

# Mezzanine capital as a part of the investment portfolio of insurance companies

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## Abstract

This paper investigates Mezzanine capital as a component of insurance portfolios under consideration of their regulatory investment restrictions. Analyses are based on a unique dataset including detail cash flow information of around 900 Mezzanine loans.

In a comprehensive simulation, three times we formed a total of 7 000 pools with 100 mezzanine, 100 stock or 100 bond investments each, respectively. These bootstrap results reveal a comparable high sharpe ratio for Mezzanine portfolio investments and a negative return correlation to bond or stock portfolios.

In a second step, using a linear optimization model we calculated efficiency curves and determined positive effects when adding Mezzanine to the bond/stock portfolio. Due to the restriction to invest less than 30 per cent of tied-up capital in risky investments, insurance companies can not reach certain optimal risk/return pattern only with investments in stocks or bonds. We show that including Mezzanine to the portfolio helps optimizing performance, especially under considerations of these regulatory limitations.

**JEL Classification:** G11.

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All data for this project were obtained from the CEPRES Center of Private Equity Research ([www.cepres.de](http://www.cepres.de)).

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## **Mezzanine capital as a part of the investment portfolio of insurance companies**

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### **1. Introduction - Private equity investments in insurance portfolios**

The insurance industry has constantly faced new challenges in recent years which have brought about numerous changes in the sector. With growing competition and continually changing regulatory conditions, one field in particular has been the focus of much attention: asset management. Those responsible for an insurance company's capital investments are confronted with the challenging task of optimising their asset portfolio within the framework of the company's specific requirements and demanding return targets. In doing so, against the background of the development of the markets in the late nineties, particular importance is attached to the aspect of risk. The question is what limited, calculable risks can be taken to exceed, consistently, the returns usually to be expected on the money market.

Investors who restrict their range of investments to the classic financial instruments, shares and bonds, are in a dilemma. The negative performance of the global stockmarkets over several years is reflected in the performance of their whole portfolio. Government bonds usually do not suffice to attain the yield the investors strive for. Moreover, alternative forms of investment such as private equity or hedge funds do frequently offer excellent return expectations but cannot be taken advantage of by many investors with a special need for security.

As surveys show,<sup>1</sup> professional asset managers, in this situation, are seeking alternative investments which have great return potential and at the same time contribute to optimising the portfolio due to the low correlation with other classes of asset investments. Furthermore, especially insurance companies place importance on the generation of regular income in order to ensure that they reach the goal of paying the guaranteed interest.

Mezzanine capital has attracted increasing attention lately, although rather as a form of financing than as an asset class. The term "mezzanine" comes from architecture and describes the intermediate storey between two floors of a building. In the context of corporate finance mezzanine capital has – like an intermediate floor – a position between debt and equity in the balance sheet. The mezzanine lender grants a subordinated loan with a fixed term and regular interest which at the same time is coupled with an "equity kicker", i.e. a participation in the success of the company. The equity kicker usually comes in the form of an option that enhances the total return for mezzanine without exposing the lender to downside risk.

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<sup>1</sup> Cf. for example JP Morgan Fleming "European Alternative Investment Strategies Survey 2003".

Although mezzanine capital as a form of investment is not yet widespread with institutional investors in Germany and therefore has hardly appeared in many portfolios, it is a capital investment which has been tried and tested for decades. The market pioneers were American insurers which in the fifties already granted loans to private companies and, through the equity kicker, participated in their success. High current interest income and the possibility to participate in the appreciation of the company's value, represented the attraction of this form of investment to the investor. In addition to a direct investment in mezzanine by means of a mezzanine loan, institutions can also invest in mezzanine indirectly by investing in mezzanine funds. In the middle of the eighties, the first independent specialised mezzanine funds appeared which – as is common with private equity investments – were organised in the form of a closed-end fund. Today, over 150 independent mezzanine fund managers exist, about 80 per cent of which are in the USA.

