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FINANCING OPTIONS FOR RESIDENTIAL REAL ESTATE

THE INDEPENDENT STUDY SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER IN BUSINESS ADMINISTRATION

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Abstract

How much may your property cost and how can you finance it? This thesis will show you various financing models and guide you through the typical real estate financing instruments in Germany today. Since in real estate financing there is no cookie-cutter solution, a good real estate financing is tailor-made for each situation.

In essence, the same instruments are used for private real estate financing and commercial real estate financing: loans, mortgages, and derivatives for interest fixing. The property to be financed is usually taken as collateral to secure the financing, the bank charges it with a land charge. The advantage of such classical real estate financing is its simplicity and comprehensibility for the consumer and the low costs due to standardization to the bank. But it has its limits when it comes to larger projects or even portfolio financing.

In addition, there is the structured property financing, which is mainly used for commercial real estate financing and project developments. In this case, the cash flow of the object to be financed is much more important than in the case of classic financing. An important aspect is the investor's chosen capital structure, e.g. the share of equity or the use of mezzanine capital. Since these financing options are much more complicated they need close controlling and cooperation between investors, project developers and banks.

The application area of financing models in the real estate sector is large, as these models cannot only be used for long-term object financing, but also be used in the upstream and downstream phases of the real estate cycle. It is also possible to combine the various types of financing and to adapt them to the needs and requirements of the property and the investors.

Index of abbreviation

ABS	Asset-backed securities
CMBS	Corporate mortgage backed securities
DSCR	Debt service coverage ratio
e.g.	Exempli gratia, for example
ER	Equity ratio
EURIBOR	Euro InterBank Offered Rate
ICR	Interest coverage ratio
IRR	Internal rate of return
KfW	Kreditanstalt für Wiederaufbau (Reconstruction Loan Corporation)
LTV	Loan-to-value ratio
p.a.	Per annum, per year
REEF	Real estate equity funds
REIB	Real estate investment banking
RLL	Risk of rental loss
RMBS	Residential mortgage backed securities
RoE	Return on equity
SPC	Special-purpose company

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1. Introduction

The financial markets of Germany are currently undergoing a period of change. The events that have led to the current upheaval are as diverse as their effects. The most important events are, for example, the development of new financial products, the convergence of the individual national markets and the current discussion about the capital requirements for banks, which is currently under the heading "Basel III", which, however, is only reluctant to adapt to the changes and stick to old-fashioned financing models.

The central task of this work is to analyze whether it is useful to deviate from the classical real estate financing. In addition, it is to be clarified to what extent financing models can also be used in the sales area for the purpose of selling real estate, as has been customary in the automobile industry for many years.

The various possibilities of real estate financing are to be shown during the processing. The suitability of various financing models and variants for residential real estate is examined. In this context, individual property and real estate portfolios are to be examined which are to be commercially developed, sold or marketed. The work is therefore of interest to developers, project developers, housing associations and other investors active in the housing sector. The question is also of particular interest to banks, who have to orient themselves as providers of financing solutions to the needs of their customers.

In the second chapter, the fundamentals for investment and financing will be presented in order to deal with the topic, with a particular focus on the specifics of real estate investment and financing. The knowledge of the economic fundamentals and the real estate related peculiarities is necessary to understand the financing models presented later. In this chapter, too, an exact limitation of the topic and the classification into superordinate contexts are made.

In the third chapter the providers of real estate financing are presented and the product offer of the most important financing partners, the banks, is described. At this point, we are deliberately refraining from evaluating the individual products since a financing model can be composed of different financial products. For this reason, the combination of several unfavorable products could lead to a promising financing model.

The fourth chapter includes the presentation and evaluation of classical real estate financing. The financing model, which has been used for a long time in the financing of real estate in Germany, and which still dominates the financing practice today, is called classical real estate finance. Also, it describes the current trends in real estate fi-

nancing, which are referred to as "structured financing". In practice, the term "structured financing" is used to summarize all financing models that deviate from classical financing. The various instruments and financing modules are presented here. Lastly, possible financing models, which can be used during project developments are to be evaluated. In this context, the use of mezzanine loans and private equity is scrutinized more closely.

As a summary, the final chapter presents the contents in a short form and summarizes the important results of the processing.

2.Theory and practice related to the topic

An investment is generally understood as the conversion of capital into assets. The conversion of capital creates a stock of different assets which can be summarized as “assets” (Olfert, Rahn2011). The capital required for real estate investment can derive as equity by the investor itself or as a third party's capital. Capital procurement is referred to as financing. If the investment object is a property, then one speaks more specifically of a real estate financing.Real estate financing takes account of the specific characteristics of real estate and is therefore a special form of financing.

2.1 Fundamentals of the investment

By carrying out an investment, an investor pursues certain objectives. Increasing income and wealth is an important goal pursued by many investors. In order to maximize its income or capital, the investor conducts a profitable investment or carries it out through a third party. He provides the required capital either in whole or in part. The state tries to control investment activity indirectly through tax incentives or subsidy programs in order to achieve its own goals.

The various investment opportunities can be subdivided according to the nature of the investment object into two groups, which are known as financial or real investments (Olfert, Rahn 2011). The acquisition of claims or equity rights is understood as a financial investment (Becker 2015). Claims and equity rights include for example bonds or company shares. A real estate investment is an investment in a property. A minimum capital sum, which must be financed for the implementation of the investment, results from the respective property.

An investor is a natural or legal person who pays out and receives payments from an investment object (Becker 2015). According to this definition, the source of the funds is not relevant to the disbursement and the nature of the investment object. Investors are, therefore, private individuals or companies that invest in various properties, such as securities, shares or real estate.

2.2 Special features of investment in real estate

Investors who invest in real estate generally also pursue the objective of an increase in income and capital. The most important investment motives of real estate investors include value appreciation, tax advantages, the pos-

sibility of borrowing, and the protection from inflation. The investment opportunities in the real estate sector essentially correspond to the different types of real estate. The immediate investment in a property is also referred to as direct investment. A property is a closed space that provides benefits over a certain period of time. Real estate is assigned to different types according to its functions (Schulte, Archleitner, Schaefers 2002):

- Residential (one, two and multi-family houses, condominiums),
- commercial real estate (office, commercial and industrial real estate),
- special properties (hotels, clinics, senior citizen homes, infrastructure).

The following discussion focuses on housing estates, which are defined as properties with a focus on residential use. Investors investing directly in residential real estate include private investors and commercial investors (Schulte, Archleitner, Schaefers 2002).

Private investors generally have smaller capital volumes available than commercial investors. They invest primarily in condominiums, one- and two-family houses, which they either use themselves or serve as an investment. Commercial investors who invest in residential property usually invest their capital in multi-family houses and real estate portfolios. As a rule, they operate and rent out their own assets. The focus of this study is on commercial investors; The other considerations are confined to this group of investors.

Investment decisions in the real estate sector are partly influenced by the federal government and the states. In this context, the economic housing support programs of the Reconstruction Loan Corporation ("Kreditanstalt für Wiederaufbau", KfW)can be mentioned as examples. These programs include housing modernization programs, building restructuring programs and the CO2 reduction programs

These programs are intended to promote modernization and energy saving measures in residential buildings through interest-rate loans. The eligible measures and the respective interest-rate periods of exemplary programs are presented in the table below (KfW 2017a).

Table 1:

Exemplary programs of the Kreditanstalt für Wiederaufbau (KfW)

	Program 151	Program 153	Progam 124
Supported activities:	● Energetical improve-	● Energy-efficient con-	● Purchase or construc-

	ment of living space ● First purchase of energetically improved living space	struction of living space	tion of owner-occupied living space
Efficient Rate p.a.:	0.75%	Starting at 1.20%	Starting at 0.75%
Term:	Up to 10 years	Up to 20 years	Up to 10 years

Source: KfW 2017b, KfW 2017c, KfW 2017d

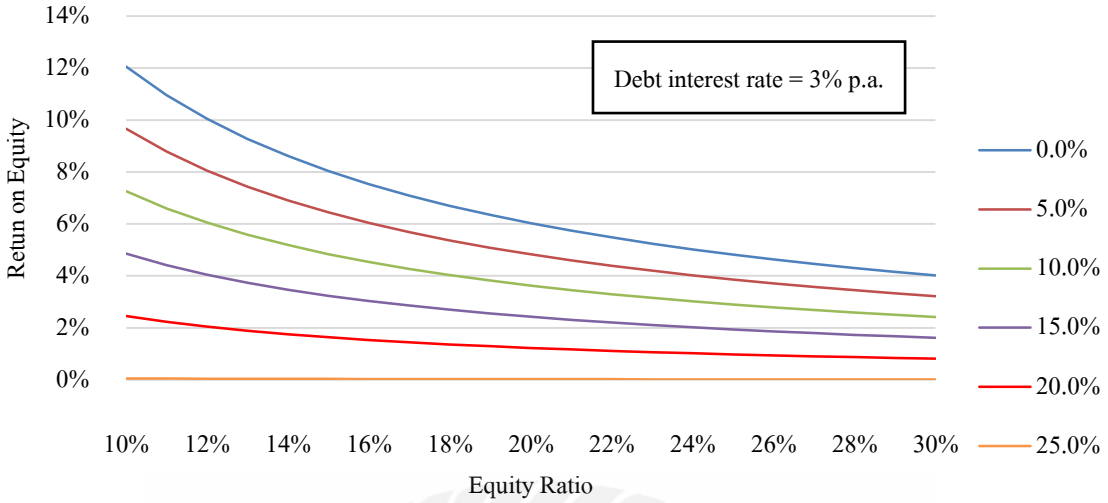
2.3 Fundamentals of financing

An investment can be financed by equity or debt. Equity is the share of the financing that is invested by the owners themselves. External capital is used to provide further capital for a limited period of time.According to their quota, equity investors are involved in the profit and loss of an investment. The claim of the lenders is limited to the interest and the repayment of the lent capital. If an investor has not enough equity available for an intended investmentadditional capital in form of debt is necessary. The use of foreign capital can also be useful for other reasons. In this context, the leverage effect and the tax privilege of borrowed capital must be mentioned (Graefer, Schiller, Roesner 2010).

The leverage effect states that the equity capital profitability rate of an investment is increased by increasing the leverage ratio, provided that the total return on capital is higher than the interest rate on borrowed capital (Geltner, Miller, Clayton, Eichholtz2006) In this case, the income generated with the borrowed capital is higher than the expenses incurred by the use of borrowed capital. Equity profitability is defined as the ratio of the total profit and the equity capital employed. If the equity ratio in the denominator is reduced to near zero in an extreme case, the equity profitability increases constantly until it finally becomes nearly infinite. If the total return on capital is lower than the interest rate on borrowed capital, the equity issuer will face a loss that would not have been realized without the use of capital. The following figures are intended to illustrate the opportunities and risks of this effect using the example of an existing property (see appendix I).

