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Underpricing of newly issued corporate bonds in the CEE markets**

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ABSTRACT

IPO anomalies in the corporate debt markets are to great extent unexplored field in the academic literature. The aim of this paper is to investigate the underpricing phenomenon of newly issued corporate bonds on the Catalyst market and its determinants. I use event study methodology to test for underpricing and perform regressions to find its determinants. The sample includes 142 corporate bonds issued between March 2010 and August 2013 and listed on the Catalyst market. The computations confirm the uderpricing effect in the CEE market, however do not allow to indicate its determinants.

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1. INTRODUCTION

IPO anomalies on the stock market are extensively documented in the literature. Researchers all over the world investigated both short term mispricing and long term underperformance phenomena. Papers offer plenty of hypotheses explain these patterns and their origins. Taking that into account it may seem astonishing, that very few studies concern similar phenomena in the bond market1. Up to now, there are several papers including observations from the United States and foreign markets, mostly Japan. What is more, it seems that no paper investigated bond IPOs in the markets of Central and Eastern Europe.

The aim of this paper is to investigate, whether the initial underpricing of the bond IPOs could be observed in the e market and to find out which factors contribute to the underpricing. The study is composed of 3 parts. The reminder of the article is organised as follows. First, I review the existing literature in the field, focusing both on theoretical explanations and empirical research. Second, I present datasets and research methods employed. Finally, I present the empirical research and its results. My computations are based on a preselected sample of 142 corporate bonds issued between March 2010 and

[1] Interesting reviews could be found in studies of Ritter (1998) or Jenkinson and Ljungqvist (2001).

August 2013 which were listed Catalyst, the only regulated market in CEE dedicated to corporate debt. The paper ends with conclusion and suggestions for further research.

The paper makes two crucial contributions to the relatively modest literature on initial bond offering (IBO) mispricing. Firstly, it attempts to verify whether the IBO mispricing is present also in the CEE markets. Secondly, it tries to identify which factors influence a size of the mispricing, by amplifying it or minimising. The results of analysis are important for both "sides" of financial markets. From the point of companies seeking financing, they allows to better estimate a cost of capital and its components, and thus helps to decrease and optimise it. On the other hand, the research results helps investors to better forecast the expected rate of returns in the corporate bond market.

2. THEORETICAL BASIS

There are many hypotheses explaining initial underpricing at stock IPOs, but not many of them could be applied to the bond market. In practice, two standard explanations are offered: asymmetric information between investors and excessive competition between underwriters.

The first prominent explanation is presence of asymmetry in access to information among various market participants. The hypotheses may come in a few forms which may slightly differ from each other. Rock (1986) emphasise the winner's curse problem, which emerges when well informed investors request allocation only of low and fair value IPOs. Thus, the allocation of overpriced and frequently unprofitable IPOs is left to uninformed investors. The problem is solved through underpicing. It offers profit to uninformed investors, which would otherwise not participate in the IPOs. The Rock's model is extended by Benveniste, Busaba and Wilhelm (2002), and also by Sherman and Titman (2002). Those authors regard undepricing as a sort of payment to IPO participants for revealing information about their opinions and valuations of the bonds offered.

Another extension of information-based theories focuses on differences in access to information of investors and managers. This hypothesis involves signalling models (Allen and Faulhaber 1989, Welch 1989, Grinblatt and Hwang 1989) and is related to a lemons problem. If investors cannot tell the difference between "good" and "bad" companies, they value all of them the same. This is the reason why managers of good companies want to differentiate themselves from the bad ones and take advantage of underpricing mechanism "to receive their true, high worth" (Cai, Helwege, Warga 2007). Some authors suggest that the underpricing problem may be reduced thanks to a good reputation of an underwriter (Chemmanur and Paeglis 2005, Chemmanur and Fulghieri 1994, Hughes and Thakor 1992, Diamond 1989, Diamond 1991, Gorton 1996, Fenn 2000, Carty 1996).

Datta, Iskandar-Datta and Patel (1997) suggest that undepricing could be also a result of excessive competition among underwriters. According to their explanation, underwrites compete rather for high credit quality issues than low quality ones (junk bonds or not rated bonds). As a consequence, they drive

up prices of investment grade bonds and push down prices of junk bonds. Due to that, the first group may be overpriced, and the other underpriced.

