Stefan Armonat and Andreas Pfnür

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Arbeitsbereich öffentliche Wirtschaft am
Fachbereich Wirtschaftswissenschaften der
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Stefan Armonat* & Andreas Pfnür**

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Abstract:

In the market for German real estate finance at the end of 2001 a phenomenon could be identified that shows significant parallels to the shortening of credit supply in the US market in the early nineties, called the credit crunch. There are two basic reasons that explain the withdrawal of mortgage banks from the current events in real estate debt finance. Both are linked to a lack of risk identification in real estate investment. First, mortgage banks are engaged in a portfolio of bad real estate credits. In the past and today, banks do not receive information to price the true property risks. Especially from their money transfer to eastern Germany they still suffer of high deprecations in these engagements. The high impact of single properties can not be diversified. This is why banks were exposed to higher risks than they calculated in their market risk exposure. On the other hand, the preparation for Basel II indicates how sensitive risk have to be treated according to the new regulatory environment. This causes a split of relationship ties where real estate risks were not priced for decades. The result is a failure of all sorts of real estate finance in Germany. From the survey on institutional real estate investment behavior, it becomes evident that market participants ignore property risks and they do not have the instruments available to price these risks. This is why banks act so cautious in preparation for Basel II. Banks will have to find the instruments to either price these property risks or have intermediaries price them and include diversified securities into their holdings.

True intermediaries are not present in German real estate finance. Banks failed in their function to price risk and monitor the quality of investors in debt finance. In addition, a lot of direct finance from households to real estate investors as open-ended or closed-ended funds takes place. We suggest the introduction of a real estate investment banking function that offers true intermediation services. It monitors the risk pricing of real estate investors and places the securitized and rated risk exposure at banks or in the capital market to provide finance to capital seekers. Future real estate investment would be financed risk-adjusted and financing volumes could increase again.

* Dipl.-Kfm. Stefan Armonat, Frauenthal 15, D – 20149 Hamburg, s.armonat@eversmann-und-partner.de.
** Priv. Doz. Dr. Andreas Pfnür, Von-Melle-Park 5, D – 20146 Hamburg, pfnuer@econ.uni-hamburg.de.

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1 Introduction

During the consultation period of Basel II agreements, real estate researchers and especially investors became aware what change in investment behavior the regulations from Basel II incur to the real estate investment and finance industry. In contrast to stock and bond operations, where professional risk management and risk valuation systems are established for decades, no explicit risk has been identified in real estate projects. This insufficient approach for institutional investment that handles society's savings is incompatible with the demands of Basel II. Instead of considering the necessary steps to an introduction of a real estate adjusted risk pricing, the concerned actors went public and started to criticize the regulations of the Basel committee on banking supervision[1]. Meanwhile the concerned bank corporations, and especially the mortgage banks that are most concerned with the regulations in the real estate investment sector, established risk management systems in accordance with the Basel II regulations.

At the end of 2001 investors had realized that the credit policies at German mortgage banks had changed dramatically. The banks rejected a lot of credit applications to real estate investment projects. Bank equity had been redirected internally to fund projects with a lower risk exposure. In sum, the large German mortgage banks had nearly stopped their business in commercial real estate finance[2]. This affected the German real estate investors at large. The problem was not a rise in prices of debt, but a general unavailability of credit for their investment projects with all economic consequences. They did not only stop financing bad projects, but also promising projects were not agreed on, because the banks were not able to estimate the risk exposure from the debt contract. Information asymmetries are too high to allow funding of these properties.

This phenomenon is similar to an event in the United States at the beginning of the 1990s. It was called the credit crunch[3]. Many loan associations reduced their debt financing to real estate developers. Weber/Devaney (1999) see two influence factors for this event. One is the presence of so called "bad credits" from the 1980s on the balance sheets of the banks, the other may have been the Financial Institutions Reform,

[1] Kritik an Basel II aus der Immobilienwirtschaft
[2] Zeitungsartikel zur Geschäftsaufgabe der Banken.
[3] See *Tucillio* (1991).

Recovery and Enforcement act of 1989 (FIRREA) as a change in the regulatory environment. As this behavior leads to an inefficient distribution of an economy's capital to profitable investment projects on a risk adjusted basis, the interest of this paper is guided towards an investigation of the reason for the failure in credit supply in real estate finance.

Real estate markets are imperfect and incomplete. The aim of this paper is to investigate how the ineffective pricing of risks in real estate investment affects the quality of investment and the allocation of capital to real estate under the regulatory environment of Basel II. From the identification of the reasons for the market failure in real estate finance, directions on a future real estate market that is more complete because of new instruments and participants have to be given to price risk adequately. These suggestions show how real estate investment can be adapted to the forthcoming regulatory environment.

In the next section we describe the institutional investment environment that sets the premises for the regulatory influence of Basel II. That will demonstrate the interdependencies of the credit crunch in Germany. In section 3 the results from an empirical survey of institutional real estate investment behavior are contrasted with theory to give indications on real estate risk pricing. The findings will be used to examine the compatibility of Basel II with the existing practice in risk valuation and to identify possible reason for the market failure. Section 4 contains a market model of intermediated real estate investment to overcome the current sub-optimal capital allocations of banks. It sketches the way to price real estate risks adequately in order to include real estate financing into the regulatory environment that results from Basel II. Section 5 concludes the paper and demonstrates the consequences for the German market of real estate investment and finance from the introduction of Basel II.

2 Credit crunch: Institutional investment environment for Basel II

The focus this study uses is the real estate investment consideration that originates in the aim to invest capital in order to receive return with respect to risk and liquidity. At the same time, these equity investments are accompanied by other means of real estate finance as debt or mezzanine capital. Real estate investors are the market participants that seek capital and on the other end of the market different institutions provide funding for the investment projects. Banks used to fund real estate investors with debt. We will refer to role of these "intermediaries" at a later stage of this chapter.

The investors and the suppliers of finance all act in special investment environment that results from certain specifics of real estate. These specifics can be separated into three groups. (1) Market structure: Real estate markets are highly imperfect markets. The reasons for this are decentralized market structures[4], high transaction costs and market entry barriers[5], illiquid markets and long-term executions of transactions[6], and finally the uncertainty about the information efficiency of real estate markets[7]. (2) Real estate investments: Evaluation of real estate performance is not easy to perform. Different models and non-standard applications of methodologies for the valuation of property lead to incompatible performance measures[8]. (3) Real estate management: In contrast to financial investments, in real estate investment there is the need to manage and maintain the property bought. This management capability to optimally use the property has a strong influence on the performance of the investment. Taking these three specifics together, it becomes evident that the actors in real estate markets face high information asymmetries (ex-ante and ex-post performance evaluation, uncertainty about the quality of the agents) and high transaction costs that lower the quality of the investment decision. In this environment banks performed their debt finance. The demands from the consultation papers of the Basel Committee on Banking Supervision indicated a change of the regulatory environment, real estate investors and the financing banks act in.