Figure 1:

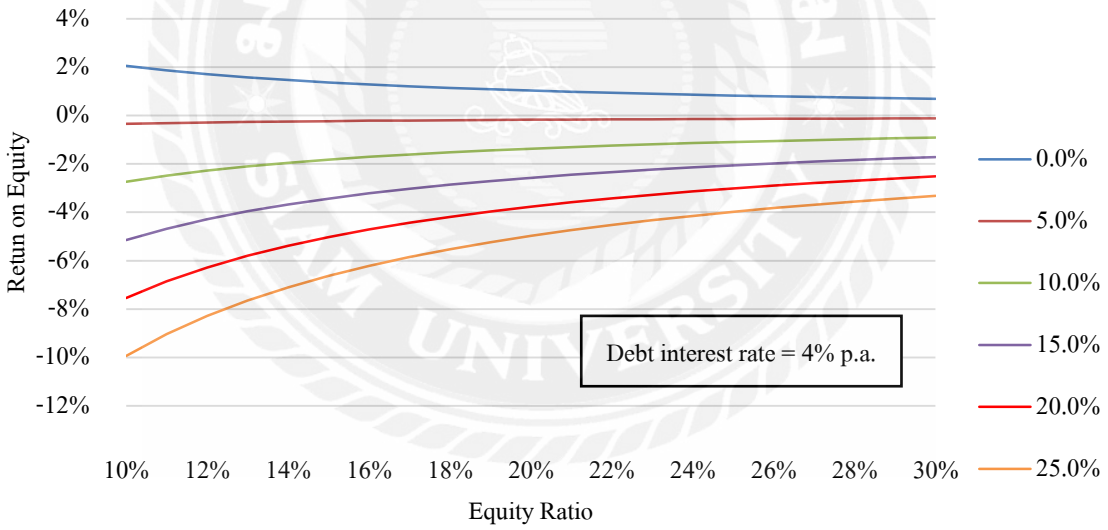
Impact of the leverage effect at low interest rates, debt interest rate 3% p.a.



Source: own resource

Figure 2:

Impact of the leverage effect at high interest rates, debt interest rate 4% p.a.



Source: own resource

Figure 1 illustrates that the leverage risk is low in the case of low interest rate borrowed capital, since an increase in borrowed capital will in no case lead to a reduction in the return on equity. In the case of good properties which are characterized by a low risk of rental loss, however, there is the possibility of increasing the yield. The return on equity of good properties can be significantly increased at a low interest rate as a result of the increase in borrowed capital. Such an increase in yields is not possible at a high interest rate which can be seen in Figure 2. In this case, there is a leverage risk in the case of bad properties with a high risk of rental loss, so that the return on

equity decreases as leverage increases and in extreme cases it can even become negative. The interest rate level and the state of a property to be financed are known prior to the determination of the debt and equity ratio so that the effects of the leverage effect can be estimated well in advance by means of simple scenario analyzes.

The tax privilege for borrowed capital is limited to holders of commercial enterprises which are required to pay trade tax for their activities. The amount of the business tax to be deducted from them is based on the amount of their business income as well as on possible deductions and reductions (GewStG 2002).In addition, interest payments can also be deducted from the tax, which results in an additional tax benefit from the debt (tax shield).

2.4 Special features in the financing of real estate

The use of borrowed capital is almost always necessary in the financing of real estate because the high investment volume for an object cannot generally be borne by one investor (Murfeld 2010). The value of property is an important trait of real estate, which makes high external financing possible. The existing value of the property serves as collateral for the repayment claim. The value corresponds in principle to the future usefulness of the property. As real estate is generally usable in the long-term, this also justifies the long-term use of outside capital (Fischer, Kleiber, Werling, Simon, Weyers2014). Hedging is usually done by means of property liens (e.g. mortgage or land charges). The liens entitle the borrower to use the pledged property as soon as the debtor fails to meet his payment obligations in accordance with the contract. The exploitation is carried out either by foreclosure auction or by compulsory administration. In the case of foreclosure auctions, the borrower is satisfied from the auction proceeds of the property; In the case of compulsory administration, he receives the current income generated through the land.

3. Real estate financing offers

In order to finance a property, various financing models can be used in a wide variety of variants. The various financing models are generally composed of several financial products. There are many providers of financing on the market, which offer various products for real estate financing.

3.1 Providers of financing

According to the breadth of the bid, the various providers of financing are divided into two groups: Universal banks and specialized banks. The group of universal banks includes credit banks, savings banks, state banks and credit unions (Brauer 2013). They offer their customers the full range of banking services and are not limited to certain banking transactions, like specialized banks are.

Specialized banks operating in commercial real estate finance include real estate credit institutions and investment companies. The main business of real estate credit institutions, which are also referred to as mortgage banks, is the lending of capital to finance domestic real estate and the issuance of mortgage bonds ("Pfandbrief") (KWG 1998). Investment companies invest the money of their customers in admissible assets according to the principle of risk spreading (KAGB 2016). The legal assets include, for example, securities, shares and real estate.

3.2 Bank products for real estate financing

Banks are the most important providers of financing products. For this reason, the products offered by them will be presented. Related products are grouped into product areas of which the following products are applicable to the financing of real estate:

- fixed loans,
- overdrafts,
- derivatives in the off-balance-sheet business,
- bank bonds and mortgage bonds in the field of emissions.

3.2.2 Loans

Fixed loans are loans issued by banks to their customers. In general, long-term loans are referred to as loans. Through a loan, the lender provides the borrower with financial means at agreed terms as stipulated in the credit agreement. Key terms include maturity, interest rates, repayment, and collateral. Loans can be issued by the banks in various currencies. The repayment is effected in the corresponding issue currency.

The term of a loan is the period between the credit disbursal and its full repayment. The borrower can choose the length of the term largely freely. The term does not necessarily have to start with the conclusion of the contract, but can also be in the future (Murfeld 2010). In this case, a forward loan is used.

Interest is the price that a borrower must pay for the temporary transfer of funds. It is fixed during the fixed interest period and must be fixed anew after the expiration of the fixed interest period. If the term of the fixed interest period equals the loan period, it is called fixed-rate loan. An alternative to the fixed-rate loan is the roll-over loan. For roll-over loans, the term is divided into equally long fixed-term loans. The length of the fixed-term loans corresponds to the interest-rate-fixing period and in practice usually takes one or three months. Before the start of each section, the interest rate is fixed. To do so, the bank establishes a reference rate together with the borrower and negotiates a margin to be applied on top of the reference rate. The benchmark usually is the EURIBOR 49 with a corresponding maturity or the actual market interest rate of the borrower (Brauer 2013). The margin covers the costs incurred by the credit management and satisfies its profit claim. In addition, the margin is to be used to cover the credit risk. The amount of the margin is therefore essentially dependent on the collateralization of the credit or the creditworthiness of the borrower.

Various types of redemption are offered by the banks to repay a loan. The annuity loan, the installment loan, and the bullet loan are the three most important forms of credit repayment in the long-term range. In the annuity loan, the capital service to be paid regularly, which is composed of interest and repayments, stays the same. This is the most common type of loan since it provides a steady capital service and benefits form the effect of saved interest (see appendix IV). The installment credit is repaid by the same repayment amounts, so that the residual debt is steadily reduced over time. The constant reduction in the residual debt reduces the amount of the interest rate in the same ratio. In the case of a constant repayment rate and a constantly lower interest rate, capital service also decreases steadily. In the case of the bullet loan, the repayment is made at the end of the term. During the term, usually only interest will be paid which relates to the amount of the loan.

It is possible that the borrower's economic performance may deteriorate during the term of the loan and that he cannot settle the loan in a timely manner, only partially or not at all. The collateralization provides the lender with collateral which can be used in the event of credit default. The provision of collateral reduces the default risk for the lender. The collateral to be provided is negotiated between the lender and the borrower and listed in the credit agreement.

In connection with real estate financing, the land claim and the mortgage (BGB 2002) are of particular importance. The land claim and the mortgage are liens on property and serve as collateral for a cash claim. They are grouped under the concept of property lien. A property lien is a good collateral for the lender: If the borrower does not comply with his payment obligations, the lender may use the property. The better a loan is collateralized, the lower the risk premium required by the bank, which is a component of the interest rate. Well-secured loans can therefore be issued at more favorable terms to borrowers than bad or unsecured loans.

In real estate financing, banks divide the financing volume into three areas for which they issue various loans. The ranges are separated by collateral limits, which depend on the collateral value. The collateral value is a long-term value that is at least achieved in the case of a short-term sale or auction (BelWerV 2006). For up to 60% of the value of the loan, banks issue real estate loans. Real estate loans have very low rates due to the low risk of credit default. Loans covering the range of 60% to 80% of the collateral value are designated as collateralized personal loans.

All loans that are not within this collateral area are generally considered to be not adequately secured by the object itself. The full repayment is only ensured with sufficient creditworthiness of the borrower, so that the default risk of these loans is higher than that of collateralized personal loans. The increased risk of default also increases the banks' interest rates. A bad credit rating of the borrower will further raise the interest rate if the loan is granted at all.

In summary, it can be said that loans are the most important products from the area of fixed amount credit. Due to the variation in terms and conditions and the resulting combination possibilities, there is a broad offer that can be used for real estate financing. The following table illustrates the possible combinations in the design of loans.

Table 2:

Overview of types of loans

Term:	Up to 30 years		
Beginning:	Immediate loan	Forward loan	
Interest rate:	Fixed rate loan	Roll-over loan	
Repayment:	Annuity credit	Installment loan	Bullet loan
Collateral:	Real estate loan	Collateralized personal loans	Personal loan
Currency unit:	Euro loan	Foreign currency loan	

Source: own resource

3.2.3 Overdrafts

An overdraft facility can be invested at any time up to a stipulated amount. The maximum claim is limited by the credit line approved by the bank. The terms of maturity, interest, repayment, and collateral are largely determined by the type of credit and can hardly be varied. The currency of a current account credit is largely freely selectable (Bueschgen 2006).

As a rule, overdraft credits are issued indefinitely. In these cases, the maturity ends with the termination, which can be effected either by the bank or by the borrower. The interest on a bank overdraft is variable and gets adjusted by the bank as soon as the situation on the money market changes. It is higher than the interest rate required for a credit with a fixed maturity (Graefer, Schiller, Roesner 2010). However, the interest rate applies only to the overdrafted amount and the actual time of overdraft.

This credit type allows a flexible utilization and repayment of the loan. As a general rule, bank overdrafts with no collateral are granted as blanket loans. On the other hand, overdraft facilities are often collateralized in connection with real estate financing (Brauer 2013).

In summary, a bank overdraft is expensive but flexible. It should only be used for financing if the benefits of flexibility justify the high costs incurred during actual use. The unused portion of a current account credit represents a liquidity reserve for the borrower which does not incur any costs.

