below B was eliminated – and the rest was divided into 5 categories, each receiving a score from 1 to 5 – from the junk bonds to the pristine investment grade bonds.

Secondly, we screened the listed corporate entities. For our model to make sense, the company needed to be traded on a public exchange denominated in euros such as the Frankfurt or Vienna Stock Exchange on the date of issue. For example, the corporate bonds of Gazprom – which were included in our dataset, were eliminated on the account that Gazprom is a publicly traded company.

Another notable example is while the initial pre-filtered data set included Tesla Inc. bonds, we filtered these out – while Tesla is indeed a publicly traded company, it is traded out of the New York Stock exchange with prices quoted in USD, and therefore, not applicable for our purposes.

We end up with 148 points of data – each with a matching rating grade, excess return and stock price. In this section, we will also display scatter plots to observe a visual relationship between each of our independent variables and dependent variables individually. These are shown below.

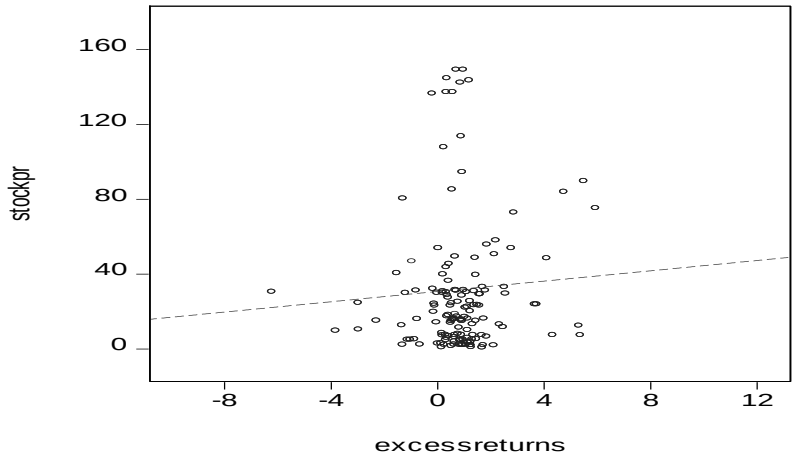

Figure 1: Scatter plot showing the relationship between Share Price and excess returns

Here, we can observe a positive relationship exist between the series. One interesting thing to note is that the vast majority of excess returns are actually zero – meaning there are none excess returns for most of the papers in our dataset, which is to be expected given both the Efficient Market Theorem and the extremely low interest environment of contemporary European financial markets.

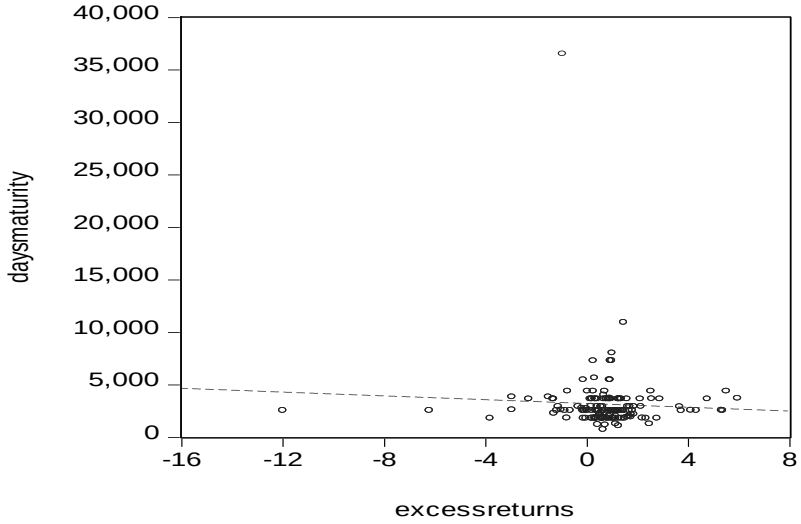

Figure 2: Scatter plot showing the relationship between Days Until Maturity and excess returns

Here, it is again extremely difficult to make out a visual relationship between our liquidity measure, the lifetime of the bond and our excess returns. This in itself is interesting – theory predicts that as a financial instrument becomes less liquid, excess returns should increase to compensate for the increased market risk the investor is undertaking.

Table 1. The ratings makeup of our dataset.

Moody's Rating	***Grade***	***Score***	***Frequency***
AAA	Investment	5	5
A	Investment	4	22
BAA	Investment	3	0

BA	Junk	2	40
B	Junk	1	81

Source: Own Calculations.

Finally, here we can observe the Moody's grade makeup of our dataset. We see that the vast majority of our corporate bonds are graded as junk and only a small minority are what we would term investment grade bonds. This table also shows the scoring system we have used to control our dataset as our risk measure.

5. Discussion

In this section, we display the results of our regressions and discuss our findings, and how they fit in with previous research, whether there are any surprises and the limitations arising from the nature of our methodology and data.