Before the discussion of Basel II, in Germany the law on control and transparency (KonTraG) was introduced. According to this regulation, real estate investors have to establish a controlling system that identifies and follows up on the specific property risks that a company is exposed to[9]. In June 1999 the Basel Committee presented the first draft of the consultation paper for a new regulation of the capital adequacy guidelines in the participating countries. The aim was to improve the methodologies to determine capital charges on credit risk and include other forms of risk into the calculation of capital charges. At this point, we do not want to discuss the details of the

[4] See Dubben/Sayce (1991), p. 27.
[5] Yavas/Yang (1995), pp. 347.
[6] See Belkin/Hempel/McLeavey (1976).
[7] For the relevance of information efficiency for risk pricing, see chapter 3.1 .
[8] See for a discussion of real estate valuation and performance evaluation: Scarrett (1991); Born/Phyrr (1994); Keunecke (1994); Platz (1994); Kleiber/Simon/Weyers (1995); Leopoldsberger (1997); Sayce/Connellan (1998); Pfnür (2000b).
[9] See Arbeitskreis Finanzierungsrechnung der Schmalenbach-Gesellschaft für Betriebswirtschaft e. V. (2001), pp. 4.

new accord, but the effect for the market was a reconsideration of credit risk exposure and the bank policies linked to it.

The consequences for the real estate industry are significant. On the one hand, real estate investors have to improve their internal risk handling to be able to present their individual risk exposure to funding banks. Applying the principle behind Basel II consequently, this means to leave the single property in the valuation of the risk exposure behind and concentrate on the creditworthiness of the borrower (institutional or private investor)[10]. This creditworthiness is a function of the quality of his real estate portfolio. Single properties step out of the focus of an investment analysis and the underlying sum of cash flows from multiple properties enters it. It is possible, e.g. that a portfolio can catch the loss of a whole property, but it may also be that the loss of only a small cash flow in a weak economy leads to the bankruptcy of a whole real estate company. On the other hand, banks are forced to price the risk they need to disclose from the investment projects. If banks consider the creditworthiness of the borrower as the true risk function, then they have to apply different valuation methods than they used to do. Because of the changing environment, mortgage banks changed their debt policies. At the end of 2001, finally the market for real estate debt finance nearly failed. Credit was hardly and under tough restrictions available to developers[11].

The situation of real estate finance in 2001 can be described with a highly imperfect market structure and a significant change in the regulatory environment. In theory, researchers suggest for this kind of markets the presence of intermediaries that exploit the imperfections to their benefit, but offer valuable services to the market participants in reducing the cost of market imperfections and in helping them adapt to the regulatory demands.

The following section will structure the possible role, functions, and activities of intermediaries in the market of real estate investment. Subsequently, there will be an analysis of the existing participants with regard to their role and ability in taking an intermediary position between capital supply and demand. At the end of the argumentation the need to overcome market imperfections will be linked to the presence of agents that reduce these imperfections.

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[10] For the principles of Basel II, see *Basel Committee on Banking Supervision* (1999).

[11] See Immobilienbusiness (2001), p. ??. The HVBReal Estate Group describes a deal with the Deutsche Telekom, where they structured the finance of an asset deal. They themselves took a certain amount of debt finance that is secured by lon-term guarantees by the Deutsche Telekom AG. With such a contract, the deal is nearly riskless for the creditor.

The basic explanation for financial markets exists in the purpose to collect the savings of individuals and distribute this capital stock to the most profitable investments of an economy under optimal risk-return considerations. People willing to supply their capital to the purchase, building, management, and sale of property, postpone immediate consumption of their income in order to participate in a cash flow they expect from the investment they awarded their capital to. On the other hand, there are real estate investors seeking for capital to buy, hold and sell property with the aim to earn more money from their activities than they have to pay to their creditors or equity partners. Intermediaries allocate the risk-adjusted capital flows between these two parties. This is necessary because especially in real estate markets, the market imperfections are high as we demonstrated above. Future states of the real estate market are only covered to a minimum by the existing opportunities to invest in property and some derivatives. Speaking of all possible Arrow-Debreu titles for future real estate market states, today only a handful of these titles can actually be bought by return-seeking investors.

This leads to the role intermediaries have to play in the market for real estate investment. As real estate capital seekers are not able to provide their suppliers with state-contingent securities or investment opportunities, intermediaries have to improve the ability of lenders to real estate to cover future states. They identify future states, price these outcomes today, and match suppliers and seekers of these titles. Van Horne (1985) argues that intermediaries exist where they can introduce viable financial innovation to make markets more efficient in an operational sense and make markets more complete.

In the literature, intermediation functions are twofold. Referring to Gurley/Shaw (1960) intermediaries fulfill a transformation function. They transform non-marketable, primary securities into marketable, indirect financial securities that satisfy the investment desire of capital suppliers and can be traded in liquid markets. In later studies (e.g. Chant (1991)) the transformation function is extended from the pure spatial and time-related point of view to aspects of a transfer and re-modeling of investment risk. Direct finance does not offer enough diversification of risks. Intermediaries create securities and split the investment amounts to diversifiable sizes. Another central function that can be deviated from the considerations of Jensen/Meckling (1976) and Diamond (1984) is the reduction of costs, which result from information asymmetries. Diamond's classical model attributes intermediaries the ability to monitor an investment ex-post at the same cost that every single lender of capital has to carry when wanting to

receive the same information about the uncertain state-dependent investment project. This gives him cost advantage over the sum of all lenders monitoring the investment returns themselves. The relationship between the intermediary and his lenders doesn't show information asymmetries. As the intermediary can well diversify his portfolio, he is able to issue debt as a state-contingent contract. Hellwig (2000) extends this model to a risk-averse intermediary. He shows that also the entrepreneur has an interest in receiving funds from an intermediary. Because of a shift of all return risk and his expert monitoring, the intermediary supplies the borrower with cheap capital. For the capital seeker, optimal intermediation policies do only generate finance, but also insurance for his capital needs (p. 721). This valuable function of intermediaries depends on the ability to monitor and to evaluate the investment projects of the entrepreneur and the possibility to diversify investment risks. A last function regarded here is the aid of intermediaries in adapting to the regulatory environment[12]. Economies of scope and in-depth knowledge of the investors risk structure enable intermediaries to adjust their clients' investments and risk management practices to legal regulations.

Scholtens (1993) gives four categories of activities that intermediaries perform to complete their functions in capital markets. This is (1) satisfaction of demand and supply of financial assets, (2) the administration of accounting systems, (3) matching of borrowers and lenders preferences, and finally (4) the demand and supply on non-tangible assets in the form of e.g. insurance (risk-taking) or advice (risk-less) (p. 117). For real estate, the maintenance of accounting systems is subordinated. Therefore we see three central activities to intermediaries in the real estate markets. First, this is the capital supply to real estate investments, with a matching of market participants' preferences. Second, there is trading as a mean to actively create portfolio structures and standardize the risk profiles in order to securitize them. These two areas are linked by the third activity, the risk management. Risk management is necessary to price investments and transfers accurately. At the same time, it can be offered as a service to real estate investors. We attribute these functions and activities to intermediaries in the real estate markets. By considering the market structures, the services of intermediaries seem to be necessary elements of the real estate capital market to maintain the functioning and clearance of the markets.

The participants in the German real estate market are open-ended and closed-ended real estate funds, real estate investment companies, insurance companies, pension funds,

[12] Adaption to regulatory environment

corporate real estate managers, development companies and large private investors. These institutions perform direct investment in real estate, although the investment purposes are different. Insurance companies and pension funds see their objective in receiving a return on their invested capital. But instead they perform the same tasks and evaluate the performance the same way as for example developers or real estate companies do. These participants act as entrepreneurs in the market of real estate investment. The funding parties are households, private equity investors, and, because of the high leverage in German property investments, the financing banks. Households invest their capital to a large extend directly into real estate funds. None of these parties takes functions of intermediation as described above. Banks do not monitor the investments of their creditors, nor are they engaged in transforming the cash flows of the properties they fund. The institutions that are commonly considered as intermediaries, such as insurance companies and funds, perform direct investment without an intermediation function. With regard to the capital suppliers, they are directly linked to them as capital seekers for their real estate investments.