3.2.4 Derivatives

Derivative financial products are generally referred to as derivatives. Derivatives are products which values depend on an underlying value (Rudolph, Schafer 2010). For example, the underlying may be an interest rate or an exchange rate. So that in these cases it is more appropriate to speak of interest rate derivatives and currency derivatives. Derivatives are divided into two groups according to the contract content: Unconditioned or conditional products. Unconditional products, including swaps, oblige both parties to the contract to fulfill their obligations and are not subject to any conditions. On the other hand, conditional products are subject to the fulfillment of contractual conditions and oblige only one contractual partner.

The group of conditional products includes, for example, options. Interest rate and currency management is the most important area of application to which swaps and options are applied (Rudolph, Schaefer 2010).

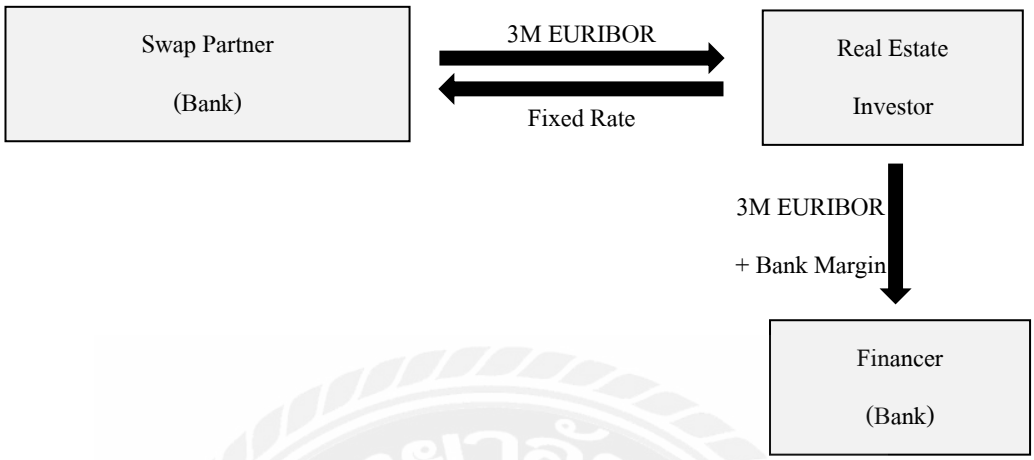
3.2.4.1 Swaps

A swap is a contractual exchange agreement on future payments usually concluded between banks and their customers. The exchange of payments is made on contractually agreed terms, so that the entire term of the swap is divided into several periods of the respective payments. The amount of the respective payments depends on the development of the underlying asset, which is also referred to as the underlying. The principal components of a swap agreement are the underlying, the maturity, and the swap structure. Most swap contracts are based on an interest rate or exchange rate (Graefer, Schiller, Roesner 2010). These swaps are referred to as interest rate and currency swaps. In the case of an interest rate swap, fixed interest rates are exchanged for variable interest rates. The fixed interest rate is fixed in the swap contract and remains unchanged throughout the term. The variable interest rates of the individual settlement periods correspond to a contractual reference rate, e.g. the 3-month EURIBOR.

Based on the two interest rates and the agreed nominal amount, the interest payments to be made by both contracting parties are determined in each period. The partner, for whom the larger number of payloads results in a billing period, compensates the other for the difference. For example, an interest rate swap can be used to convert a roll-over into a fixed-term loan, if the nominal amounts of both transactions correspond. The resulting payment obligations are shown in the figure below.

Figure 3:

General procedure of a swap



Source: Hull 2015

The resulting payment obligation of the real estate investor is easy to calculate: Since the variable interest payments of the two transactions correspond, he must pay the fixed interest from the swap transaction plus the credit margin from the underlying transaction. Banks calculate the fixed interest rate for the swap based on current capital market data, so that swap financing, unlike a fixed-rate loan, does not offer any cost advantages.

In the case of the currency swap, capital amounts of different currencies are exchanged at the beginning and end of the term (Hull 2015). The exchange and redemption of the capital amounts takes place at the exchange rate valid at the beginning of the term. Since the two amounts to be exchanged correspond to each other at the beginning of the term, an effective exchange is only necessary at the end of the term. In the case of the currency swap, interest is exchanged during the term, which accrues to the capital amounts received. If fixed interest rates are exchanged for fixed interest rates, then a currency swap is used in the narrower sense (Rudolph, Schaefers 2010). An exchange of fixed variable interest rates is possible through an interest rate swap. A swap of variable interest rates is agreed upon by means of a basic swap.

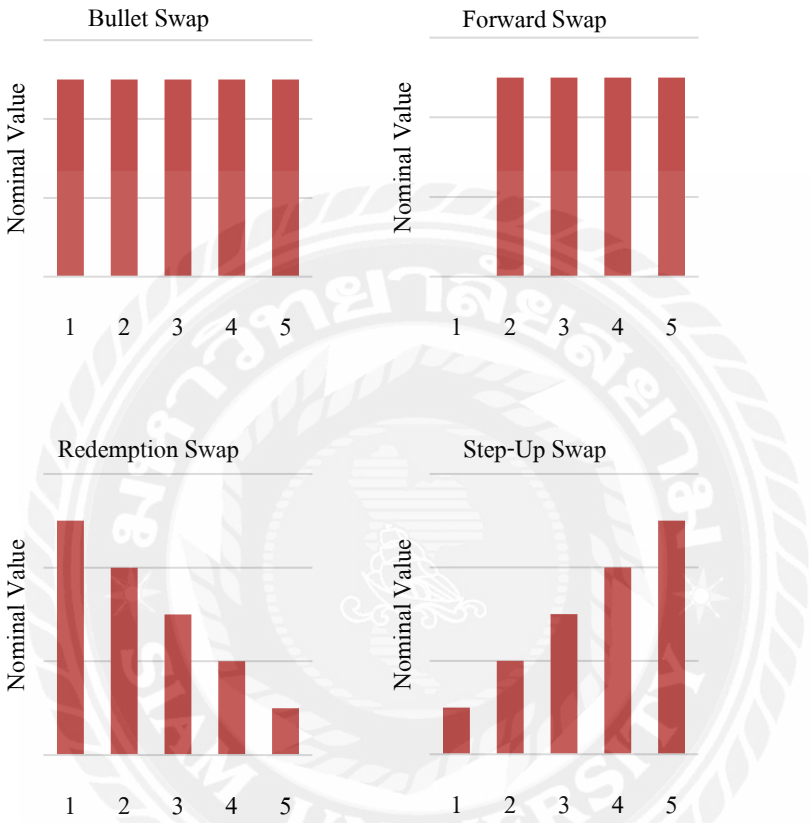
The term of a swap is the period between the beginning of the first and the end of the last billing period. The contracting parties can freely negotiate the length of the term, whereby banks are generally willing to accept any term.

The swap structure defines the nominal amounts of the individual periods. The structure can be adapted flexibly. By optimally adjusting the nominal amount, the risk to be hedged can be eliminated. The most commonly

used structures in practice are known as bullet swap, redemption swap, forward swap, and step-up swap (Rudolph, Schaefer 2010). The following figure shows the most important swap structures.

Figure 4:

Different structures of swaps



Source: own resource

In the case of a bullet swap, the nominal amount remains the same for the entire term of the swap. The nominal amount for the repayment swap decreases during the term. Each repayment structure can be simulated by the combination of bullet swaps with different maturities. A forward swap will begin in the future. The nominal amounts during the lead time are therefore zero. The nominal amount for a step-up swap increases during its term. By combining several forward swaps with different lead times, a step-up swap with the desired structure can be simulated.

At a low interest rate level, the use of swaps can be interesting in the context of the prolongation of existing loans. In a low-interest phase, expiring loans are often extended before the due date in order to benefit from low

interest rates in the future as well. In the case of the classic variant, the existing loan is terminated prematurely and a new loan agreement with extended maturity and lower interest rates is concluded. An early repayment penalty payable for the dissolution leads to an immediate burden on liquidity (Boesch 2014). Alternatively, a low interest rate can also be secured by means of a forward loan whose conclusion does not result in a liquidity burden. The usage of swaps makes it possible to secure low current interest rates for the future. These targets can be achieved with a double swap.

Two swap contracts with different maturities are concluded through a double swap. A short- to medium-term swap that matures at the maturity date of the existing loan, converts its fixed-rate into variable interest. For this purpose, the real estate investor pays a reference interest, e.g. the 3-month EURIBOR and receives a fixed interest rate from the swap partner. A second swap is used to exchange the reference interest received against a fixed interest rate in the long-term. The interest rate is therefore fixed during the remaining term of the existing loan. From the maturity date of the existing loan, a roll-over loan is recorded with a corresponding reference interest, so that the interest rate is fixed even after the term of the existing loan. At a low interest rate level, the interest burden is generally lower than that of the existing loan. In addition, the low interest rate is fixed for a certain period. In the construction of a double swap, the structures of the two swaps must be adapted to the repayment structures of the loans.

3.2.4.2 Options

Like swaps, options are contracts which can be arbitrarily arranged between two contract partners. The contractual partners of option contracts are usually banks and their customers. In general terms, a contracting party is entitled to buy or sell a certain underlying asset at a fixed base price against payment of a premium. The most important provisions of an option contract are therefore the underlying price, the basic price, the term, and the option premium (Graefer, Schiller, Roesner 2010).

Most of the option contracts are based on an interest rate or exchange rate. These options are described more precisely as interest rate and currency options. The interest rate options include caps, floors, and collars also referred to as interest limitation agreements. With a cap the holder hedges against high interest rates. For this purpose, the bank agrees on fixed dates at which a certain reference rate is compared with a fixed interest rate (the base price). If the reference interest rate exceeds the base price, the cap owner is compensated by the bank by the next reference period (Graefer, Schiller, Roesner 2010). For this hedge, he pays his bank an option premium. In the same way, hedging against low interest rates can be made with a floor. Usually a cap is interesting for borrowers who are

indebted with a variable interest rate; A floor is attractive to investors who have raised their capital at variable interest rates. A collar is a combination of buying a cap and selling a floor. The holder of a collar is hedged against a high interest rate, but benefits from reduced interest rates to a limited extent. A collar is used to hedge against high interest rates while reducing the costs of such hedging.

Just as interest rate options are used to hedge against interest rate risks, currency options can be used to hedge against currency risks. A currency option entitles the holder to exchange a certain amount on a fixed date at a specific exchange rate. The basic price, which is also called the exercise or strike price, can be freely chosen by the customers of a bank. The chosen basic price thus expresses the customer's subjective risk setting. The level of the option premium is decisively influenced by the basic price.

The term of an interest rate option is the period between the start of the first and the end of the last billing period. Since future interest rate fluctuations are to be hedged against by means of an interest rate option, interest rate hedging begins at the beginning of the second period. In the case of a currency option, the maturity of the contract begins and ends with the maturity date. The customer can freely choose the length of the term. The different lengths of the maturity are considered in the calculation of the option premium.