Table 2. Estimation Results

Variables	***Dep. Var*** $(r_{cb} - r_f)$	***Dep. Var*** (r_{cb})
Constant	0.98***	4.55***
Stock Price	0.01	0.02*
Days until Maturity	-0.01	-0.02*
Ratings Score	-0.17***	-0.25**
R-squared	0.01	0.40

Notes: Robust standard errors are shown in parentheses. * p < 0.05, ** p < 0.01, *** p < 0.001.

Table 2 displays the results of a standard multivariate Ordinary-Least-Squares analysis that we run with our dataset. The first column stands for the estimation results when the dependent variables is considered as r_cb-r_f while the second column shows the results of the estimation with the r_cb as a dependent variable. As shown in Table 2, the results of the first estimation are somewhat disappointing. The predictive and explanatory power of our model as it stands is low – our R-squared shows us that the model explains less than 2% of the variation between excess returns. This is extremely low, and casts doubt over our methodology.

Rating score is found to be significant at 1% level while the other explanatory variables are insignificant.

Moreover, looking at our coefficients, we can see that our liquidity measure and share price variable have coefficients close to zero, meaning they do not seem to impact excess returns at all. This can be partly explained due to the fact that in Europe's near-zero-to-negative interest rate environment, we just do not observe excess returns. Finally, the coefficient for our rating grade is one that is expected. As the rating grade increases, (1 being B-grade, 5 being AAA grade), we see that there is a downward pressure on excess returns. This is, of course, in line with what theory predicts.

It is at this point that we decide to take things a little further and tweak our econometric model a little more – and end up with the following model below.

$$r_{cb} = z + \beta_1 p_i + \beta_2 t_i + \beta_3 g_i + u_i$$

We remove the corresponding risk-free yield term we were using to calculate excess returns – and just leave the yield to maturity (YTM) as our dependent variable. We justify this choice in two ways – first, by far and large, Efficient Market Theorem predicts that excess returns are not consistently possible for any investor. And secondly, the zero-interest rate environment of the euro should mean that yields to maturity present an adequate measure of the returns

associated with this corporate bond. However, we still suspect that our analysis suffers from misspecification errors. To remedy this issue, we log both our dependent variable and our first independent variable, the stock price – as it is the focal point of our study, the other two variables merely being there as control measures. As some of our corporate bond entries have negative yields, we cannot outright transform them into log values. For this purpose, we rebased both our stock prices and our bond yields with a base of +100, allowing us to transform them both into logs and perform our regression again, whose results will be shown below.

Having the new dependent variable in hand, the findings sound better and more realistic. The predictive power of our model has been increased as the R squared jumped up to 40%. The right-hand side variables are now becoming significant given the provided robust standard errors. The coefficient of our stock price has also become more meaningful, with a 1% increase in the share price on the date of issue increasing yields by 0.20% - not a meagre amount considering the monetary state of the Eurozone.

However, we still suspect that our research is plagued with misspecification errors. We have no reason to suspect that our variables have a linear relationship with the dependent. As a way of coping, we utilise Ramsay's RESET test on our secondary regression, the one displayed in Table 3. The results are shown below.

Table 3. Ramsay RESET Test

	Value	***Probability***
RAMSEY Test	1.47	0.23

It seems that our Ramsay RESET test fails to show evidence for any non-linear relationship between our independent variables and dependent variable.

By and large, our findings in this section seem more in line with later research – as we also found evidence that stock prices and yields commove in the same direction. There is not any evidence of a substitution effect, which is surprising.

It seems that investors do not consider stocks and bonds to be substitutes. This can be due to a variety of factors – stocks being significantly more liquid than bonds while at the same time presenting more risk and earning opportunities seem more suited to the individual investor whereas bonds might end up in the hands of large institutional investors such as pension funds and retail banks, meaning these two markets are segmented and serve two different customer bases with different needs, eroding the substitution effect that we had hoped to observe.

6. Conclusion

In this paper, we looked at examining the relationship between stock prices and bond yields with and without controlling for excess returns. It was our hope to find a relationship that could be identified as substitutory but instead we found that instead, these two markets were most likely segmented and served the different needs of two different customer bases.

We also found that while stock prices were impactful, liquidity, as measured by the lifetime of the bond were not. By and large, the most impactful determinant of bond yields in our model turned out to be ratings – for our purposes, we used Moody's which usually moves in tandem with S&P and other major rating agencies' ratings. This result seems to lend credibility to the idea that bond holders are only concerned with the risk of default when purchasing a bond, and do not pay much attention to anything else.

This provides evidence that bond buyers in the Eurozone care about risk – and perhaps risk alone due to the memory of the Greek sovereign debt crisis. In further research, we would augment our research to include several measures of different types of risk such as liquidity, market, etc while discarding the other terms.

We obtained our data for corporate bonds denominated in euros – trying to contribute to filling the gap caused by the lack of research into the European financial market. We observed all throughout the literature review that the vast majority of research, both seminal and contemporary, is US-centric. Considering the different interest rate environments present in both markets, we hoped to glimpse new insights.