Summarizing these outlines, it becomes evident that in the current state of the real estate markets no intermediaries are existent, or at least the intermediation function has been disregarded. Banks fail in their function to monitor the investors according to lenders needs and on the other hand a lot of direct investment takes place. The plausible explanation for this behavior is the neglecting of risk in real estate investments. Real estate investments were considered as secure investments, as the focus of the valuation was more the “bricks” than the cash flows. If an investor and the financing bank do not see the risks involved in property investment, both parties do not put efforts in determining and especially pricing the risks of the investment projects. Loans were given at certain rate above the refinancing costs of the bank. This was the situation before the capital crunch in German real estate financing. Markets were and are still imperfect, risks are irrelevant and no intermediaries that have techniques available to price the risks as the core of their business are present. At this point, the awareness about real estate investment risk strikes the market from two sides. There is the internal perspective of bad credits, especially in eastern German property, where all mortgage banks are involved in, and an external perspective in the impending change of the regulatory environment with Basel II. Both developments drastically outlined as first the existence of risks in real estate investment, and second, the need to evaluate and

price the property risks. This paper gives two propositions for the credit crunch that took place in Germany in 2001:

1. Investors do not have information that could disclose investment risks to financing banks. Banks are not aware of the risk exposure they had from real estate and slowly adjust their balance sheets with deprecations.
2. The regulations from Basel II force the banks to price the risks of real estate loans accurately. As long as they do not have the appropriate instruments and methods available to evaluate the risks, they only finance real estate investment projects that are ensured against losses.

Two factors that discouraged banks to continue participation in the market of real estate debt finance. We motivate this with the two propositions this paper makes. In the subsequent section, an empirical analysis of the institutional real estate investment behavior will serve as a discussion of the two assumptions of the market failure. Asset pricing is the key element of a functioning market. The following analysis of the theoretic risk pricing considerations and the pricing applicability in the investment environment is set up to give further insight into the market behavior of the real estate investors and financing parties. By mirroring the two propositions with the empirical results, evidence for the German capital crunch will be given.

3 Analysis of risk handling in real estate

3.1 Theoretical considerations on risk handling

In real estate finance, the considerations of performance evaluation and asset pricing are central topics that tremendous research effort has been devoted to[13]. To obtain the true performance measure of an investment in real estate, the return to the investment as well as the risk this return is exposed to have to be determined[14]. It is also important, not only to concentrate on the single property, but also on portfolio effects by regarding the risk structure. From the outlines about the market environment in Germany, we already stressed the difficulties in the stringent performance evaluation of real estate investments. There are basic options to evaluate real estate performance. The first is property based. It relies on methods from the investment analysis. Berens/Hoffjan (1995) describe a real estate planning tool that includes all relevant cash flows of a property over the planning period. This financial planning includes the central financial influences such as rental income, operating cost, interest payments, or maintenance cost. Structural determinants and environmental development influence the financial figures. The investment decision fixes the structural determinants, witch are e.g. the location, the building quality, or the architectural design. They are unique to a single property. Environmental development changes over time. Macroeconomic development, regional real estate market development, the quality of the facility management, and the creditworthiness of the rental parties have also, in correlation with the structural determinants, a high influence on the financial figures of the investment project. The results of this calculation are total investment worth and the internal rate of return to the project. Uncertainties about the future development in these financial figures can be modeled by using a simulative risk analysis. Investors are able to receive not only the expected value of the internal rate of return but also a statistical deviation with the variance of result. With this analysis the investors has the performance information in the same format available as if he performs a market based financial asset pricing.

Capital market asset pricing is the second form of evaluating real estate performance. It is signified by a valuation of the systematic influences the single asset has on the total market performance. Therefore only two figures, mean of the return and the standard deviation to it have to be estimated. Correlation to other assets in the markets builds the

[13] See Williams (1999) for an analysis of the research topic „real estate finance“.

link to the overall market development. For a determination of return and risk, investors can use past sources such as historical time return series or they can estimate the risk-return ratio from their expectations about the future development.

The main problem in the theoretic methodology of the literature to determine past sources of return is the identification of an accurate return series. Because real estate is traded infrequently, returns have to be estimated or determined by appraisals. Also transaction-based data does not reflect the true price development of real estate. As many others *Corgel/deRoos* (1999) demonstrate how returns can be recovered to include them into the allocation considerations[15].

Institutional real estate investors in the US in general are asset managers that perform return oriented investment. Their objective is to include real estate into their overall asset allocation considerations. This may be a reason why Anglo-American researchers concentrated on the capital market asset pricing, although the market conditions are no in favor a such acting. Subsequently, there will be an analysis what suggestion have been made to perform real estate asset pricing and what difficulties have been identified in this conduct. Considerations to perform financial portfolio management in real estate holdings are the first point of analysis. The application of financial asset pricing with regard to the implicit portfolio structure relies on the efficient market hypothesis. Efficiency tests offer insight into the possibilities of financial risk valuation that researchers identified in certain sub-markets. With regard o the results of the efficiency test, the final point of the analysis of real estate risk pricing in the overall asset allocation decisions.

One of the first attempts to regard real estate in a MPT framework was *Friedman* (1971) explaining the application of *Markowitz´* (1952) diversification strategy to a mixed asset portfolio and the construction of efficient real estate portfolios. He even accepts that "risk in real estate may be quite different, but again for the present this question will be relegated to the field of real estate investment analysis" (p. 866). His assumptions and issues are significant for the whole body of literature. *Viezer* (2000) reviews the different attempts of diversification to optimize the portfolio after the asset class allocation decision to real estate. He concludes that diversification efforts do not seem to create a financially efficient portfolio construction, but they enhance return and

[14] Performance evaluation: retrun to risk
[15] *Lai/Wang* (1998) discuss the problems creates with the de-smoothing and recovery of return series.

reduce risk of the investment (*Viezer* (2000), p. 90)[16]. Regarding real estate portfolio risk pricing under the application of capital asset pricing seems to be linked to some difficulties. Investors structure their real estate porfolios under strategic aspects, but the valuation of risk from diversified portfolio holdings does not seem to be possible.

The presented work about real estate portfolio management heavily relies on the assumption of an efficient market hypothesis. In contrast to these papers a special body of literature is concerned with the explicit tests of real estate market efficiency[17]. So far, no final judgement about real estate efficiency as one of the central preconditions to the application of financial asset pricing to real estate has been made. *Gatzlaff/Tirtiroglu* (1995) underpin the preliminary nature of the research to date. A majority of the studies reviewed by *Gatzlaff/Tirtiroglu* (1995) does not support any of the three forms of market efficiency (Fama (1970)) for different spatially an economically separated real estate markets. All these tests of market efficiency rely on the quality of the data as in portfolio management and asset allocation calculations. If the data is inaccurate the results gained are "spurious"[18]. The difficulty with real estate performance is the creation of a representative return series[19].

Ibbotson/Siegel (1984) argue that unsecuritized real estate provides compensation for illiquidity and informational inefficiency. This argumentation has to be differentiated into two dimensions. In a market there may exist imperfections. If these imperfections are priced correctly the markets still may be efficient[20]. This conclusion from *Gau* (1987) is an important consideration for the further discussion. Intermediaries may use imperfections to their advantage and price them in efficient markets.