The option premium of an option reflects the opinion of the respective market on which the underlying is traded. While interest rate options are linked to the money and capital markets, the premiums for currency options are based on the respective foreign exchange markets. The option premium of an interest rate option is essentially dependent on the interest rate at the closing date, the future expected market fluctuations of the reference rate, the chosen base price, and the maturity. Similarly, the option premium of a currency option is dependent on the exchange rate at the closing date, the future expected market fluctuations of the exchange rate, the chosen base price and the maturity.

Summarizing, swaps and options indicate that it is possible to include personal expectations of interest rate developments into the financing. In addition, financing by means of swaps and options is flexible and can also be subsequently adapted to changing conditions. In practice, the combination of swaps and options has resulted in a variety of underlying instruments, including options for a fixed-rate loan (swap options), prolongable swaps or callable swaps.

3.3 Bank bonds and mortgage bonds

Banks must procure a large portion of the money they issue as loans to their borrowers from the money and capital markets (Gramlich, Gluchowski, Horsch, Schaefer, Waschbusch 2012), because their own resources are not sufficient. The money supply of the banks is called refinancing and is made by deposits, received funds or bonds. A bond issued by a bank itself is designated as a bank bond. The duration, interest rate, repayment, collateral, and currency can be freely chosen in the design of a bank bond. A bank can determine the terms of a bank bond by itself and based on its own credit portfolio. The loans granted by a bank are to be refinanced as much as possible by the choice of the maturity. The interest rate for a bank bond can be fixed or variable. A reference interest rate and a discount or premium to the reference interest rate are used to determine a variable interest rate. The interest rates for the respective fixed interest rate are calculated based on the respective valid reference interest rate previously agreed upon.

The repayment of a bank bond can be carried out as annuity or ratification. In addition, the repayment may also be arranged elastically or in full.

In Germany, the classic refinancing instrument for real estate loans is the so-called “Pfandbrief”, a special kind of mortgage loan. The Pfandbrief is a bank debt bond covered by claims which are secured by land charges. Securitization of a Pfandbrief is done by the real estate loans issued by the bank and must be guaranteed at all times. The term "Pfandbrief" is protected by law and may only be used by privileged banks, including mortgage and federal state banks. Privileged banks can refinance favorably via Pfandbrief, since interest rates on them are low, mainly because of the excellent collateral (PfandBG2015).

In summary, banks can refinance themselves on the capital market in the long term by issuing bank bonds. They are able to set the conditions largely flexibly. Real estate loans issued by banks can be refinanced favorably by issuing the Pfandbrief.

4. Major types of real estate financing

In this chapter, the three major types of real estate financing will be examined: Classic real estate financing, structured real estate financing, and project development financing.

4.1 Classic real estate financing

The financing model for real estate predominantly applied in Germany, is referred to as classic real estate finance. In addition to the actual financing of the property, the refinancing of the credit-borne banks is also described. The additional consideration of refinancing is important because banks do not make the capital available themselves but procure it from the money and capital market. In this comprehensive view, banks are intermediaries and not financiers. The classic financing model has advantages and disadvantages for both the real estate investor and the financing bank. In the past, disadvantages due to a lack of alternatives were accepted.

4.1.1 Financing through fixed-interest loans

The total financing volume of a real estate investment is defined by the purchase price of a property or its production costs plus additional costs. The investor determines the share that he would like to finance through equity. The difference between the financing volume and equity is the proportion of debt to be financed by borrowed capital. The investor requests the borrowing interest from a bank. To this end, he submits a credit application containing the key data on the property and the planned financing.

If the bank is willing to finance, it determines the loan value of the property. The various borrowing limits result from the collateral value, whereby the collateral value itself represents the maximum amount for borrowed funds. If the requested financing volume is larger than the determined collateral value, a financing gap arises which must be closed by a higher equity ratio. Once the financial capacity has been determined, the individual terms and conditions for lending (duration, interest, repayment, and collateralization) are determined in consultation with the investor. Other contractual components, e.g. the amount of the processing fee and the interest rates are typically set by the banks but can be negotiated as well.

The term of a credit agreement is usually between 10 and 30 years. Because of the long-term nature, the credit agreement is more precisely a loan agreement. The term of the agreement is based on the repayment of the loan and is decisively influenced by the business policy considerations of the bank and the investor (Lappe 2012).

A fixed interest rate agreement usually fixes the interest rate for 10 to 20 years, seldom even 30 years. The interest rate is calculated internally by the bank and then offered to the investor. It is calculated as the sum of the re-financing rate and the bank margin. Different margins are estimated for the individual loan levels because of their different default rates. The total interest is calculated as a weighted average interest rate and is calculated from the individual interest rates for the various loans. The weighting takes place with the respective shares of the individual loans in the financing volume.

In practice, the repayment of the loan is usually carried out by means of annuity rates. To this end, the initial annual amortization is contractually agreed. The amortization is intended to compensate for the loss in value of the property so that the amount of the collateral is always higher than the amount of the receivables. In the case of real estate financing, it is customary to agree on repayment during the year, usually quarterly. In the special case, a bullet loan can also be taken out to finance a property. However, due to the steady decline in the value of the property, the collateral will fall for the bank. In this case, the investor is required to deposit a corresponding collateral equivalent at the bank.

As a rule, collateral is secured by means of liens which are entered into the respective land registers of the property in the form of land charges or mortgages. In order to secure the value of the property being collateralized, the banks insist on the conclusion of an insurance against fire and storm damages. If the property collateralization exceeds collateral of the property itself, a personal share is assigned. In this case, the banks, in order to secure their claims, also require the transfer of rental and lease receivables. This assignment is generally in a silent form. As long as there are no disturbances in the credit relationship, the tenant is not informed of the assignment of the claims.

The bank charges a processing fee for the processing and examination of the loan application. The fee is usually 0.5% -1% of the loan amount and is payable upon conclusion of the contract. The disbursement of the loan sum, as well as the repayment, is effected according to a pre-defined payment schedule. The banks prefer only a few installments with large amounts, since they are subject to administrative costs for each payment. When purchasing an existing property, the payment is possible through a few installments, since the purchase price must be paid as a sum. In the case of new construction or renovation, drawing the loan sum in a few large installments is not optimal. In this case, an overdraft facility is often used to cover current payments. As soon as the next disbursement date of

the loan is reached, the bank overdraft is repaid with the disbursement amount of the loan. The use of the current account credit is repeated in the same way until the construction or the rehabilitation is completed.

If the borrower does not pay the loan amount in time, the bank calculates interest rates on the unrecovered amount (Lappe 2012). The interest rates are already agreed on in the contract and settled monthly. The amount of the interest rate is calculated by a bank in such a way that no loss is incurred to the bank by the non-acceptance of the loan. The loss to the bank corresponds to the difference between the expenses and the income generated by the provision of the financial resources available. The expenses arise through the interest paid for the refinancing of funds already paid on the capital market. The short-term investment of funds in the money market creates a return that is generally less than the costs. Similarly, the early redemption penalty is payable if the borrower terminates the loan prior to the expiration of the interest period.

4.1.2 Refinancing through bank bond and Pfandbrief (mortgage loans)

The annual reports of the banks clearly show that refinancing is largely carried out by issuing bank bonds. Mortgage banks and federal state banks, both of which have the privilege to issue Pfandbrief, refinance themselves as far as possible through this instrument. The main reason for this is the lower interest rate relative to other bank bonds. This relative advantage of a Pfandbrief can be explained by the low default risk, on the one hand, and on the other hand, there is a wide acceptance on the capital market. As a result of the statutory provisions in the Mortgage Banking Act and its constant monitoring by the supervisory authority, the Pfandbrief becomes a safe investment product for investors.

A well-trained, clear, and liquid secondary market increases the attractiveness of the Pfandbrief (Koscielny 2012). For this reason, in addition to the traditional small-volume Pfandbrief, jumbo Pfandbrief are accessible to institutional investors. Jumbo Pfandbrief have a minimum volume of € 500 million and are issued by the banks as fixed-interest bonds with bullet repayment. Currently, the total volume of Pfandbrief issuances is divided into half by traditional Pfandbrief and jumbo Pfandbrief.

4.1.3 Advantages and disadvantages of classical financing

The classic financing described above is still a widely-used financing model in Germany. This fact can be attributed to several advantages benefitting both the real estate investor and the bank as a financier. An important advantage for the investor is the secured calculation basis resulting from the fixed interest rate agreement. For him, the interest rate risk is no longer applicable, which also reduces the economic and liquidity risks. As a result of the reduced risk, the bank requires a smaller risk premium which leads to lower interest rates as a component of the margin. The granting of loans is largely standardized. Due to the standardization, the banks do not incur high administrative costs internally. Administrative costs, like risk premiums, are part of the margin, which means that more favorable administrative costs lead to lower interest rates. In addition to the margin, the refinancing costs of the bank also influence the interest rate. The high demand for jumbo Pfandbrief by institutional investors lowers the refinancing costs of the banks. In addition, fixed-interest loans can be refinanced very well through fixed-interest Pfandbrief.

An investor can only profit from the advantages of classic financing if he is able to contribute enough capital to the investment, because in the event of a financing gap, there is no financing in the classical sense. If a property requires a particularly large investment volume, such as a shopping center or a hotel, a cluster risk is created for the financing bank, which it does not want to take over. Classic real estate financing leads to high transaction costs, particularly in the case of portfolio transactions, since many objects must be individually appraised and jointly collateralized.

Furthermore, the portfolio value does not necessarily correspond to the sum of its individual object values, since the value of a portfolio also depends on its composition. A broadly diversified real estate portfolio with an equally wide spread risk is worth more than a portfolio with a concentrated risk that could even endanger its existence. When buying a property, it is more advantageous to buy an object company (share-deal) for several reasons instead of buying the object directly. One reason for the purchase of a company is the lower transaction costs, since the entry in the land register is omitted and there is no real estate transfer tax. The acquisition of an object company is not to be financed with the classic financing model, which is specifically designed for the purchase of a property. Due to the lack of alternatives, structured financing in the real estate sector has become established.

4.2 Structured property financing

The disadvantages of classic financing have led to the further development of financing techniques in the real estate sector. The result of this development is referred to as structured real estate financing or real estate structured finance. The structure is intended to analyze opportunities and risks of real estate investment and to classify them into risk classes to refinance them using suitable instruments. For banks, direct financing of the property via the capital market is particularly advantageous. In such a business, they work as a service provider for the customer and therefore do not assume any rights or obligations from the financing. Particularly interesting is the avoidance of equity capital to which banks are legally obligated (KWG 1998). Structured real estate financing is thus expanding the classic financing model by additional methods and instruments that stem from project financing. The individual instruments are designated as financing building blocks. The combination of the building blocks allows the financing to be flexibly and individually designed. The instruments and methods of structured financing expand the possibilities for financing and refinancing.