The following paper examines the advantages which mezzanine offers as an asset class and how the efficiency of the investment portfolio can be improved by including mezzanine capital. We base analyses on a dataset describing 900 mezzanine loans. In a first step we use bootstrap simulations to generate representative portfolio returns of comparable mezzanine, bond and stock portfolios. In a second step we present descriptive statistics and - in a third step – using a linear optimization model we develop efficient portfolios including bond, stock and mezzanine investments. This is done under special consideration of the national regulatory investment restrictions for insurance companies. At last we give a summary conclusion.

## **2. Methodology - Mezzanine capital in the context of asset allocation**

### **a. Portfolio optimizing for private equity investments**

Many insurance companies resort to a variant of the Markowitz model, well-known in modern portfolio theory, to structure their investment portfolio. The central idea of this approach is the construction of an optimum portfolio taking various classes of investment into consideration. The calculations made in the process are based on information concerning the expected return and risk asset classes and the correlation between them.

However, one has difficulty using this optimization approach in alternative forms of investment such as mezzanine capital. The return for, for instance, shares and fixed-interest bearing securities is calculated on the basis of market prices (so-called "Time Weighted Return, TWR"). In contrast to that, no market prices are calculated at regular, frequent intervals for mezzanine investments. The market value of a mezzanine transaction can therefore only be calculated objectively at the time the transaction is fully realized. The internal interest on invested capital "Internal Rate of Return, IRR" has therefore established itself as the standard for assessing the return of a private-equity investment instead of the time-weighted return used for exchange-traded securities.

Portfolio-optimizing models are, however, based on expected annual return and volatility, which are calculated on the basis of the time-weighted returns of the past. So the internal rate of return (IRR) calculated for mezzanine investments cannot be taken into

account directly in optimising portfolios.<sup>2</sup> In addition, the Markowitz approach requires calculating correlations between the public market and the mezzanine market, which is not possible to carry out by directly comparing the different return measures. In order to solve these problems, an innovative approach has been developed based on the work of Fama/McBeth<sup>3</sup> and Fama/French<sup>4</sup>, which allows for simultaneously considering listed investment alternatives and mezzanine investments in the portfolio optimization process.

## **b. Database and methodical considerations**

For mezzanine investments, no market data is published on a regular basis. Therefore, CEPRES Center of Private Equity Research has compiled its own mezzanine database. Its content is detailed information on the cashflow of approx. 900 mezzanine loans (as of 15 September 2003) which were granted by independent mezzanine funds between 1986 and 2002. This database makes it possible to construct a market portfolio of mezzanine investments and to take mezzanine as an asset class into account in a portfolio optimising model.

To construct the market portfolio, it was assumed that an investor builds up and then disposes of a diversified portfolio of 100 mezzanine loans over a period of ten years. The cashflows for the 100 loans are based on actual data and were picked from the CEPRES database at random<sup>5</sup>. The so-called “pooled IRR” of the invested capital can then be calculated for each of these pools of mezzanine investments. In a comprehensive simulation, a total of 7 000 pools with 100 mezzanine investments each were formed and their average return as well as the return’s standard deviation was calculated.

In a second step, the internal rate of return was calculated for an investment also held for a period of 10 years consisting of a share portfolio (represented by the MSCI World Index) and a bond portfolio (represented by the JPM Global Government Bonds Index). The amount and the time of the investment in the share and bond portfolio are the same as prescribed by the random mechanism for the various pools of 100 mezzanine transactions. With this procedure, a total of 7 000 cashflow sequences for an investment in the corresponding share and bond portfolio were drawn up which constitute an adequate yardstick for a comparison with the mezzanine portfolios compiled. For these two benchmarks, too, the average IRR and the standard deviation for the 7 000 rates of return can then be calculated. Finally, by comparing these benchmarks with the simulated mezzanine portfolios, the correlations of the returns between the three classes of investment can be calculated in a standardised way and used to optimize the portfolio.<sup>6</sup>

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<sup>2</sup> IRR and TWR only concur under very strict theoretical conditions; cf. Rouvinez, (2003), pp. 34 and following.

<sup>3</sup> Cf. Fama/MacBeth (1971)

<sup>4</sup> Cf. Fama/French (1992).

<sup>5</sup> The random picking is carried out according to the so-called Bootstrap procedure (picking with putting back).