If real estate is an efficient portfolio contribution, there should be activities to allow institutional return oriented real estate investment in this market segment. In contrast to

[16] Even more as there is no single efficient frontier in a real estate portfolio. Several possible solutions solve the optimization problem if real estate data is entered. *Liang/Myer/Webb* (1996) claim that this fuzziness of the efficiency line is an indicator for the inability of researchers to accurately locate the true optimal allocation in real estate portfolios. See also Young/Greig (1993) for an analysis of a fuzzy efficient frontier.

[17] *Gatzlaff/Tirtiroglu* (1995) give a comprehensive review and evaluation of the literature on market efficiency tests in real estate markets.

[18] *Gatzlaff/Tirtiroglu* (1995), p. 159.

[19] In this context *Ross/Zisler* (1991) state: "Recently there have been a number of analyses of the equity real estate market, and, almost without exception, these analyses simply treat existing data as though they were the same as data on returns from the stock and bond markets. Unfortunately, nothing could be further from the truth" (p. 175).

[20] *Ibbotson/Siegel* (1984) state that the premiums are the cost of the indivisibility and the transaction costs as market imperfections in real estate. The efficient market concept is less strict than the perfect market concept (see *Fama* (1991)).

capital market securities there is no generally accepted principle how to evaluate the performance of a single property or a real estate portfolio in a multi-asset portfolio context[21]. The lack of these measures results in an unplanned allocation of capital to the segment of real estate investment. *Bajtelsmit/Worzola* (1999) describe the empirical allocation behavior of pension funds. Their results strongly support the statement that asset class allocation is done separately and prior to within-class allocation. Once an amount is devoted to an asset class, investors seek to structure these assets independently.

Many studies found evidence that real estate offers advantageous investment opportunities when the risk-return is measured in a capital asset pricing framework from the regarded data. A survey of the related literature on performance in real estate (*Sirmans/Sirmans* (1987)) finds that about half the researchers estimate real estate to be a profitable investment with regard to the implicit risk exposure. Returns and the identified risk relate strongly to the selected biases for the evaluation of the performance. *Gyourko/Keim* (1992) conclude that real estate returns strongly depend on the individual real estate firms that show very heterogeneous profiles. The question about the actual risk return ratio of real estate assets is still unsolved in the literature[22]. There are indications that real estate offers favorable investment opportunities and especially a perfect hedge against inflation. But the biases for the available figures are too contrary for institutional investors to have a fixed estimation of risk attributes in their real estate investments[23].

For the further argumentation we want to emphasize that there is a strong impact of real estate allocation to overall portfolio performance. But what the exact recommendations are, has not been concluded. Real estate pricing has not been described according to the needs of the capital market and especially the real estate capital market participants. Until now it is not clear yet, if real estate markets are efficient, but it may be doubted strongly. Real estate portfolio management is not a financial optimization of real estate holdings in order to be able to price them as a unit at the aggregated level. Instead it is a

[21] *Roulac* (1988) discusses the methodological problems in the valuation of real estate returns and the risk they are exposed to.

[22] *Giliberto* (1992) for example tries to identify the necessary return of real estate for a given level of risk. *Mei/Lee* (1994) identify a factor premium for real estate assets. Taking the results of the different studies together, the indications are too heterogeneous to determine risk and return profiles of real estate.

[23] *Seiler/Webb/Myer* (1999) structure the empirical work of real estate allocations by the amount recommended for an investment in real estate. But the reference to the reasons for the inconsistent percentages of real estate allocation is lacking. The deviation results from different settings of the empirical data gained and computed.

strategic optimization of property holdings. To perform the necessary risk pricing in real estate investments, the financial approach does not seem to be the without difficulties, even under some optimal theoretic considerations. But to maintain institutional real estate investment, a methodology to evaluate the risks and to enhance financing in the real estate markets has to introduced. Property-based asset valuation as introduced as the beginning of this section remains the possible alternative.

With regard to this problem, we describe the decision behavior of German real estate investors. The aim is to examine whether the empirically identified pricing of real estate assets is compatible financial asset pricing or if there are indications to perform real estate risk pricing property-based.

3.2 Empirical evidence from German real estate investors

The study presented here has two main focuses[24]. First, it analyzes the factors influencing the performance of real estate assets. The second goal is to review the models used by the institutional investors to monitor their investments. In the first section risks of real estate investments are identified and subsequent the handling of risk in the investors strategy and controlling tools. From these findings we describe the market situation in German real estate investment and the limitations that result from the techniques performed in real estate performance evaluation. Prior surveys are concerned with the way performance in real estate investment is evaluated. They show that the return of investment is calculated very frequently today but risk as a second dimension of the performance is ignored because of missing tools to measure it[25]. Diversification of these risks is insufficient. Our study will extend these findings and examine the decision environment. This applied methodology allows us to draw conclusions on the real estate investment behavior by interpreting the individual's decision process with its consequences for the overall market structure.

The relevant information investors use has its sources in the environment close to the property they want add to their portfolio. In the view of the decision-makers different factors are responsible investment success or failure. Whereas 52 % of the respondents

[24] For a detailed outline of the methodology and the attained results, see Pfnuer/Armonat (2001) and Armonat/Pfnuer (2002).

[25] The surveys on real estate performance valuation and controlling go back to *Wiley* (1976). *Farragher* (1982), *Page* (1983), *Webb* (1984), *Webb/McIntosh* (1986), and *Louargand* (1992) identified insufficiencies in risk identification and handling of institutional real estate investors. The later studies predicted an increasing use of methods from MPT in the asset pricing of property.

see the location as the main factor for long-term success, only 24 % blame the location for a loss of investment value.

In contrast the market development is the main reason for investment failure, claimed by 33 % of investors. But only 18 % mention this item for a sustainable return on their investment. A factor analysis of the items that determine the investment success from the investors perspective gives further insight into decisions structure in real estate investment. After decades of financial research in real estate the location of a property is still responsible (6.39 from 7) for the investors sentiment of the success. Beyond this golden rule of real estate investment the respondents try to evaluate the financial cash flows that are specific to property (initial investment value, potential sales price, income, and expenses). Estimating these cash flows is difficult without the structural determinates of the property and the economic development. Investors use the property criteria to estimate the cash-flow development, which is indicated by the items that show a high correlation with the factors income and expenses. But in contrast the economic development is a separate factor that has only an intermediate relevance of 4.92 for the investment success. Looking at this information, it is evident that the property and its direct environment have a significant impact on the performance. Macroeconomic influences are regarded as a whole. Generally German investors pay little attention to the macroeconomic development in this country and concentrate on the property with its qualities. Reasoning these considerations, we find that investors base investment decision on local market conditions and disregard macroeconomic factors in the investment decision.

In addition there exists a strong interdependency of property specific factors, that are actually supposed to be unsystematic. Regarding this, the pricing of portfolio risk becomes very difficult[26]. The significant information asymmetries that exist in the market for real estate investment lead to a sub-optimal capital allocation[27]. The particular circumstances at the individual property level are more important than market level forces. Other factors like macroeconomic indicators are widely neglected as information relevant to asset pricing. Risk management of the portfolio with respect only to the systematic risk ignores factors that have a high impact on performance but

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Brzeski/Jaffe/Lundström (1993) performed separate work for the Swedish market and *De Wit* (1996) for the Dutch market.

[26] See Armonat/Pfnuer (2002) for a more detailed analysis on this topic.

are not diversified. Real estate pricing does not reflect the imperfections of the real estate market. The conclusion from these findings is that real estate markets are information inefficient because they do not price all available information.

Market microstructure in real estate investment adjusts to imperfections and inefficiencies of the market. Investors act in an environment where they use their advantages in information. The intransparency, the relevance of local market conditions, and the interaction between single property risk and market development make accurate financial asset pricing impossible. Property-based risk pricing has to reveal a lot additional information in comparison to the current status.