4.2.1 Financing instruments

Fundamentally, structured financing of a property is a project financing (Schulte, Schaefers 2002). Project financing is the financing of a self-sustaining economic unit. The lender is only used to receive the current surplus funds and the value of the project as security, so that he takes part of the project risk. In accordance to the share of its risk taking, the lender is involved in the success of the project. The leverage effect and the tax privilege for borrowed capital show that the project success can be increased by the optimal use of equity and borrowed capital (VDP 2014). Provided the equitable allocation of the opportunities and risks of the project is ensured, all project participants are interested in an optimal capital structure.

The overall financing is divided into individual tranches for the purpose of risk reduction and the order of the recipients of cashflows is established. In practice, a four-part classification has been implemented, described by the terms senior credit, junior credit, mezzanine credit and equity. With a higher risk taking, the investor is also increasingly involved in the project success. The financing structure of an object company shows the breakdown of the total financing volume into individual risk tranches.

Figure 5:

Balance sheet of an exemplary property company

Assets	Liabilities & Equity
Financing volume	Equity (highest risk)
	Mezzanine loan
	Junior loan
	Senior loan (lowest risk)

Source: VDP 2009

4.2.1.1 Senior loan

The lowest-risk part of total funding is referred to as senior credit or senior loan. The share of senior credit in the total financing volume is usually between 50% and 75%. In this case, 25% to 50% of the net rental income is equal to 25% to 50% of the net interest income. A senior credit is usually collateralized primarily. Through collateralization, the bank can refinance such a loan through Pfandbrief. Like a real loan, a senior credit is also attributed to the value of the financed property, so there is no significant difference between them (VDP 2014).

4.2.1.2 Junior loan

The junior credit or junior loan represents the second financing tranche after the senior credit, correspondingly subject to a higher credit risk. Through these two loans approximately 80% of the market value of a property can be financed. The capital service to be paid for the first two tranches is covered by the net rental income of the property; but the junior credit does not include the risk counter. For this reason, good rental bonuses or additional securities are required. The interest rate of the junior credit is strongly based on the expected rental income and additional collateral. There are no fundamental differences between a junior loan and a secured personal loan (VDP 2002).

4.2.1.3 Mezzanine loan

A mezzanine loan is a subordinated loan with an equity-like nature. This type of credit is provided by banks and individual property funds specializing in mezzanine financing. The lender assumes a large part of the entrepreneurial risk without being able to participate in business decisions. For this reason, a risk premium or an increased interest rate is required for a mezzanine loan. The risk premium often refers to the investment or financing volume. The increased interest rate for a mezzanine loan is mainly dependent on the level of the risk. The interest rate can be adjusted by a margin stepping to changed risks (VDP 2014). In the case of margin stepping, the interest rate drops, for example, at a certain leasing or sales level. Instead of a risk premium or an increased interest requirement, the creditors can also be compensated by participating in the project profit. For example, low interest rates can be agreed on with an additional profit sharing to reduce current financing costs. Profit sharing is calculated based on the final project profit and can be zero in the worst case. The additional remuneration to be paid for a credit similar to equity is referred to as equity kicker (Schulte, Schaefers 2002).

After the payment of the loan, the lender has no influence on the further development of the project. Therefore, he will oblige the borrower to take certain measures when the risk of the project changes. These contract clauses are called covenants. Covenants are based on real estate and balance sheet-related key figures, which are regularly determined by the lender. The limit values for the key figures are defined in such a way that they are compliant with the financial capability of the property. The most important balance sheet figures are:

- Debt service coverage ratio (DSCR),
- Interest coverage ratio (ICR), and
- Loan-to-value ratio (LTV).

The DSCR describes the capital distribution and is calculated as the ratio between the net rental income of a period and the capital service to be paid for this period. The capital service consists of interest and amortization. If the redemption portion is not considered, the ICR is obtained as interest coverage relation. The LTV describes the borrowing limit and is calculated as the ratio of the credits used and the value of the property (Geltner, Miller, Clayton, Eichholtz 2006). The following figure shows the formulas for the balance sheet-related key figures.

Figure 6:

Overview of balance sheet indicators

DSCR = (Net rental income) / (Debt service)

ICR = (Net rental income) / (Interest payments)

LTV = (Outstanding debt) / (Market value of the object)

Source: own resource

The property-related key figures usually monitor compliance with the planned construction period, construction costs as well as the rental and sales figures (Hockenbrink 2015). If a key figure undercuts or exceeds the contractual limit value it is an indication of an increased project risk and initiates measures. The measures are specifically regulated in the contract and are intended to have a risk-reducing effect on the lender. If, for example, the market value of a property decreases, the LTV will decrease, given the credit volume stays unchanged. The ratios DSCR and ICR are reduced if the net income decreases while fixed interest rate and amortization stay the same. The overrunning or undermining of a limit value obliges the borrower, for example, to provide additional collateral. In the same way, contract clauses entitle the borrower to demand collateral from the lender as soon as the key figures develop positively (VDP 2013).

A mezzanine loan is often used as a bridge financing, which is later replaced by the final financing. This has two main reasons: On the one hand, there are considerable risks in the project development phase leading to a high credit default risk and therefore argue against a high lending. On the other hand, project developers are generally undercapitalized for the development of large properties, so they cannot close a financing gap themselves.

4.2.1.4 Equity and private equity

As a rule, additional 10% equity must be provided for the total financing when an additional mezzanine loan is taken (Kain 2008). As a source of equity, private equity can be included in the financing in addition to the investor's own capital. Private equity is the capital of funds made available outside the stock exchange. It is made available for a period of usually 1.5 to 5 years. Usually, the expected annual return on investment (IRR) for private equity is around 20%. The funds are made available through a share in the company. As a result, the private equity donor is involved in the opportunities and risks, as well as in the business decisions, according to its share of the

business. Collaboration is the most important distinguishing feature between mezzanine capital and private equity. Participation is usually carried out by a property company, which is established for a specific real estate object.

The financing instruments used in structured financing differ in several features. The table below clearly identifies the differences between the individual instruments.

Table 3:

Different instruments of real estate financing

Instrument	Financer	Financing Share	Compensation	Collateral
Equity	Investor, private equity	Ca. 10%	Profit	None
Mezzanine loan	Mezzanine funds, Bank	Ca. 10%	High interest rate + share of profit	None
Junior loan	Bank	Ca. 20%	High interest rate	Secondary real estate lien
Senior loan	Bank	Ca. 60%	Low interest rate	Primary real estate lien

Source: following Goepfert, Raddatz 2003

4.2.2 Refinancing instruments

The structuring of the financing offers the possibility to refinance the entire credit or individual tranches of the commitment. In addition to the Pfandbrief and the bank bond, further instruments are used to refinance structured finance. Other instruments include syndication, securitization, and equity placement. The activities for the financing of a property and the refinancing of the necessary funds are summarized under the term "real estate investment banking" (REIB).

4.2.2.1 Syndication

The term "syndication" refers to the sale of loan claims to borrowers who are generally banks. Syndication places the entire financing volume of real estate investment in several smaller tranches on the banking market.

Therefore, other banks are offered a financing share. Financing is usually arranged by one bank and then taken over by the members of a bank consortium (VDP 2013). To this end, the arranging bank, designated as a consortium manager or book runner, concludes a credit agreement with the borrower on the entire financing volume. The consortium manager binds his consortium partners, who are usually referred to as consortia, into the financing by concluding further contracts. The two-stage contract relationship does not provide a direct link between the borrower and the consortium. Therefore, the consortium manager is the only contact person for the borrower as well as for the consortium, who also assumes the entire handling of the financing. If the borrower is aware of the participation of further banks, it is referred to as an open consortium; If he is not informed of the joint financing, there is a silent consortium relationship. A special case of syndication is consortium financing. In the case of consortium financing, the other banks are already included in the loan granting phase.

In the case of syndicated loans, a distinction is made between vertical and horizontal syndication. In the case of vertical syndication, all syndication partners have an equivalent creditor and collateral position. If a partner is offered a priority or subordinate position with a corresponding margin, it is referred to as a horizontal syndication.

Syndication is a measure that banks can use to relieve their capital and spread their risk. A capital relief can be necessary if the credit limit is exceeded by financing (KWG 1998). However, risk diversification can be useful to offer more favorable interest rates to customers, since the degree of risk spreading influences the margin of a credit exposure. This is explained by the fact that a bank with a broadly diversified credit portfolio is given a good rating and therefore good conditions on the money and capital market. Banks depend on the money and capital market and therefore strive for the best possible rating. A bank is only prepared to deviate from an optimal composition of the credit portfolio and to accept cluster risks if it receives an increased margin. For this reason, higher margins must be demanded for large real estate investments (e.g. shopping centers, hotels, or housing portfolios), even if creditworthiness is high (Gondring, Zoller, Dinauer 2013). Syndication can therefore be used in a meaningful way to eliminate cluster risks and thus offer better interest rates.

A further advantage of syndicated financing is the better monitoring of credit management, since all members of the bank consortium must examine the creditworthiness of the borrower and form their own judgement (KWG 1998). Based on independent audits, several banks pooled their experience and implemented intensive credit monitoring. Syndication is already practiced in large-volume lending businesses, particularly in the financing of large real estate investments.

4.2.2.2 Securitization

Securitization is a method by which receivables can be converted into interest-bearing securities and sold to investors (VDP 2013). Thus, it is also a measure for capital relief and risk diversification for banks, such as syndication. Securitization is carried out through asset-backed securities (ABS). In the case of an ABS transaction, receivables including collateral, are sold to a special-purpose company (SPC) (Schulte, Archleitner, Schaefers 2002). The seller receives the cash value of the receivables package and continues to take delivery. Mortgages can be either rental/lease income from real estate or interest and redemption payments from real estate loans. Mortgage-backed securities are treated according to the kind of property as corporate mortgage-backed securities (CMBS) and residential mortgage-backed securities (RMBS). The securitization of CMBS refinances commercial real estate or their loans; RMBS are used in the refinancing of residential real estate or housing loans (VDP 2014).

The SPC refinances the purchase of receivables by issuing bonds. Current payments from receivables are passed on as interest and amortization to the holders of the bonds. For this reason, the interest and repayment structures of the receivables and bonds must correspond. The uniform flow of payments from real estate and real estate loans is thus particularly suitable for securitization (VDP 2013).

The bonds are collateralized by means of selling the receivables portfolio to the special-purpose company. The purchase risks are transferred entirely to it. However, due to the high diversification resulting from the large number of individual receivables, the default risk for the overall portfolio is low. The default risk of the portfolio is valued by rating agencies and assigned to a corresponding rating class. In practice, it is customary to divide the receivables portfolio into various risk tranches and to refinance them via bonds with different interest rates. By offering different bonds with different risks, the investor should be given the opportunity to invest according to his preference. As a result, MBS securitization bonds are also of interest to investor groups that typically do not invest in real estate or real estate loans. The maturity of the bonds is based on receivables and encompasses 15 to 30 years for mortgage-backed securities.