<sup>6</sup> For the exact method of benchmark modelling see Daniel M. Schmidt 2003: Private equity-, stock- and mixed asset-portfolios: A bootstrap approach determining performance characteristics, diversification benefits and optimal portfolio allocations, Working Paper, Univ. Frankfurt am Main.

### 3. Results of the portfolio optimization

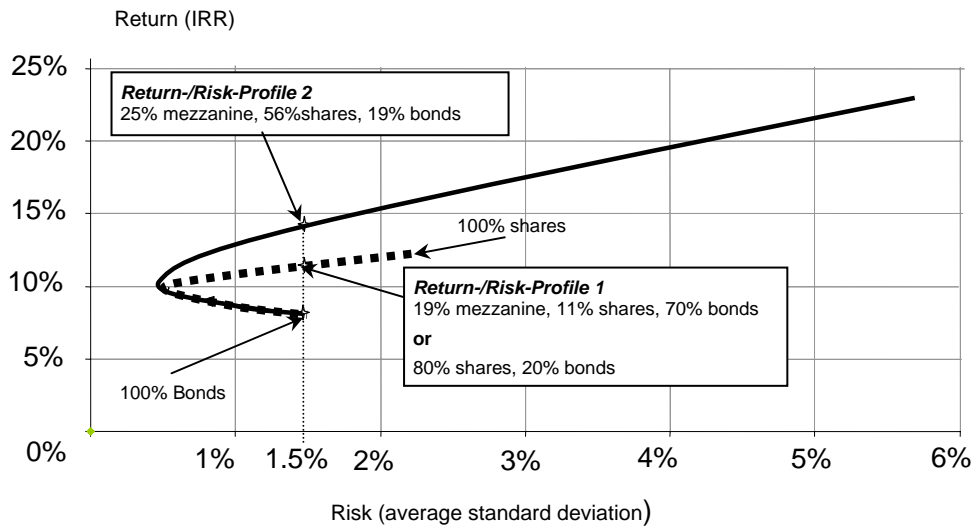
Table 1 shows the average return and the mean risk of the mezzanine pools as well as the portfolio used as a benchmark on the basis of an investment in the MSCI World Index and den JPM Global Government Bonds Index. The mezzanine return amounts to 23.7%. This figure is significantly higher than the return for shares and bonds. Despite the greater volatility of the mezzanine investments (5.8% as opposed to 2.2% and 1.5%), a comparatively good or significantly better Sharpe Ratio is achieved.<sup>7</sup> Furthermore, the low or negative correlations between mezzanine capital and shares and fixed-interest securities indicate that including mezzanine capital in a portfolio of shares and bonds should have a positive effect on its efficiency.

	Mezzanine capital	MSCI World	JP Morgan Global Govt. Bonds
Return (IRR)	23.7%	12.5	8.3%
Standard deviation	5.8%	2.2%	1.5%
Sharpe Ratio	3.23	3.36	2.13
Correlation coefficient of mezzanine capital		-	0.232

*Table 1*

In order to be able to quantify the effect of including mezzanine in an efficient share-bond-portfolio, portfolios were formed from different mixtures of shares (MSCI World), bonds (JPM Global Government Bonds) and mezzanine capital. Using a linear optimizing model, efficiency curves can be calculated for various combinations of the three investment alternatives. Diagram 1 represents the return/risk combination for portfolios consisting of two (dotted curve: shares and bonds) and three (continuous curve: mezzanine, shares, bonds) classes of investment with a weighting which varies freely. The positive effect of an investment in mezzanine capital is obvious. By adding mezzanine to a share/bond portfolio, the expected return of the whole portfolio increases, the risk staying the same (transition from the dotted efficiency curve to the continuous one).

<sup>7</sup> On the assumption of a risk-free interest rate of 5 per cent. All figures were calculated for a holding period of 10 years.



*Diagram 1*

In managing the assets and liabilities of insurance companies, investment decisions cannot, however, be taken solely on the basis of an unrestricted optimization. Rather the permanent obligations towards the policyholder as well as the rules of the regulatory authorities in Germany have to be taken into account. Consequently, German insurers may only invest up to a maximum of 30 per cent of tied-up capital in risky investments such as shares or mezzanine capital. These restrictions on investment policy were taken into consideration in a second optimization with the extra condition that a maximum of 30 per cent of the capital invested in the portfolio can be invested in shares and mezzanine together.