The competition hypothesis appears to have two weak points. Firstly, it is difficult to justify why some investors actually buy overpriced bonds. Secondly, there is an issue of other dimensions over which underwrites compete: commissions, size of an issue, etc.

The competition hypothesis seems to be confirmed for instance by Datta, Iskandar-Datta and Patel (1997), who observed that positive abnormal rates of return on the IPO day are characteristic for low rating bonds, while investment grade debt often perform poorly during IPO. These studies appear to be confirmed by Cai, Helwege and Warga (2007), but it is worth noting that McKenzie and Takaoka (2008) come to an opposite conclusion. Some extensions of the competition model may be found also in the paper of Takaoka and McKenzie (2006).

Besides the theories described above, some attempts were taken to explain the underpricing phenomenon with liquidity issues. However, this field of research resulted in mixed conclusions. Ellul and Pagano (2006) think that bond underpricing may be regarded as a form of compensation for low liquidity right after the IPOs, which they partly confirm with their empirical research. On the other hand, Booth and Chua (1996) conclude, that initial underpricing induce higher investors' activity right after the bond IPOs. Finally, the study of McKenzie and Takaoka (2008) is also worth mentioning. The authors connect the IPO underpricing effect with a level of market and interest rates volatility.

Empirical research over abnormal IBO returns takes usually two forms: either analysis of bond YTMs or price patterns. Early studies (Ederington 1974, Lindvall 1977, Sorensen 1982) examined mostly YTMs and indicated that these of newly issued bonds before the first listing are usually higher than already listed bonds with a matching maturity and credit quality. However, because of difficulties in proper YTM calculation in case of bonds with built-in options, Weinstein (1978) decided to use benchmark-corrected prices instead of YTMs. He based his computations on a sample of 179 initial bond offerings and 412 seasoned bond offerings from years 1962-74. Most of the bonds were investment grade. Weinstein observed 0,366% average abnormal return in the first month of listing. On the other hand, Fung and Rudd (1986) did not manage to confirm existence of IBO underpricing and Wasserfallena and Wydler (1988) found proofs of this phenomena in the Swiss market.

Older studies did not distinguish between initial and secondary bond offerings. In contrast, Datta, Iskandar-Datta and Patel (1997) investigated exclusively IBOs. The authors used listings from NYSE and found positive abnormal returns averaging 1,85% for junk bonds and negative abnormal returns for investment grades. A similar methodology was employed by Helwege and Kleiman (1988), who used also dealer quotations. The regarded such approach as more appropriate due dealer-dominated character of the bond market. These researchers found statistically significant underpricing of speculative bonds, but only of 39 basis points.

Among the newer IBO research, it is necessary to point out papers of Kozhanov and Ogden (2012), as well as Cai, Helwege and Warga (2007), which both generally confirm underpricing phenomenon. In

contrast, McKenzie and Takaoka (2008), find out that corporate bonds in the Japanese market were rather overpriced than underpriced. Finally, interesting remarks could be found in a paper of Kohanov, Ogden and Vaghefi (2011). These authors indicate, that corporate bonds usually right after the IPO deliver abnormal rates of return, which last up to 6 months. However, later the bonds usually underperform effectively erasing initial superior returns.

3. DATA SOURCES AND RESEARCH METHODS

I based my computations on all corporate bonds listed on the Catalyst market, which were issued between March 2010 and August 2013 (the full period since the market was opened). I eliminated from the sample zero-coupon bonds (because of different price behaviour), government guaranteed bonds (because there are more similar to government bonds than corporate bonds), and bonds with no single trade during the first 100 days from IPO (in order to eliminate the distortions implied by lack of liquidity). After these operations, the final sample consisted of 142 corporate bond offerings. Data involving prices, dates, and benchmarks come from Bloomberg.

The analysis of behaviour of corporate bonds after an offering was performed according to a following procedure. First, I begin with the popular average cumulative abnormal returns (ACAR) approach. Next, using previously calculated ACARs, I performed regression analysis with dummy variables.