Securitization is a complex financing method, which is associated with correspondingly high costs. These include, for example, the cost of setting up the SPCE and the cost of the external rating. Because of the high proportion of fixed costs, an economic minimum size of roughly € 200 million per transaction is required for securitization. The following table shows the advantages for MBS securitization participants.

Table 4:

Advantages of MBS

Advantages of the bank	Advantages of the real estate investor	Advantages of the investor
● Release of capital for new financings ● Optimization of loan portfolio ● Provisions from receivables processing and management	● Higher collateral limits ● Lower financing costs	● Liquid investment into real estate without high transaction costs ● Low default risk ● Higher yields than treasury bills of the same rating

Source: own research

Through an MBS transaction, a property can be financed directly on the capital market so that the bank no longer acts as a lender but as an intermediary between the respective real estate investors and potential financial investors. Because of the economic minimum size, direct capital market financing is only possible with large-volume real estate and real estate portfolios. There is also the possibility that several real estate companies organize a joint securitization transaction and divide the fixed transaction costs among themselves. Such a common securitization is referred to as a multi-seller transaction. Multi-seller transactions are a good alternative to credit financing for housing companies and are currently establishing themselves on the capital market (Geltner, Miller, Clayton, Eichholtz 2006).

4.2.2.3 Equity placement

In connection with private equity, banks leave their traditional role as financiers and act as intermediaries. In this role, they advise and mediate between financial investors and real estate investors without directly participating in the actual business.

Private equity investors are mainly Anglo-Saxon funds. Special funds investing in the real estate sector are also referred to as real estate equity funds (REEF) or opportunity funds. The aim of these funds is to acquire real estate and property portfolios at a favorable price and resume them after a short period of time at a higher selling price. The increase in value is to be achieved by:

- Creative financing methods,

- Targeted modernization or refurbishments,
- Professional management, and
- Utilization of tax models.

The active market players include internationally known names such as Goldman Sachs and Morgan Stanley. In addition to real estate equity funds, project development funds are also launched in Germany. In the case of project development funds, on the other hand, there is a chance of a high return, because the short maturities of project developments and the participation in the project profit generate a high return on successful projects. The broad spread of a fund is beneficial because it can compensate for the total loss of an exposure through profits from other exposures. The objects to be developed must therefore not have a large investment volume. In order to minimize the administrative costs for a fund, a certain minimum volume must also be observed for each property. Project development with a capital requirement of between € 20 and € 50 million is suitable for private equity by funds.

4.3 Project development financing

Project developers usually finance their development projects through bank loans. The bank financing of project developments is usually carried out by means of pre-financing or interim financing. Pre-financing or intermediate financing is a short- to medium-term borrowing of capital later replaced by long-term financing. Especially in economically difficult times, banks do not want to take over the high risk of project development and are rarely ready for financing. Professional developers and project developers who are predominantly active in metropolitan areas are among the target group of the banks. While this group can finance its projects through bank loans, small project developers are often dependent on alternative financing options. The mezzanine financing and the private equity financing are alternatives to the bank loan, which can be used as part of a project development.

4.3.1 Mezzanine financing

If a financing gap exists the use of mezzanine capital may be necessary to carry out a planned project development. In addition, the inclusion of a mezzanine loan may be economically feasible as it may possibly increase the equity profitability. The increase in equity profitability can be traced back to the leverage effect, because mezzanine capital can be used to increase the debt financing ratio. The higher costs for a mezzanine loan are usually offset by the positive effects of high leverage. The use of mezzanine capital can be economically feasible for a project developer as the sample calculation in the appendix II depicts.

With a view to a possible increase in yields, the use of mezzanine capital should therefore be checked before any project development as it can lead to a reduction in the equity ratio and the leverage effect can have a positive effect. A reduced use of capital allows the project developer to carry out several projects with his financial resources, thereby improving his return on equity. However, a possible increase in the yield is also associated with an increased economic risk that must be considered when deciding whether or not to finance mezzanine financing.

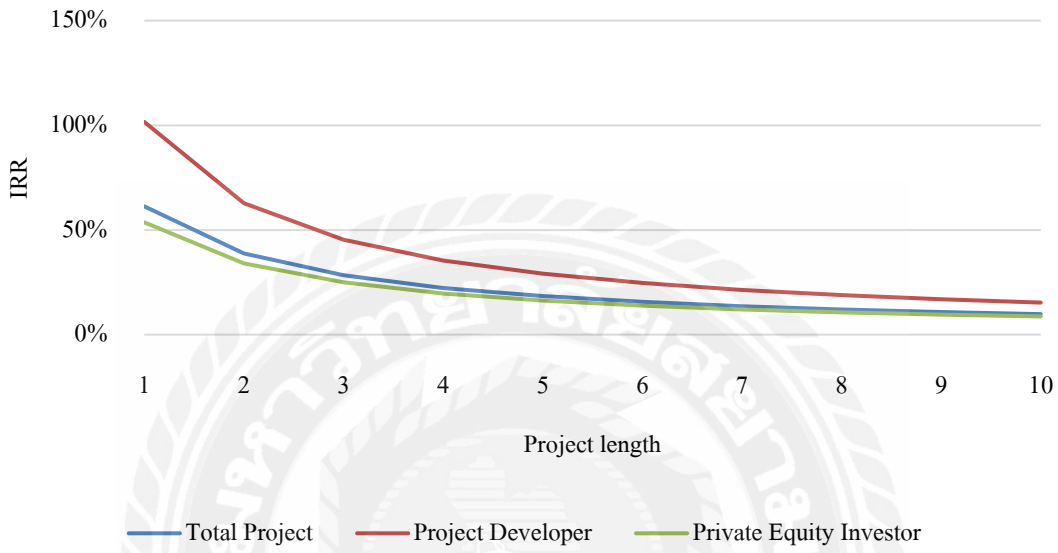
4.3.2 Private equity financing

In contrast to mezzanine financing where additional borrowed capital is used, the equity ratio of financing is increased through the use of private equity. By investing in equity, the private equity donor is also involved in the

profit; The leverage effect cannot be exploited. Individual agreements are concluded between the contracting parties for the distribution of profits. A sample calculation showing a possible profit distribution is included in appendix III.

Figure 7:

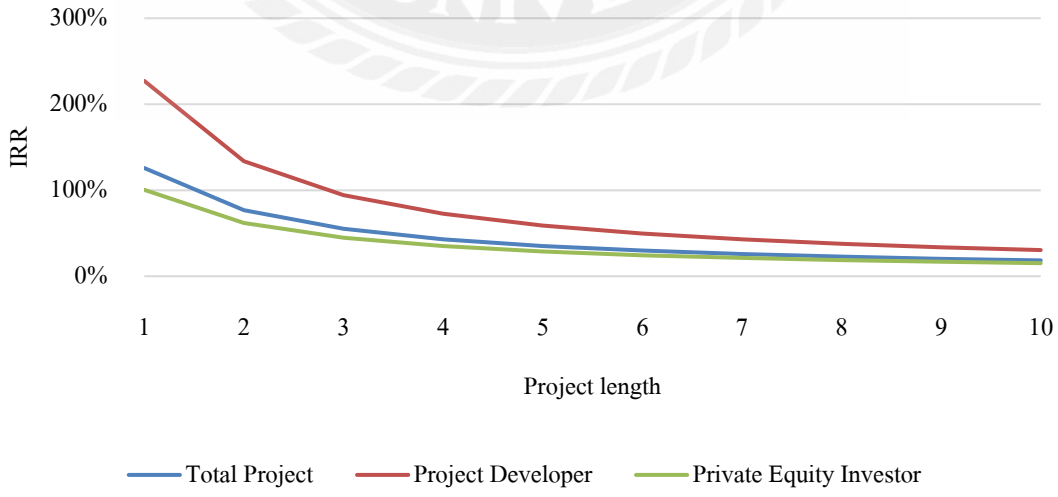
Profitability of a project development including private equity, project surplus 15,000,000€



Source: own calculation

Figure 8:

Profitability of a project development including private equity, project surplus 21,000,000€



Source: own calculation

The figures show that the returns strongly depend on the project length. Due to the different shares in equity and the agreed profit sharing, the project developer's return is more dependent on the duration of the project than the return on the private equity issuer. This is intended to motivate the project developer, who can influence the duration of the project by his deployment. The comparison of the individual scenarios shows that the internal interest rate (IRR) of both shareholders is strongly dependent on the actual project surplus. In order to increase the project value, it is therefore necessary to consider all possibilities of promoting sales, including the provision of sales promotion models.

In general, the use of private equity in project development means that the project developer is limited by the co-right of the private equity issuer in its entrepreneurial decision-making freedom. Since both equity partners are interested in a project success, this restriction is not very critical. The big advantage of private equity is the fact that through its use financing gaps can be inferred. In some cases, the private equity donor can also help with the sale or rental, provided that the latter has good market contacts (Leykam 2014).

5. Summary

The application area of financing models in the real estate sector is large, as these models cannot only be used for long-term object financing, but also be used in the upstream and downstream phases of the real estate cycle. These phases include project development and object marketing.

When investing in real estate, state subsidies can be used under certain conditions. These funding possibilities should be examined already within the framework of the investment decision, since they have an advantageous effect on the profitability of the investment. In addition, the profitability can be increased by optimizing the capital structure. In this context, simple sample calculations lead to meaningful results. The findings should be presented to the respective financing partners as they represent the profitability of an investment in a transparent manner. A good profitability leads to a good collateralization and has an advantageous effect on the financing conditions. The number of products that can be used to finance real estate is large. They can not only be used to develop a suitable financing model, but also to retroactively modify an existing model.

Financing with swaps and options does not lead to any cost advantages; However, these products make it possible to incorporate interest rates and risk premiums into financing. A real estate investor is offered not only debt, but also mezzanine capital and private equity. With the help of MBS securitization, real estate can also be financed directly through the capital market, which leads to cost advantages and independence with large financing volumes. Against the background of “Basel II” and "Basel III", banks are increasingly using securitization technology to refinance their loans; Thus, leaving the classic role of the financier and increasingly becoming a service provider.

Through a mezzanine financing a project developer can increase his return. Banks have been providing mezzanine loans to their customers for several years. The granting of such loans is independent of the investment volume so that they can be used both for small and large projects. As part of the project development, mezzanine loans can also be used to fill financing gaps. In the context of the development of large-scale projects, private equity can be included in financing, in addition to mezzanine capital. Since private equity is only made available by funds, a project volume of at least € 20 million is usually required. In many cases, the realization of capital-intensive projects is only possible using private equity because most project developers do not have sufficient equity. Project-specific agreements on the use of profits allow both project developers and private equity donors to achieve a reasonable return.