The pricing of risk demands an identification and valuation of the risks in real estate investment. Historic returns could be calculated for an estimation of the total investment risk and a correlation with market development[28]. Other suggestions point towards an interpretation of the uncertainty of future returns from fundamental factors[29]. The following analysis discusses the possibilities investors face when judging the return and risk of their investments.

Investors estimate certain factors as especially relevant for the return on their investment. The uncertainty about the future development determines the risk of the required return. German investors admit that they have little knowledge of the development of the factors they estimate as central for the cash flow projection on a ten-year horizon. Their individual ability to guess the rental income ten years from today shows a deviation of 38 % from the mean. With 86 % rental income has the most impact on investment performance, followed by provisioning costs with 74 %, and the sales price with 66 %. The expenses for the construction of a building can be estimates with 38 % deviation. The highest level of uncertainty exists for the achievable sales price in ten years (47 %). Regarding these uncertainties and the possible multiplication effects that occur in a calculation of the investment value, the results gained have little influence on the decision process. Comparing two investment values that differ for 0.5 % in return, it is not necessarily the better choice to select the higher investment value when neglecting the risk profiles of the investment projects.

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[27] In German real estate markets it is not true that „errors in pricing the assets are random", as *Gatzlaff/Tirtiroglu* (1995), p. 161, set a definition for efficient markets. In contrary they are accepted consciously by disregarding certain return factors in the investment decision.

[28] Most of the studies apply return series from historical data to determine the risk and return ratios. See the literature reviews *Sirmans/Sirmans* (1987) and *Han/Liang* (1995).

[29] See *Liu/Mei* (1992) and *Liu/Mei* (1994) who involve information about environmental developments into the determination of future cash flows and the pricing of the assets.

At the same time investors do not use methods that integrate the two dimensions of the decision problem. Only 21 % of the decision-makers think that risk-utility-analyses are suitable to handle the uncertainty of their investments. And only 8 % of the decision-makers think that probability distributions are the right measures to use to include risk perceptions into the calculation of their investment.

Investors do not regard these risks because they do not see an opportunity to change their decisions after they completed the investment. In their opinion 65 % of the investment success is already determined at the time the investment is made. This is a reason why investors do not control risk. They do not see the freedom to shift alternative projects after the investment.

As a result the attitude of decision-makers towards risk is neutral. We found that the risk preference function of the respondents is a straight originating at a return level of 5,5 %, which at the time of the survey was close to the average return of long-term state debt[30]. Risk does not seem to be a relevant measure for real estate investors when regarded within the decision arena for real estate investments. The amount of risk involved in real estate investment is not transparent and therefore investors do not price investment risks in a future orientation.

At the same time, investors are able to calculate the historic risks of their property. Real estate decision-makers refuse to use this opportunity. Their view is future oriented. 2 % of the respondents use only historic return data for an investment decision whereas 51 % think that only expected returns are a relevant measure. This finding is supported by the techniques identified in the calculation and the controlling of the investment. Dynamic methods and cash flow based methods are used for the planning and the calculation of the single property investment. 56 % apply cash flow simulations annually but only 47 % use the ex-post measures of the return on equity 39 % include the increase in property value in these calculations. More attention is rewarded to the ex-post portfolio view. 56 % calculate the return on equity for the complete real estate. Cash flow simulations are performed annually by 51 % of the investors.

Investors put as much information as possible into the investment date and perform cash flow calculations. But they control the performance to a very low extent. Only half the respondents use ex-post methods. The reason for this may be the missing instruments to

[30] See *Deutsche Bundesbank* (2001), p. 44. The identified 5.5 % indicate that real estate may be an investment with a longer investment horizon because the return is higher than the 4.7 % of the 10-year-EuroBund in January 2001.

evaluate the risk and to identify alternatives. Preferred sources used for identifying risk are individual market analyses and expert interviews that, respectively, 97 % and 92 % of the investors use. Benchmarks rely on historic data. Fewer decision-makers (77 %) perform a comparison of their own performance with benchmarks.

Above we pointed out that few investors estimate statistical measures as suited for risk measurement. A minority of the respondents only accepts even more applicable methods like scenario analyses (37 %) and discounts or supplements for risk (29 %). Taking the insufficiency and infrequency of performance evaluation, this is strong evidence that the investors do not have the right instruments available to determine and control the risk and return to their portfolio investments. Instruments and tools to evaluate risk in real estate investment do not exist to a sufficient extent and therefore are not applied in a backward orientation.

Linking the two findings about future and backward risk identification, we can state that investors concentrate on future returns in their investment decision. Historic returns are not measured and the instruments to do so are not available. At the same time investors underestimate the relevance of the risk factors in investment. They are not able to determine the amount of risk present in their investments. They concentrate all efforts to collect information on the investment date. But the uncertainty about this information is not integrated. From that day on the development of performance is accepted passively but not managed actively. The risk of the asset is not priced. Real estate asset pricing is performed without evaluating and controlling risk.

Risk is widely neglected in the decision-making process of institutional real estate investors. But efforts are made to diversify potential risky influences by splitting the investment to several categories as demonstrated in section 3.1. Investors seek to structure or maybe diversify risk by splitting their investments to a variety of properties. The most relevant factors for allocation are the micro-location (77 %) and macro-location (68 %). The decision-makers prefer regional diversification criteria to economic criteria. The most important economic factor is the object category that is mentioned by 58 % of the respondents. Property size is only recommended by 33 %. In-depth statistical research with factor analysis and cluster analysis shows that there is little systematic correlation between the single items that were presented in the questionnaire. This can be explained with the different strategic focuses of the decision-makers and the ambivalent influence of certain factors on different portfolios. For a

diversification of risk, these factors seem to be more a naive strategy than a planned allocation[31]. In real estate markets, no evident diversification criteria exist.

We showed that the behavior in real estate pricing and in risk valuation gives little room for an application of capital market asset pricing. But even the decision-makers themselves see great difficulties in constructing efficient portfolios. Interestingly they do not estimate the transaction costs and taxes to have a high impact on the market inefficiency (only 22 %) but more the micro-market determinants that we analyzed in section above. 53 % think that information asymmetries and insufficient knowledge about the development of the markets cause the allocation failure to high extent. 38 % blame individual expectations on performance to be of high relevance for the inapplicability of MPT and CAPM. A significant problem is the inseparability of real estate assets. 40 % of the respondents see the individual impact of the single property as too important for the portfolio performance. And again the investors state that they invest for a long-time horizon. 49 % say that as they do not switch portfolio holdings they are not able to adapt to changing market environment and keep the portfolio at an efficient composition. Taking these findings together real estate investors estimate themselves to be acting in an inefficient market and they are well aware of the imperfections they face. Overall investors do not estimate real estate markets to be efficient.

The construction of portfolios is more a strategic focus than a vehicle to diversify risks. Investors do not use standardized diversification criteria to structure their investment. Because of the market conditions they do not see any possibility to reduce the investment risk in constructing efficient portfolios. Changes in the market development have no influence on the perceived risk exposure of the investor. They do not adapt portfolios because of an increase in the amount of risk to the expected return.

Single properties have a high relevance for the performance of the portfolio. Risks that are specific to a single building cannot be diversified on a portfolio basis. Properties cannot be divided and are held for a long time. Investors do not identify the influences on the performance behind evident regional or economic criteria. The total risk of the single real estate assets remains in the investment portfolio. This is why the relevant benchmarks for the investors are competitors that work with a similar implicit risk exposure as they do.