I begin by calculating abnormal returns (ARs) for each day within the 180-days period after the first listing. The daily AR was calculated as:

$$AR_{it} = R_{it} - R_{E(i,t)}, \tag{1}$$

where Rit denotes bond i return[2] on day t, and RE(i,t) is bond's i expected return on day t. The econometric literature offers a wide range of expected return models, which additionally in recent years significantly gained on sophistication. Interesting reviews could be found for instance in Campbell, Lo and MacKinlay (1996), MacKinlay (1997) or Kothari and Warner (1997, 2006). In this paper I employ benchmark-corrected rates of return, which is similar to the methodologies employed in the studies of Datta, Iskandar-Datta, Patel (1997) and Cai, Helwege, Warga (2007). From the formal point of view, it is a variation of a market model, as presented by MacKinlay (1996).

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}, \tag{2}$$
$$E(\varepsilon_{it0}) = 0, \qquad var(\varepsilon_{it0}) = \sigma_\varepsilon^2.$$

[2] I used logarithmic rates of return in all the computations.

where Rit and Rmt are the period-t returns on security and the market portfolio, ε_{it} is the zero mean disturbance term and αi, βi and σ_{ε}^2 are the parameters of the market model. The actual model I use was a market-adjusted return model (MacKinlay 1996). The market adjusted model is a restricted market model with αi constrained to be 0 and βi constrained to be 1.

Finally, the model's specifications is as follows:

$$R_{it} = R_{mt}. \tag{3}$$

I use maturity-matched Bloomberg/EFFAS Bond Price Indices as benchmark portfolios. It would be more appropriate to use a corporate bond index, which would factor not only variation in interest rates, but also changes in credit spreads, but there are no such indices available in the CEE market.

It is also necessary to point out, that the first ARit was computed against the issuing price, and that it related to the benchmark behaviour in the period between the offering and the first transaction day.

After computing daily ARs based on expected return models, I proceed with time-series aggregation, so as to obtain cumulative abnormal returns (CARs):

$$CAR_i = \sum_{t=1}^{T} AR_{it}, \tag{4}$$

and then I average CARs cross-sectionally for all the bonds in the sample, in order to obtain average cumulative abnormal returns (ACARs):

$$ACAR = \sum_{i=1}^{N} CAR_i. \tag{5}$$

When I calculate ACARs, I divide the full sample additionally into subsamples, based on various bond characteristics, which could potentially influence the scale of abnormal returns: maturity, collateral, public status at the time of issue, its size and its character (initial or secondary).

The zero hypothesis that ACARs are not significantly different from zero was confronted with an alternative hypothesis that ACARs actually differ from zero. I verified this hypothesis with parametric (t-statistic and t-Student distribution) and non-parametric tests (z-statistic from a bootstrap procedure).

Next, using the CARs based on the closing price at the first session with any transactions, I regress CARs against some dummy variables. The aim of the regression was to investigate which factors contribute to the variation in abnormal returns and was based on the same variables, which were used earlier to divide the sample into the subsamples:

- IPO – the first offering on the bond market,
- private status – issuer's stocks were not listed in any regulated market at the day of offering,
- lack of collateral – bonds were not secured with any collateral,

- small issue – a total size of an issue did not exceed 10 mio. PLN,
- long term bond – bond's maturity was longer than 3 years.

The regression analysis was performed in 8 separate dummy variable configurations. The regression parameters are estimated employing OLS and tested in parametric way.

4. RESULTS AND INTERPRETATION

Figure 1:. presents the cumulated ACAR rates during 180 days after the first transaction.