6. References

6.1 Books

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7. Appendix

Appendix I: Leverage effect

Appendix II: Sample calculation “Mezzanine loan”

Appendix III: Sample calculation “Private equity”

Appendix IV: Annuity loans, effect of saved interest

Appendix I: Leverage effect

The influence of the capital structure on the return on equity is illustrated by the following simplified example: An apartment building with a rental area of 2.500 m² serves as a sample project. The financing volume is € 5,000,000 and corresponds to the sum of the purchase price and the ancillary costs. In the case of the object under consideration, the sustainably achievable rent is € 8.00 per square meter of lettable space per month. The maintenance costs are to be considered annually at € 9.00 per square meter of lettable space per year, the administrative costs depend on the amount of the gross profit and amount to 3%. Gross profit, maintenance and administrative expenses are calculated as follows:

Gross rental income: 2,500m² * 8.00€/m² *12 months = 240,000€

Maintenance costs: 2,500m² * 9.00€/m² = 22,500.00€

Management costs: 240,000€ * 3.00% = 7,200€

The risk of rental loss (RRL), the equity ratio (ER) and the borrowed capital (i) are considered variable in the calculation. The RLL is expressed as a percentage of the gross profit and amounts between 3% and 20%, depending on the creditability of the renters. The risk of rental loss and the borrowing costs are therefore calculated as functions of the variable inputs:

Risk of rent loss = RLL * 240,000€

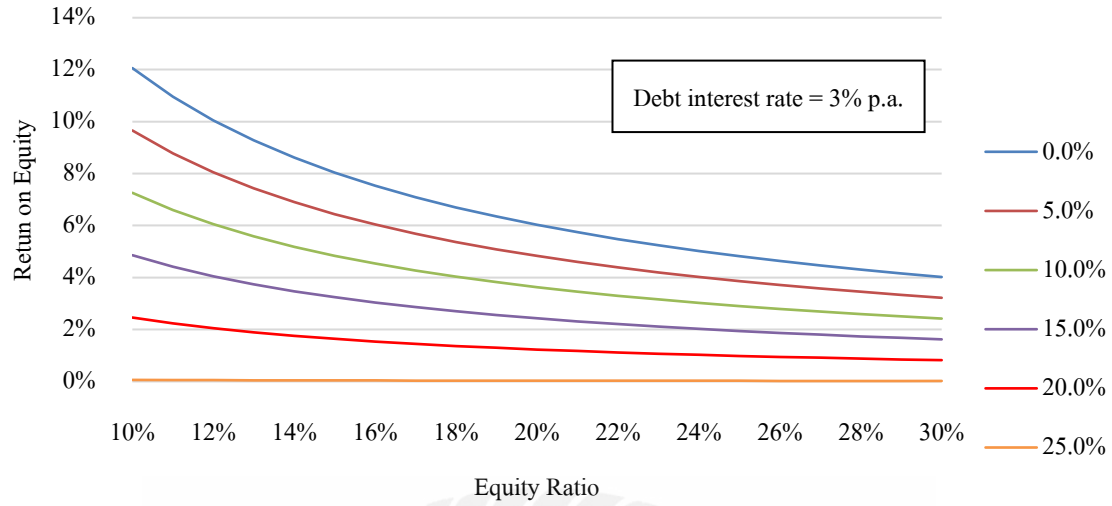
Yearly debt costs = I * 5,000,000€

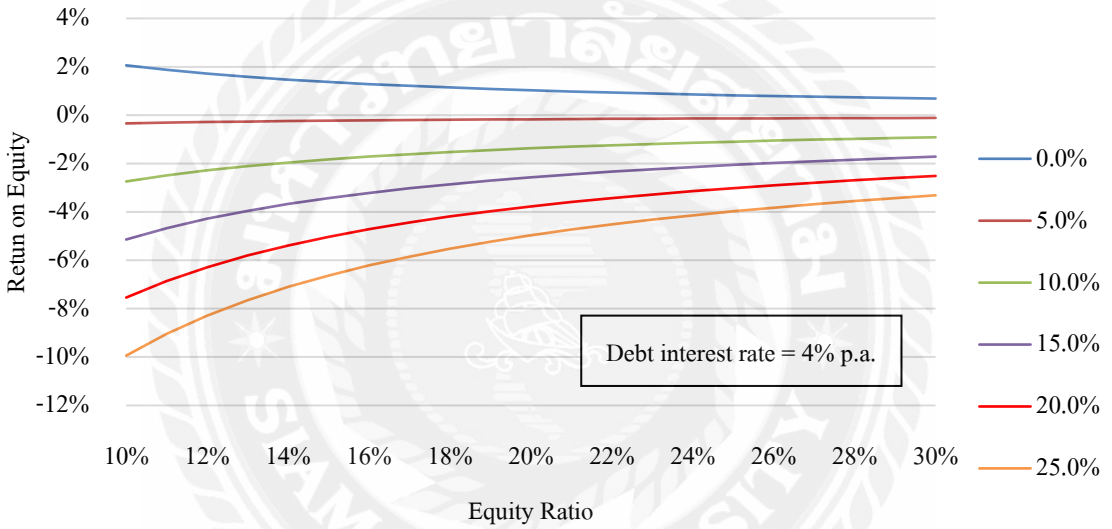
From the annual revenues and costs, the return on equity (RoE) can be determined:

RoE = (net rental income) / (Equity)

RoE = (240,000€ - 22,500€ - 7,200€ - RRL * 240,000€ - i * 5,000,000€) / (ER * 5,000,000€)

The evaluation for selected parameter values can be represented graphically as follows:


14%
12%
10%
8%
6%
4%
2%
0%
Retun on Equity
Debt interest rate = 3% p.a.
10%
12%
14%
16%
18%
20%
22%
24%
26%
28%
30%
Equity Ratio
0.0%
5.0%
10.0%
15.0%
20.0%
25.0%


4%
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-10%
-12%
Retun on Equity
Debt interest rate = 4% p.a.
10%
12%
14%
16%
18%
20%
22%
24%
26%
28%
30%
Equity Ratio
0.0%
5.0%
10.0%
15.0%
20.0%
25.0%

Appendix II: Sample calculation "Mezzanine loan"

The use of mezzanine capital is illustrated by the example of a project development in housing construction. In this context, the creation of an apartment house is considered. The land and construction costs are estimated at approx. 22 million €; From the subsequent sale, sales proceeds of approximately 24 million € are expected. From the start of the project to the complete sale, one year will pass as expected, so the project duration is known.

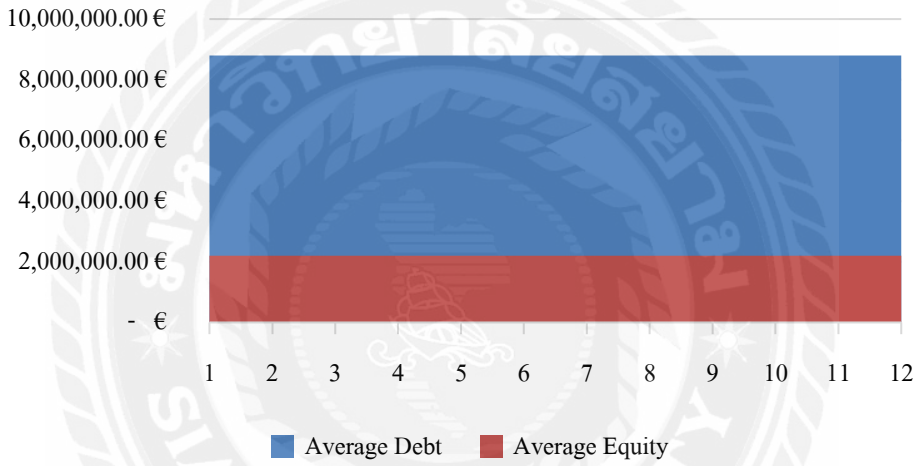
In the case of financing without the use of mezzanine capital, an equity ratio of 20% is necessary. This gives the capital structure as follows:

	Financing share	Financing volume
Equity	20%	4,400,000€
Debt	80%	17,600,000€

The following assumptions are made for the further calculation:

- interest on borrowed capital is 3% annually,
- the project costs are rising steadily, 1
- the use of equity and debt capital is the same proportion and
- the interest is not co-financed, but is offset against the project fee.

The correspondingly rising project costs result in a corresponding financing requirement. The course of capital utilization can therefore be seen as a linearly increasing function. Because of the linear profile of actual capital utilization, the average utilization is 50% of the financing volume. The equity and debt is used according to the respective financing proportion. The total capital utilization over the 24 months of construction can be derived graphically as follows:



The average borrowed capital can be used to calculate the financing costs as follows:

Borrowing costs = debt capital utilization * debt interest rate

Borrowing costs = 8,800,000€ * 3% = 264,00€

The sum of land, building and financing costs is the total cost of the project:

Project costs = Land costs + Construction costs + Borrowing costs

Project costs = 22,000,000€ + 264,000€ = 22,264,000€

The profit for the project is calculated as the difference between the sales revenues and the project costs:

Profit = Sales revenue – Project costs

Profit = 24,000,000€ - 22,264,000€ = 1,736,000€

The return on equity corresponds to the quotient from the project profit2 and the average capital utilization and is calculated as follows:

RoE = (Project profit) / (Average equity utilization)

RoE = 1,736,000€ / 2,200,000€ = 78.9%

For alternative financing using an additional mezzanine loan, the equity ratio can be reduced by 10%. This gives the following capital structure:

	Financing share	Financing volume
Equity	10%	2,200,000€
Mezzanine capital	10%	2,200,000€
Debt	80%	17,600,000€

For the further calculation, the additional assumption is made that the interest rate for the mezzanine loan is 10% per annum.3

The use of foreign and mezzanine capital is, as shown above, 50% of the respective financing utilization. As a result of the changed financing structure, the financing costs and thus also the return on equity change. The return on equity is calculated as follows:

Borrowing costs = Debt capital utilization * debt interest rate + Mezzanine capital utilization * Mezzanine interest rate

Borrowing costs = 8,800,000€ * 3% + 1,100,000€ * 10% = 374,00€

Project costs = Land costs + Construction costs + Borrowing costs

Project costs = 22,000,000€ + 374,000€ = 22,374,000€

Profit = Sales revenue – Project costs

Profit = 24,000,000€ - 22,374,000€ = 1,626,000€

RoE = (Project profit) / (Average equity utilization)

RoE = 1,626,000€ / 1,100,000€ = 147.8%

The additional inclusion of the mezzanine loan increased the return on equity from 78.9% to 147.8%.