[31] *Vizer* (1999), pp. 82 – 83 identifies the sub-optimality of a diversification on naive criteria.

Real estate portfolio management is not a financial efficient optimization of a portfolio but the endeavor of an operative mediator to structure an entrepreneurial investment. Diversification of unsystematic real estate market influences is not possible. The true amount of risk cannot be identified using this capital market approach. Low systematic risk of real estate markets to other assets is a consequence of the inefficient and imperfect market structures. Real estate investment stays dependent on specific criteria.

The risk in real estate investment is an operative risk to the success of the real estate vehicle or asset managers buying, holding, and selling property. Idiosyncratic factors highly affect the return of the individual investment portfolio so that the total risk has to be managed. Real estate risk pricing returns incorrect results when capital market asset pricing is performed on property. This indicates that property-based approaches to real estate risk pricing have to be improved, as they are the true risk measures. The study demonstrates that the markets for real estate are still very inefficient. Investors act in a peculiar environment that does not yet force them to price the risks.

3.3 Risk pricing and credit supply

With this analysis, today's imperfections of real estate markets are not only described to the extent that is obvious from observations. The study proves that banks were lenders in markets that they could not even estimate by far in their development. But neither did the banks price the risks, nor did the real estate investors feel themselves exposed to these risks. Investors regard the change of the investment environment as of little importance for the success of their investment projects. They do not have methods to control the return over the investment horizon and they miss the opportunity to switch investment projects once the investment decision is made. This makes clear, why risk was not a relevant measure in real estate investments. Investment success is attributed to the location and the utilization adequacy of the property. At the time of the investment, investors already feel the largest part of investment success determined without the option to improve or save it. This is a notion that puts the property characteristics in the focus of the creditworthiness considerations. If the property value had been determined as an insurance of loan value at the beginning of the investment period, the loan seemed to be riskless to the bank.

At the time banks realized that they were facing tremendous losses from their real estate engagements, they started to monitor their loan portfolios. This leads to the proof of proposition 1. Real estate investors estimate the future outcomes of the central return

factors to their investment projects as uncertain. High uncertainty about the investment determinates evokes risk to the performance of the investments. Real estate deciders neglect the risks and the development of macroeconomic influences in favor to location decisions. They do not estimate the future cash flow and its uncertainties but believe in the "good" property that will always provide sufficient rental income. Banks were not able to estimate these risks and were not able to diversify cumulative influences because they carried the total risk exposure from the properties, as they themselves are not able to transfer the risks into tradable and insurable units. In result, banks could only see that they build up a portfolio of bad credits, after the environment had changed. The opportunity to monitor the development is not available. Lenders found out ex-post that their credit portfolios consisted of a lot of "bad credits".

Proposition 2 is guided toward the ability of the mortgage banks to adapt to the changing regulatory environment with the consultation on Basel II. In today's real estate markets, no instruments or methods exist to monitor or evaluate the investment performance of real estate projects. Risk evaluation doesn't take place in a backward orientation. The favored future performance evaluation is performed with expected values, but the uncertainties can not be computed in order to receive risk measures. Market based risk pricing indicates wrong results for the risk exposure to a bank. For property based risk management, market participants do not feel to have the appropriate instruments, especially as they are not able to handle sophisticated mathematical methods of risk valuation. Under these circumstances, there doesn't seem to be a variety of performance evaluation tools. Instruments to apply the capital adequacy guidelines from Basel II to loans do not exist.

In the past, real estate risk has been underestimated. Today banks and investors urgently seek instruments for an improved risk planning and pricing. In the consequence of this argumentation, the inability to price real estate risks in the past and today and the lack of intermediaries that are able to handle these risks caused the credit crunch in Germany. In the literature, capital based asset pricing is supposed to improve the exchange of real estate assets. The survey presented indicates that property based methods have to be developed to cover the true risk exposure from these investments. Market participants acted as if the investments were riskless. Intermediation functions were neglected. As risk became a topic in the market, these intermediation functions were not available where they were needed. Now these functions have to be set up in order to utilize the welfare gain from intermediaries to lenders and borrowers. The

central activity of these intermediaries will be the accurate risk pricing to make markets more efficient and more complete.

Berger/Hunter/Timme (1993) decompose an intermediaries technical efficiency in three areas where they can raise their performance. The intermediary can enhance real estate lending by reducing the inefficiencies in one of these areas. The efficiencies that are described are pure technical efficiency, scale efficiency, and regulatory efficiency. The pure technical point of view refers to the ability of an intermediary to increase the quality of managerial oversight over the loan portfolio. This implies a reduction of the percentage of "bad credits" in the portfolio. Scale efficiency means that the intermediary is able to handle more activities with the same input. And the third form, the regulatory efficiency is especially relevant with regard to the implications of Basel II. Intermediaries that have the knowledge to utilize their equity optimal to the regulator's demands are able to enlarge their loan portfolio and raise the return to investment. This implies that they can accurately estimate real estate risks, they do not have to introduce safety margin supplements, and they do not carry more risk than calculated.

The next section will be a discussion, how these outlines from the empirical results as proof for the market failure can be used to implement better techniques to price risk. In the market of real estate finance, there is an urgent need for mortgage banks to raise their technical efficiency. Higher levels of technical efficiency will lead a way out of the capital crunch. These activities are linked to certain functions in the real estate markets. Therefore it is important to consider how these functions could be institutionalized.

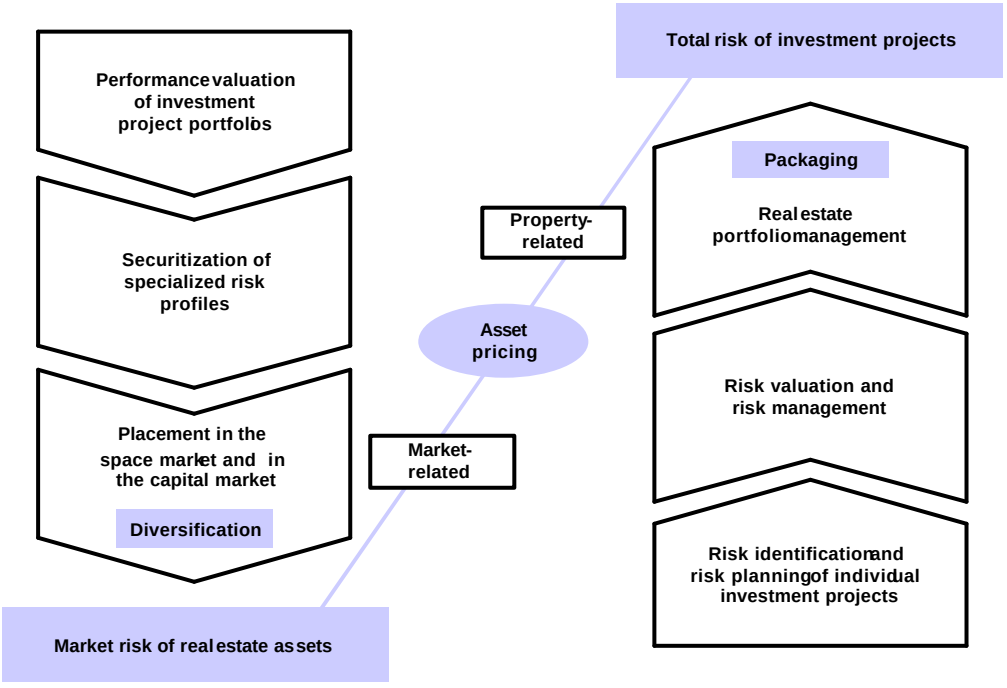
4 Intermediation considerations for risk pricing