Another way in which our approach was different than most was the lack of time-series analysis in our paper. For all intents and purposes, we were only concerned with the issue date. As investors of bonds mostly hold until maturity,

and the secondary market for bonds is limited, especially so in Europe, we hoped this simpler approach's drawback would be mostly mitigated.

References

Amihud, Y., Mendelson, H. & Pedersen, L. H., 2005. Liquidity and Asset Prices. Foundation and Trends in Finance, vol 1, no 4, pp. 269-364.

Baker, M. & Wurgler, J., 2012. Comovement and Preditability Relationships Between Bonds and Cross-section of Stocks. The Review of Asset Pricing Studies, Volume 2, Issue 1, pp. 57-87.

Bao, J. & Hou, K., 2013. Comovement of Corporate Bonds and Equities. Fisher College of Business Working Paper Series.

Barron, M. J., Clare, A. D. & Thomas, S. H., 1997. The Effect of Bond Rating Changes and New Ratings on UK Stock Returns. Journal of Business & Accounting, Vol 24, Issue 3-4.

Campbell, J. Y. & Ammer, J., 1993. What Moves the Stock and Bond Markets? A Variance Decomposition for Long-Term Asset Returns. The Journal of Finance, Volume 48, Issue 1, pp. 3-37.

Davydenko, S. A., 2012. When Do Firms Default? A Study of the Default Boundary.

de Jong, F. & Drissen, J., 2006. Liquidity Risk Premia in Corporate Bond Markets∗.

Dichev, I. D. & Piotroski, J. D., 2001. The Long-Run Stock Returns Following Bond Ratings Changes. The Journal of Finance, Volume 56, Issue 1, pp. 173-203.

Fama, E. F. & French, K. R., 1992. The Cross-Section of Expected Stock Returns. The Journal of Finance, Volume 47, Issue 2, pp. 427-465.

Gebhardt, W. R., Hvidkjaer, S. & Swaminathan, B., 2004. The cross-section of expected corporate bond returns: Betas or characteristics?. Journal of Financial Economics, Volume 75, pp. 85-114.

Goh, J. C. & Ederington, L. H., 1993. Is A Bond Rating Downgrade Bad News, Good News, or No News for Stockholders?. The Journal of Finance, Vol. 48, No. 5, pp. 2001-2008.

Grier, P. & Katz, S., 1976. The Differential Effects of Bond Rating Changes Among Industrial and Public Utility Bonds by Maturity. The Journal of Business Vol. 49, No. 2, pp. 226-239.

Hasan, M. S. & Taghavi, M., 2002. Residential investment, macroeconomic activity and financial deregulation in the UK: an empirical investigation. Journal of Economics and Business, Volume 54, Issue 4, pp. 447-462.

Holthausen, R. W. & Leftwich, W. R., 1986. The effect of bond rating changes on common stock prices. Journal of Financial Economics, Volume 17, Issue 1, pp. 57-89.

Huberman, G., 1984. External Financing and Liqudity. The Journal of Finance, Volume 39, Issue 3, pp. 895-908.

Ingram, R. W., Brooks, L. D. & Copeland, R. M., 1983. The Information Contest of Municipal Bond Rating Changes: A Note. The Journal of Finance, Vol. 38, No. 3, pp. 997-1003.

Kliger, D. & Sarig, O., 2000. The Information Value of Bond Ratings. The Journal of Finance, Volume 55, Issue 6, pp. 2879-2902.

Merton, R. C., 1974. On The Pricing of Corporate Debt: The Risk Structure of Interest Rates. The Journal of Finance, Volume 29, Issue 2, pp. 449-470.

Ohmi, H. & Okimoto, T., 2006. Trends in stock-bond correlations. Applied Economics, Volume 48, Issue 6, pp. 536-552.

Ross, S. A., 1976. The arbitrage theory of capital asset pricing. Journal of Economic Theory, Volume 13, Issue 3, pp. 341-360.

Sharpe, W. F., 1964. Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk. The Journal of Finance, Volume 19, Issue 3, pp. 425-442.

Shiller, R. J. & Beltratti, A. E., 1990. Stock Prices and Bond Yields: Can Their Comovements Be Explained in Terms of Present Value Models?. The National Bureau of Economic Research, Working Paper No:3464.

Smith, P. N., Wallis, K. F. & Church, K. B., 1994. Econometric Evaluation of Consumers' Expenditure Equations. Oxford Review of Economic Policy, Volume 10, Issue 2, pp. 71-85.

Whittington, G., 1972. The Profitability of Retained Earnings. The Review of Economics and Statistics,Vol. 54, No. 2, pp. 152-160.

Zaima, K. J. & McCarthy, J., 1988. The Impact of Bond Rating Changes On Common Stocks and Bonds: Tests of Wealth Redistribution Hypothesis. The Finacial Review, Volume 23, Issue 4, pp. 483-498.