Appendix III: Sample calculation "Private equity"

The use of private equity is illustrated by the example of a large-scale project development in residential realestate. To this end, the development of an 80,000 m² residential area is being built on which 300 houses (town villas, row and double houses) are to be built and subsequently sold. After the estimated development period of 8 years, the sale of the houses is expected to generate proceeds of approximately € 58 million. The project costs are calculated as follows:

Land costs	10,000,000€
Land development costs	3,000,000€
Construction costs	30,000,000€
Management and Sales	3,500,000€
Total project costs	46,500,000€

The project volume is of interest to private equity funds so that it can be used within the scope of the planned project development. The capital structure of the project is as follows:

	Financing share	Financing volume	Financer	Equity share	Equity amount
Equity	20%	9,300,000€	Project developer	20%	1,860,000€
			Private equity investor	80%	7,440,000€
Debt	80%	37,200,000€			

For the purposes of further calculation, it is assumed that all equity is fully invested at the beginning of the project.1 The costs of development, construction, management and sales are continuously incurred during the duration of the project and will be settled by debt at the end of each year.2 The sale of the houses takes place after the completion of production of the residential area.3 The borrowed capital (BC) and the interest accrued thereon are repaid from the project revenue after the end of the project period (t), while interest on borrowed capital (i) is 4% annually. The repayment amount (R) is calculated as follows: 4

$$R = (BC / t) * (((1 + i) ^t -1)) / i)$$

$$R = (37,200,000€ / t) * (((1 + 0.04) ^t – 1)) / 0.04)$$

The project surplus (PS), which is available to the shareholders, is calculated as the difference between the project revenue (PR) and the repayment amount (R):

PS = PR – R = PR – (37,200,000€ / t) * (37,200,000€ / t) * (((1 + 0.04) ^t – 1) / 0.04)

The project surplus (PS) can only be definitively determined after completion of the project. It is dependent on the project revenue (PR) as well as on the project time (t). The following agreement is made between the project developer and the private equity investor regarding the profit and loss distribution:

A deficit 5 is distributed according to the respective business proportion:

- In the case of a project surplus, each investor receives his capital employed. If the surplus is not sufficient, it is distributed according to the business shares.
- If the project surplus is larger than the equity capital employed, the project developer receives 30% of the surplus amount in addition to the equity capital employed.
- If the project surplus is 10% higher than projected at the start of the project, the project developer will receive 40% of this amount.
- If the project surplus is 20% higher than projected at the start of the project, the project developer will receive 50% of the amount above this second limit.

Using the expected project surplus (PSexp), the limits and the resulting areas (B) can be specified as follows:

PSexp = 58,000,000€ - (37,200,000 / 8) * (((1 + 0.04) ^8 – 1)) / 0.04) = 15,153,847.89€

Surplus Area			Distribution	
	From (€)	To (€)	Project developer	Private equity Investor
A		9,300,000	20%	80%
B	> 9,300,000	16,669,233	30%	70%
C	> 16,669,233	18,184,617	40%	60%
D	> 18,184,617.468		50%	50%

If the sale of the development sums up to a total project surplus of 15,000,000€, the profit distribution goes as follows:

Project developer

Area A: 20% * 9,300,000

Area B: + 30% * (15,000,000€ – 9,300,000€)

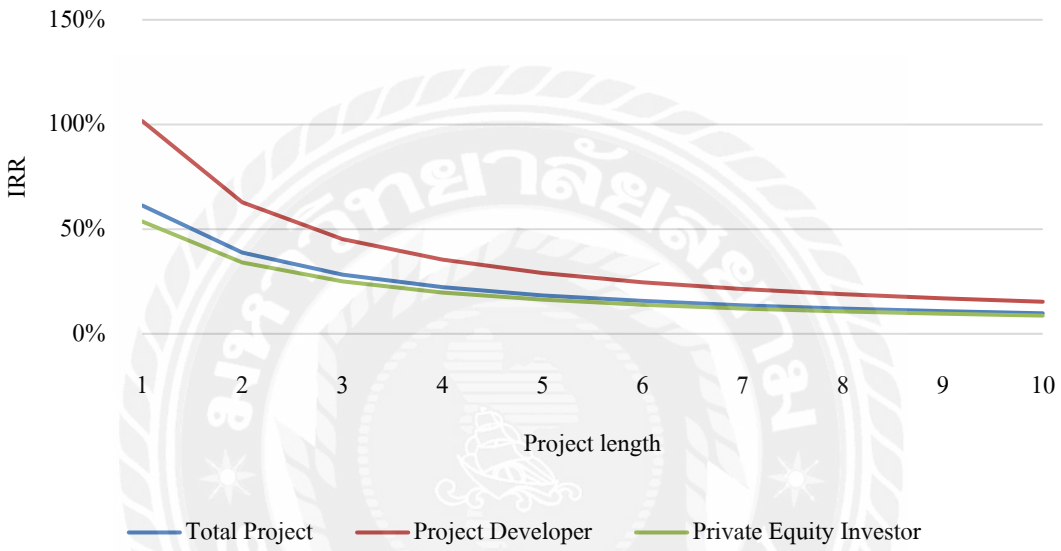
= 3,570,000€

Private Equity investor

Area A: 80% * 9,300,000

Area B: + 70% * (15,000,000€ – 9,300,000€)

= 11,430,000€



The IRR of the whole project is 12.04%.

If the sale of the development sums up to a total project surplus of 21,000,000€, the profit distribution goes as follows:

Project developer

Area A: 20% * 9,300,000

Area B: + 30% * (16,669,233€ – 9,300,000€)

Area C: + 40% * (18,184,617€ - 16,669,233€)

Area D: + 50% * (21,000,000€ - 18,184,617€)

= 6,084,615€

Private Equity investor

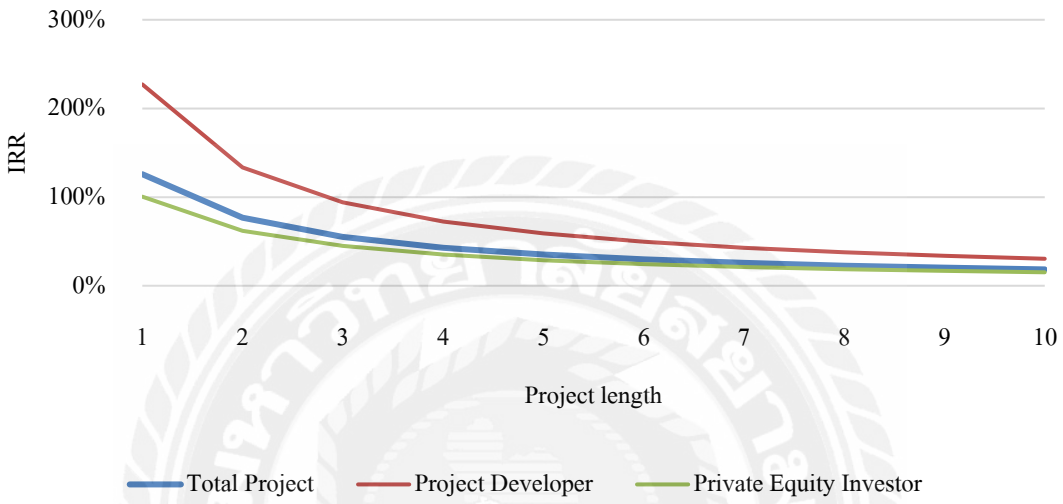
Area A: 20% * 9,300,000 +

Area B: + 30% * (16,669,233€ – 9,300,000€)

Area C: + 40% * (18,184,617€ - 16,669,233€)

Area D: + 50% * (21,000,000€ - 18,184,617€)

= 14,915,385€

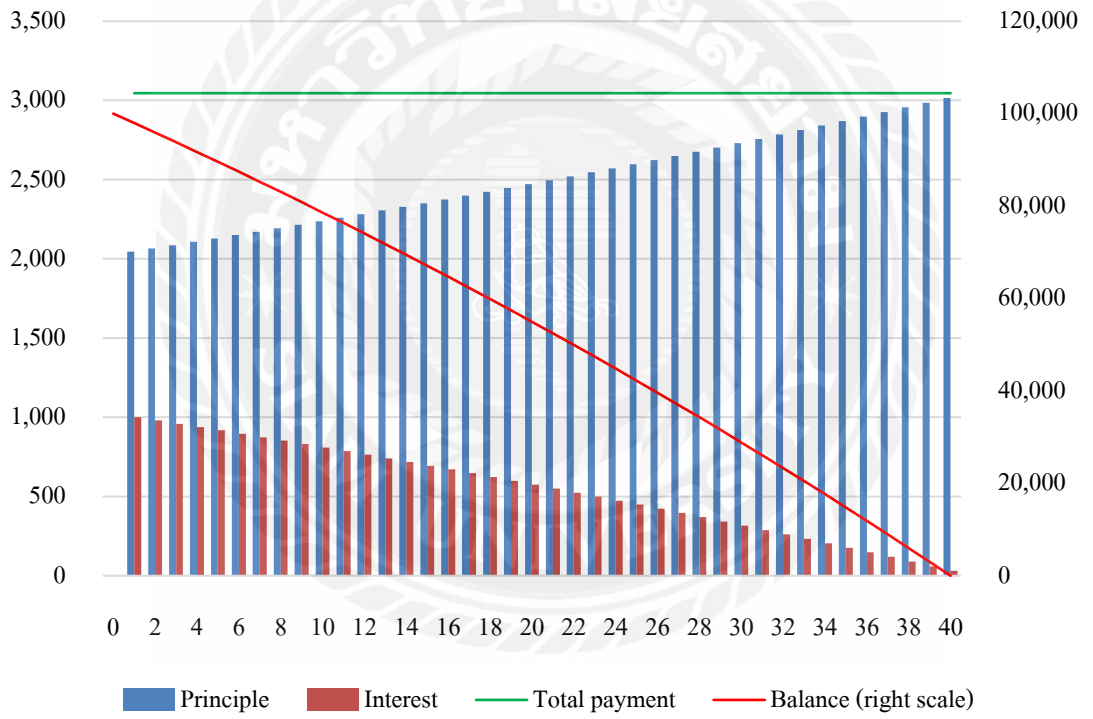


The IRR of the whole project is 22.75%.

Appendix IV: Annuity loans, Effect of saved interest

An annuity loan is characterized by the payment of a fixed amount, which is composed of a redemption portin and an interest portion. The interest rate service is calculated on the basis of the residual debt of the loan amount. If one assumes a fixed interest rate, then the portion of the annuity that is paid as an interest is dropped with each paid installment. This means that the actual cost position interest payment shrinks.

Assuming a loan of 100,000€, an annual interest rate of 4%, quarterly payment, and a full repayment after 10 years (40 quarters), the effect of saved interest can be depicted as follows:



Within the constant annuity rate, the interest rate decreases in the course of repayment. The saved interest is used to increase the repayment portion to the extent that the interest rate has decreased, which results in a continuous cost reduction during the period of loan repayment.