4.1 Implications for real estate risk pricing

Under the current market circumstances, identification of risk in real estate investment and the appropriate pricing of the cash flows uncertainties gain more and more weight. At the beginning of the analysis, we already indicated that there are two basic principles to perform asset pricing in real estate. The theoretic considerations on performing financial asset pricing to real estate are output of the target function that many investors have. In contrast to real estate investors who demand capital for property investment, these asset managers are actually capital suppliers with an interest in receiving a risk-adjusted rate of return. But instead of engaging in securitized real estate investment,

they directly invest in property because of a lack of synthetic securities. Their goal is to integrate the real estate investment into their overall asset allocation considerations. This is why this mass of institutional investment volume asks for capital market oriented methods to price real estate assets. The results from the study presented support the considerations about the difficulties in applying the capital asset pricing model and other financial methods to real estate. In direct real estate investment, the return is exposed to an entrepreneurial and operational risk, instead of a systematic financial risk. Describing the market participants, there are two objectives that real estate investors have with their property investments. Institutions that supply the market with capital need a market-based risk valuation. Capital seekers that actually want to trade property, refer to the total property risk they are exposed to.

Illustration 1: Market-related and property-related asset pricing in real estate



Source: Armonat/Pfnuer (2002)

At the moment there is no clear differentiation between these two groups of market participants. But as suggested in Armonat/Pfnuer (2002) in future the activities and the risk-pricing behavior will be distinct, especially under the point of view of risk valuation (see Illustration 3). The approach to direct real estate investment should be

property-based. In the center of the focus is the individual investment project or property. At the first stage, the investors have to identify the central return factors to the property and evaluate the development of the central influences from the change in the macroeconomic environment[32]. At that point, real estate investors have to improve their methodologies and rely more on external factors to their cash flow development than they currently do[33]. The uncertainties about the future states in the return factors indicate the risks the property is exposed. This information from the single property has to be aggregated on the portfolio level. Central factors and their uncertainties to the total investment value can be identified at that stage. Investors analyze the future cash flows with respect to cumulative risks and try to reduce the risk exposure by insuring certain risk determinants or removing and adding properties with counter-cyclical risk profiles to it. If this risk management is implemented, complete portfolios or parts of it can be taken to the next stage, the real estate portfolio management. This serves for the construction of explicit risk profiles that can be transferred into securitized investment vehicles. The risk of these packages is property based and can be explained by property-specific changes in the investment environment. All property risks are disclosed and structuring the real estate portfolio according to the properties' risk characteristics creates a specific risk profile. This property-based asset pricing is the basis for a securitization of real estate assets.

Another approach is to perform market-based asset pricing in real estate. The first step to achieve to opportunity to integrate real estate market risk into the asset allocation process is the valuation of a clearly structured property portfolio. Market participants gain transparency over the expected return and the risk of a real estate package. In a next step, the risk profiles can be securitized and the real estate securities can be placed in liquid markets. This transformation of risk exposure demands expert knowledge in the property-based valuation of real estate risks. When the securities are traded in more transparent and more efficient markets than the markets for lumpy real estate, asset managers are able to diversify their real estate allocations. Small face values and fast transactions enable them to structure well-diversified holdings that allow them to price the market-risks of the investments to their overall asset allocations.

[32] See Pfnuer/Armonat (2002) for a property-based methodology to price real estate investment risks to determine real estate performance.
[33] See results from study

At the actual stage of the market, an asset pricing of real estate investment returns incorrect results that induces investors and banks to underestimate the risk exposure from real estate investments. Asset managers and real estate investors are better off, if an intermediary with a transformation role is present in the market. He transforms total property risk into market-risk securities and reduces the information inequalities that come up, when investors disclose the entrepreneurial risk exposure of their investment projects. We will discuss what the properties of such a role have to be and how this role could transform the market of institutional real estate investment to make it more efficient and allocate investment capital better than in the current situation of the credit crunch.

4.2 Investment banking as intermediation function

Between capital supply and capital demand in German real estate markets, at the moment there exists a gap that reduces finance volumes for even profitable investment projects. The undertaken survey indicates that this gap is a result of undeveloped risk handling and instruments to price risks are not available. With the presence of intermediaries this gap would not have come into existence, as the core competency of intermediaries is to act in imperfect markets and make them more complete, so that capital is channeled from households savings to entrepreneurial activities (Van Horne (1985), p. 621). How viable such a role is in real estate markets has been demonstrated above. The necessary activities can be fulfilled by a real estate investment banking role, that we suggest as an intermediary for the German market of real estate investment. This is only thought to introduce new functions into the real estate investment market. We do not believe that new institutions will emerge because of the intermediation needs, but that existing institutions such as commercial banks, mortgage banks, or standard investment banks will build up know how and complete the tasks to that role. This is why we speak of real estate investment banking as role and not about real estate investment banks as institutions.

The real estate investment banking (REIB) role will serve as an intermediary to the market participants in real estate markets and allow them to structure their investments according to the investment objectives of the institutions. Their technologies are services to real estate investors to adjust the risk exposure of their property holdings. From economies of scope REIB is better able to evaluate the performance of single properties and identify options to take actions within the portfolio. The expertise in real

estate portfolio management will help investors to structure deals and create explicit risk exposures with their real estate holdings. From the asset managers point of view, REIB will serve as mediation role that creates the securities they can include into their overall asset allocation considerations and diversify the specific risks of individual real estate investment vehicles[34]. They rely on the expert knowledge to evaluate the property risks and place these risk units as securities in the liquid capital markets. Here REIB builds a link between market-based and property-based asset pricing. The key know how has to be in both forms of real estate asset pricing.