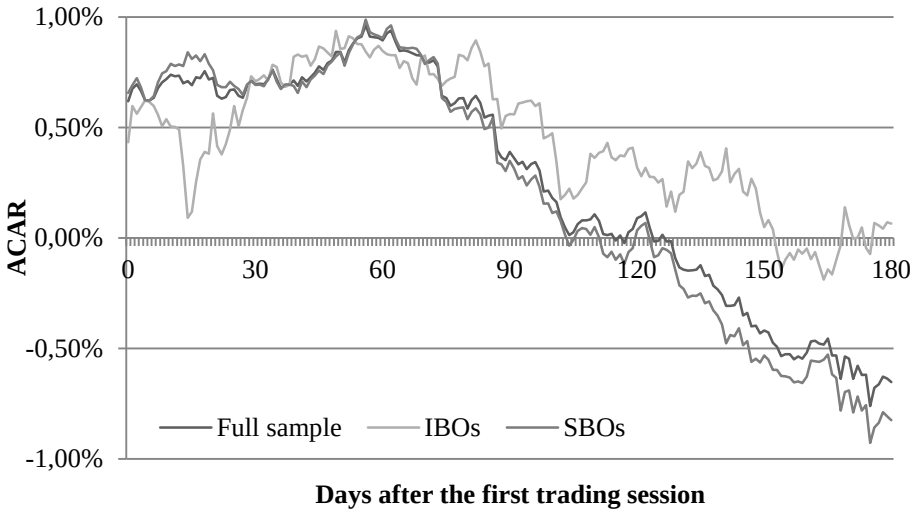

Figure 1: ACARs during 180 days following the first trading session.

The price behaviour generally follows the patterns observed in the US market in the subinvestment grade bonds segment. During the first 2 months of listings the bonds delivered almost 1% abnormal returns. Next, the superior performance successively weakened, and finally between the 4th and the 6th month the positive abnormal returns were erased to 0 or even became negative. Nonetheless, as it is depicted in Table 1., although the initial positive returns were statistically different from 0, the later negative ACARs lacked statistical significance.

Table 1: ACARs among IBOs and SBOs.

	Full sample			IBOs			SBOs		
Day no.	ACAR (%)	*t-stat*	N	ACAR (%)	*t-stat*	N	ACAR (%)	*t-stat*	N
1	0,619***	*3,783****	142	0,432**	*2,005***	24	0,656***	*3,414****	118
2	0,675***	*4,139****	142	0,597***	*2,767****	24	0,691***	*3,601****	118
3	0,696***	*4,198****	142	0,561***	*2,588****	24	0,723***	*3,707****	118
10	0,718***	*3,969****	141	0,538	*1,583*	24	0,755***	*3,638****	117
30	0,713***	*3,909****	136	0,732**	*1,986***	24	0,709***	*3,404****	112

60	0,906***	*3,57****	130	0,869*	*1,907**	23	0,914***	*3,108****	107
90	0,351	*1,531*	118	0,551	*1,250*	23	0,303	*1,138*	95
150	-0,432	*-1,313*	103	0,114	*0,275*	20	-0,563	*-1,421*	83
180	-0,636	*-1,461*	98	0,071	*0,159*	19	-0,806	*-1,522*	79

*, **, *** denote statistical difference from 0 at 10%, 5% and 1% levels. "N" is the number of observations.

What is interesting, the IBOs' returns were not higher, but actually lower, than these of SBOs. It stays in vivid contrast to what is observed in developed markets.

Table 2. depicts ACARs during the first trading session in the subsamples.

Table 2: ACARs in the subsamples (own computations)

	ACAR (%)	N	% of the sample	*t-stat*
Panel 1: private/public status				
Private companies	0,308	54	38,03	*1,075*
Public companies	0,809***	88	61,97	*4,117****
Panel 2: maturity				
Short-term bonds (up to 3 years)	0,677***	92	64,79	*4,725****
Long-term bonds (more than 3 years)	0,510	50	35,21	*1,317*
Panel 3: size of an issue				
Small issues (up to 10 mio. PLN)	0,396**	64	45,07	*2,055***
Big issues (over 10 mio. PLN)	0,801***	78	54,93	*3,171****
Panel 4: collateral				
Lack of collateral	0,634***	128	90,14	*3,539****
Collateral	0,475	14	9,86	*1,700*
Panel 5: IPO/SPO status				
Initial bond offerings	0,432**	24	16,90	*2,005***
Seasoned bond offerings	0,656***	118	83,10	*3,414****

*, **, *** denote statistical difference from 0 at 10%, 5% and 1% levels. "N" is the number of observations.

Analysing the Table 2., it is difficult to indicate which factors determine the size of underpricing. In fact, none of the factors, which were analysed in previous research, does not seem to contribute to forming the abnormal returns. These observations are confirmed by regression analysis shown in Table 3.

Table 3: Dummy variable regression (own computations).