The analysis presupposes a pure bond portfolio and examines the effects on the portfolio return at a constant level of risk, should shares or mezzanine be added to the portfolio. The results are shown in Table 2 and illustrated in Diagram 1. One can see that, on the basis of a constant risk of 1.5%, an increase from 8.3% to 11.7% in the portfolio yield is possible at first for a pure bond portfolio with the addition of shares (Return-/Risk-Profile 1). For that, however, 80 per cent would have to be invested in shares and 20 per cent in bonds. This combination cannot, therefore, be put into practice by a German insurance company due to the limitation to 30% of the risk-carrying share of investments. If, however, mezzanine capital is included in the portfolio, the same return-/risk-profile 1 can be achieved with a mixture of 19 per cent mezzanine, 11 per cent shares and 70 per cent bonds. This portfolio lies under the continuous efficiency curve and therefore only makes sense for investors with investment restrictions. Institutional investors who can have an unlimited share of risky investments can boost the return of the portfolio to up to 14.5% with a constant level of risk if they increase the percentage of mezzanine to 25 per cent and of shares to 56 per cent (Return-/Risk-Profile 2).

	Portfolio weighting			Performance	
	Mezzanine	Shares	Bonds	Risk	Return (IRR)
Pure bond portfolio	0.0%	0.0%	100.0%	1.5%	8.3%
Share/bond portfolio – no restriction	0.0%	80.2%	19.8%	1.5%	11.7%
Share/bond/mezzanine portfolio – with 30% restriction	18.8%	11.2%	70.0%	1.5%	11.7%
Share/bond/mezzanine portfolio – no restriction	24.9%	56.2%	18.9%	1.5%	14.5%

*Table 2*

#### 4. Summary and conclusion

In this article, we examined the effect of an investment in mezzanine capital on the return-/risk-profile of a diversified portfolio. To simplify matters, we worked on the assumption that the insurance company only invests in a world share index and a world government bond index. The effects of a mezzanine investment on the return (IRR) of this portfolio are therefore not directly applicable to the portfolios constructed by insurance companies in reality, which contain numerous other forms of investment. Nevertheless, regardless of each concrete individual case, an investment in mezzanine capital should contribute to the optimization of portfolios for most investors on account of mezzanine’s positive diversification characteristics.

Analyses are based on a unique dataset including detail cash flow information of around 900 Mezzanine loans. In a comprehensive simulation, three times we formed a total of 7 000 pools with 100 mezzanine, 100 stock or 100 bond investments each, respectively. These bootstrap results reveal a comparable high sharpe ratio for Mezzanine portfolio investments and a negative return correlation to bond or stock portfolios. In a second step, using a linear optimization model we calculated efficiency curves and determined positive effects when adding Mezzanine to the bond/stock portfolio. Due to the restriction to invest less than 30 per cent of tied-up capital in risky investments, insurance companies can not reach certain optimal risk/return pattern only with investments in stocks or bonds. We show that including Mezzanine to the portfolio helps optimizing performance, especially under considerations of these regulatory limitations to 30% risky investments. With a constant return volatility of 1.5% a portfolio allocation of 80% to shares would be needed to achieve an 11.7% percent portfolio return. Same risk return patterns can be reached by investing next to bonds 18.8% to mezzanine and 11.2% to shares. This, however, is according to the regulatory investment restrictions.

The results set out here presume that the investor holds a diversified market portfolio of mezzanine loans. He could build this up through being a mezzanine lender himself, but most insurers would probably lack the human resources required for this. By investing in several mezzanine funds instead of granting mezzanine loans directly, this problem can be alleviated somewhat, but the regulatory authority (BAFin) also requires the existence of an experienced investment staff for these investments.<sup>8</sup> In addition to this aspect, investing in a fund of funds,

<sup>8</sup> Cf. BAFin circular 29/2002 (VA) of 12 December 2002 Part A, III. 9. c)

which on top of the diversification also provides a professional choice and considerable administrative relief, should, for cost reasons alone, represent an efficient alternative.

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