Parameters	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept (%)	0,656***	0,806***	0,475	0,801***	0,677***	0,831***	0,652	0,787
	3,663*	***3,930****	***0,912***	***3,650****	***3,337****	***3,861****	***1,228***	***1,405***
IPO (%)	-0,224					-0,174		-0,243
	-0,514					***-0,399***		***-0,524***
Private company (%)		-0,501				-0,490		-0,359
		-1,493				***-1,452***		***-0,998***
			0,159				0,371	0,358

Lack of collateral (%)			***0,291***				***0,654***	***0,626***
Small issue (%)				-0,405			-0,529	-0,431
				-1,239			***-1,524***	***-1,188***
Long-term bond (%)					-0,167		-0,368	-0,345
					-0,489		***-1,004***	***-0,883***
R^2 (%)	0,19	1,57	0,06	1,08	0,17	1,68	1,93	2,97
Adjusted R^2 (%)	-0,53	0,86	-0,65	0,38	-0,54	0,27	-0,20	-0,60

*, **, *** denote statistical difference from 0 at 10%, 5% and 1% levels.

Although the intercept in most cases is significantly different from 0, but it was not possible to extract the factors that determine the size of underpricing.

5. CONCLUSIONS

In comparison with stock IPOs, anomalies connected with bond issues are relatively weakly investigated in the economic literature. Few studies concentrated mostly on US market suggested underpricing phenomenon among newly issued corporate bonds. This paper was probably the first attempt to find out whether the similar phenomenon may be observed on the Catalyst, and to answer the question which factors contribute to its creation.

The performed analysis allowed to confirm the existence of uderpricing of newly issued bonds in the CEE corporate bond market. However, it was not possible to indicate any specific factors which particularly impacted the size of underpricing. What is more, I was unable to confirm observations from the US market, that the abnormal returns are characteristic particularly for initial public offerings. On the Catlyst market in years 2010-13 the abnormal returns were generally similar, without regard for issue size, maturity, collateral, public or private status of an issuer, or the issue character: IBO or SBO.

Further research should concentrate on a few areas. Firstly, the sample should be expanded in both the time dimension (emissions which took place after publication of this paper) and the geographic dimension (emerging markets other than CEE). Moreover, it would be highly valuable to expand the sample into OTC market, for instance based on dealer quotations. Secondly, it would be very useful to design some credit risk index for the CEE corporate bond markets. It would allow more precise estimations of the underpricing. Thirdly, it would be valuable to assess the impact of a credit quality on the size of the underpricing and the price patterns following offerings. Nonetheless, the main obstacle is that most bonds on the Catalyst are not rated. Finally, increasing the number of dummy variables (for example with liquidity) could shed some light on the determinants of abnormal returns.

REFERENCES

Allen F., Faulhaber G.R. (1989) *"Signalling by underpricing in the IPO market"*, Journal of Financial Economics, vol. 23, pp. 303-323

Benveniste L.M., Busaba W., Wilhelm W. J. (2002) *"Information externalities and the role of underwriters in primary equity markets"*, Journal of Financial Intermediation, vol. 11, pp. 61-86.

Benveniste L.M., Spindt P.A. (1989) *"How investment banks determine the offer price and allocation of new issues"*, Journal of Financial Economics, vol. 24, pp. 341-361.

Booth J. R., Chua L. (1996) *"Ownership dispersion, costly information and IPO underpricing"*, Journal of Financial Economics, vol. 41, pp. 291-310.

Cai N.C., Helwege J., Warga A. (2007), "Under*pricing in the Corporate Bond Market"*, Review of Financial Studies, Vo. 20, no. 6, pp. 2021-2046.

Campbell J.Y., Lo A.W., MacKinlay A.C. (1996) *"The Econometrics of Financial Markets"*, Princeton University Press, USA.

Carty L. (1996) *"Is there a Reputation Effect in the US Public Debt Market?"*, Columbia University working paper.

Chemmanur T.J., Fulghieri P. (1994) *"Investment bank reputation, information production, and financial intermediation"*, Journal of Finance, vol. 49, pp. 57-79.

Chemmanur T.J., Paeglis I. (2005) *"Management quality, certification and initial public offerings"*, Journal of Financial Economics, vol. 76, pp. 331-368.

Datta S., Iskandar-Datta M., Patel A. (1997) *"The Pricing of Initial Public Offers of Corporate Straight Debt"*, Journal of Finance, vol. 52, no. 1, pp. 379-396.

Diamond D. W. (1989) *"Reputation acquisition in debt markets"*, Journal of Political Economy, vol. 97, pp. 828-862.

Diamond D.W. (1991) *"Monitoring and reputation – The choice between bank loans and directly placed debt"*, Journal of Political Economy, vol. 99, pp. 689-721.

Ederington L.H. (1974) *"The yield spread on new issues of corporate bonds"*, Journal of Finance, vol. 29, pp. 1531-1543.

Ellul A., Pagano M. (2006) *"IPO Underpricing and After-Market Liquidity"*, The Review of Financial Studies, vol. 19, no. 2, pp. 381-421.

Fama E. (1998) *"Market efficiency, long-term returns, and behavioral finance"*, Journal of Financial Economics, vol. 49, pp. 283-306.

Fenn G.W. (2000) *"Speed of issuance and the adequacy of disclosure in the 144a high-yield debt marke*t", Journal of Financial Economics, vol. 56, pp. 383-405.

Fung W.K.H., Rudd A. (1986) *"Pricing new corporate bond issues: An analysis of issue cost and seasoning effects"*, Journal of Finance, vol. 3, pp. 633-643.

Gorton G. (1996) "*Reputation formation in early bank note markets*", Journal of Political Economy, vol. 104, pp. 346-397.

Grinblatt M., Hwang C.Y. (1989) "*Signalling and the pricing of unseasoned new issues*", Journal of Finance, vol. 44, pp. 393-420.

Helwege J., Kleiman P. (1998) "*The pricing of high-yield debt IPOs*", The Journal of Fixed Income, vol. 8, pp. 61-68.

Hughes P.J., Thakor A.V. (1992) "*Litigation risk, intermediation risk and the underpricing of initial public offerings*", Review of Financial Studies, vol. 4, 709-742.

Jenkinson T., Ljungqvist A. (2001) "*Going Public: The Theory and Evidence on How Firms Raise Equity Finance*", Oxford University Press, New York.

Kothari S., Warner J. (1997) "*Measuring long-horizon security price performance*", Journal of Financial Economics, vol. 43, pp. 301-339.

Kothari S., Warner J. (2006) "*Econometrics of event studies*", [in:] E. Eckbo (red.), Handbook of Empirical Corporate Finance, Elsevier-North-Holland, Amsterdam.

Kozhanov I., Ogden J.P. (2012) "*The Pricing and Performance of New Corporate Bonds: Sorting Out Underpricing and Liquidity Effects*", working paper.

Kozhanov I., Ogden J.P., Vaghefi F. (2011), "*The Pricing and Performance of New Corporate Bonds: TRACE-Era Evidence*", working paper.

Lindvall J. (1977) "*New issue corporate bonds, seasoned market efficiency and yield spreads*", Journal of Finance, vol. 32, pp. 1057-1067

MacKinlay A.C. (1997) "*Event studies in economics and finance*", Journal of Economic Literature, vol. 35, no. 1, pp. 13-39.

McKenzie C.R., Takaoka pp. (2008), "*Mispricing in the Japanese Corporate Bond Market*", working paper.

Ritter J. R. (1998) "*Initial Public Offerings*", Warren Gorham & Lamont Handbook of Modern Finance, USA.

Rock K. (1986) "*Why new issues are underpriced*", Journal of Financial Economics,vol. 15, s.187-212.

Sherman A.E., Titman pp. (2002) "*Building the IPO order book: Underpricing and participation limits with costly information*", Journal of Financial Economics, vol. 65, pp. 3-29.

Sorenson E.H. (1982) "*On the seasoning process of new bonds: Some are more seasoned than others*", Journal of Financial and Quantitative Analysis, vol. 42, pp. 195-208.

Takaoka S., McKenzie C.R. (2006) "*The impact of bank entry in the Japanese corporate bond underwriting market*", Journal of Banking & Finance, vol. 30, no. 1, pp. 59-83.

Wasserfallen W., Wydler D. (1988) "*Underpricing of newly issued bonds: Evidence from the Swiss capital market*", Journal of Finance, vol. 43, pp. 1177-1191.

Weinstein M.I. (1978) "*The seasoning process of new corporate bond issues"*, Journal of Finance, vol. 33, pp. 1343-1354.

Welch I. (1989) "*Seasoned offerings, imitation costs, and the underpricing of IPOs"*, Journal of Finance, vol. 44, pp. 421-449.