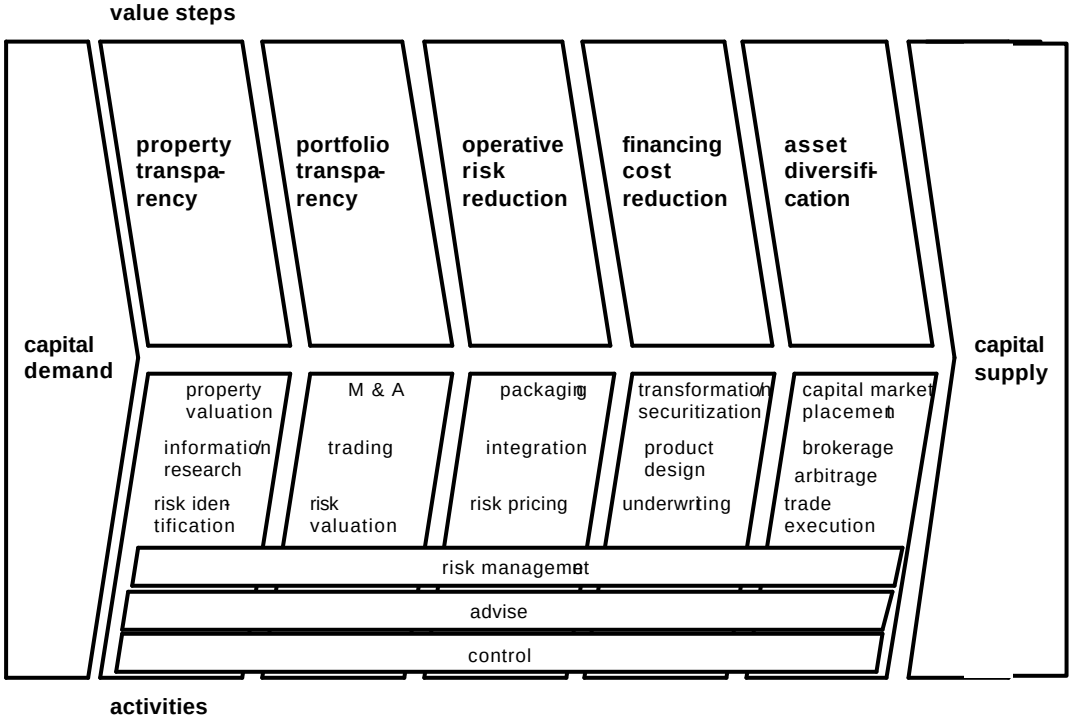
Risk transfer is the viable reason for the existence of REIB in the real estate market. Intermediaries will create securities that make the market of property investment more complete. With new securities the desired description of future real estate market states and security returns can be contracted with more contingent contracts than before. We identified three central functions to this intermediation role[35]. They are capital supply, trading, and risk management and optimize the allocation decisions of the other market participants. Investors have an interest in these functions, because they can improve the risk exposure to the equity they invested and they can reduce their cost of finance in the long run when they disclose the quality of the investment projects to their lenders, according to Hellwig (2000), p. 732. Chant (1991), p. 60 describes that lenders expect a functioning controlling mechanism from the intermediary. They face lower probabilities of losses from their real estate engagements and receive better planning information. Asset managers can concentrate on their core business of selecting securities and will not be concerned with detailed property selection and management questions. Finally, the reduction of information asymmetries that makes this role so important after the recovery of risk sentiment in the real estate market will lead investment parties back to their actual objectives. "Monitoring as form of collecting information about the firms is useful only because the information that is collected has consequences for behavior and resource allocation in the relationship" (Hellwig (1991), p. 49). The explication of risk in real estate investment created high information asymmetries, that according to Leland/Pyle (1977), p. 371 may cause market failure. An the one hand, REIB will build up long term relationship with real estate investors to improve the investors quality by supporting his real estate portfolio management practices. On the other hand, it has to monitor and certify the quality as delegated monitor to the asset managers that act for

[34] Hellwig (1991), p. 45, „securitization allows further risk sharing"

the final lenders[36]. In consequence, REIB will match transactors, mange risk and transform the nature of claims, as Greenbaum/Thakor (1995), p. 48 describe the value creation of intermediaries. The intermediation role creates risk profiles that can be accepted as a loan by a bank or been securitized to place them in the capital market. Along this value chain, which is linked to the REIB role, the next points of interest are the activities the intermediaries engage in to fulfill their functions. (regulat. Env.??)

Illustration 2: Value steps and activities of real estate investment banking
Source: Armonat (2002)

Illustration 2 shows the value steps of the REIB role in mediating the capital supply and



demand in real estate markets according to Armonat (2002). At the capital demand pole is the position of real estate investors. The first step in value creation is the transparency over single investment projects. REIB activities in this field are mainly performance evaluation of single properties that are profitable because of economies of scale and economies of scope. Therefore the intermediaries perform market research and collect information. Investors can identify return risks of the property at this stage. One step

[35] We describe the improvements in the market with regard to the identified reasons for intermediation in section 2.
[36] Certification role of investmanet banks in the economy

further, investors achieve portfolio transparency. The intermediaries evaluate the risk situation of the total property holdings. Mergers & acquisitions, as well as trading takes place at this point to optimize the portfolio structure and adapt it to the expected environmental development. On the next level, REIB aims to reduce the operative risk. Real estate portfolio management activities create packages and integrate different partial holdings into the overall optimization considerations. Here the property-based risk pricing serves as a preparation of the risk transformation at the next stage. This stage reduces the financing cost to the real estate investor. All available information is disclosed and asymmetries are reduced to a minimum by describing the future states as contingent as possible. Here the actual transformation of risky elements and securitzation takes place. REIB intermediaries design new products for the capital markets and the investors to reduce investors' cost of finance and underwrite the created securities. Before the link from capital demand to capital supply is closed, the last value step is the gain from risk diversification by investing in a set of different risky securities that are independent from the risks specifics to an individual vehicle. Here intermediaries are responsible for the placement of securities in capital markets, arbitrage deals to close arbitrage gaps, trade execution, and finally brokerage under the market participants. At all steps intermediaries perform risk management, give advice and monitor the activities of the agents they interact with. Using REIB activities, institutions in the real estate market gain the opportunity to raise their efficiency. This is especially their pure technical efficiency, as they become able to price risks more accurately and in the context that is necessary in the decision situation. And with regard to the initial question of this study, banks can adjust to the regulatory influences of Basel II and raise their regulatory efficiency. If they introduce these functions or utilize some of these functions from other intermediaries in the market, they are able to better estimate their risk exposure. The underlying equity basis for real estate activities can be reduced and the amounts in real estate lending can increase when they know exactly how to handle and price real estate risks. At this point, the credit crunch could be overcome and banks have the ability to raise their lending volumes and apply the principles of Basel II correctly. The real estate investment market becomes more transparent and liquid when intermediaries perform optimal risk pricing. A new market structure with accurate risk pricing can prevent a market failure because of Basel II regulations.

5 Consequences for German real estate investment and Basel II

An empirical investigation of the investment behavior of German real estate investors proofs the reasons for a phenomenon that we call the German credit crunch. A similar shortage of capital in the US real estate market was identified in the early 1990s. One of the possible reasons for this event may have been the change in the regulatory environment. This analysis investigates the market environment in German real estate investment and links the imperfect market structures and the absence of intermediaries with the inability of the market participants to price real estate risks. Two propositions claim that mortgage banks hold high amounts of "bad credits" and that they are not able to price real estate risks according to the demands of the Basel II consultation papers. To issue debt on real estate, risk pricing is a key element. Theoretical considerations give two options to price these risks. One is property based, but the one favored in the literature is a market based financial asset pricing. Although real estate markets are even in theory considered as inefficient, asset allocation considerations rely on these methods. The empirical study proves that risk is underestimated in real estate investment. Investors and financing banks don't have the instruments to price risks and are not able to diversify property risks. In the focus of the investor is still the property and not the change of the adequacy to space demand. Therefore market-based asset pricing indicates wrong figures. The detailed results prove the propositions made.

To overcome the market failure and to enhance financing of real estate investment projects, accurate risk pricing is necessary. Direct property investment needs to be priced property related. Once the true property risks are identified, intermediaries can transfer the cash flows into tradable securities in liquid markets. At the moment, these intermediaries do not exist and their services are not available to overcome the market imperfections. We suggest the introduction of a real estate investment banking function to intermediate between capital supply and capital demand in real estate markets. The central function is the identification, pricing and the transfer of property investment risk. When this role that can be taken by existing intermediaries is completed successfully, real estate investors may receive finance according to their individual risk exposure. Asset managers who want to integrate diversified risk profiles will be enabled to buy different sorts of securities that they can diversify on market level. In this model, the intermediation function would close the gap between capital demand and capital supply. The result of the improved risk pricing and the reduction of information

inequalities would be improved capital flows and a better allocation of the capital in the economy. This is a way to overcome the credit crunch.

The discussion about Basel II was only the auslösendes (??) element for the credit crunch. It hit a market that would have failed anyway at a point in time because of its inefficient capital allocation. There is no economic reason why cheap capital should be allocated to investment projects that show such significant risky elements. A revision of Basel II would not change the restrictive loan policies that banks introduced for real estate finance. Market participants complain that credits will be short or very expensive for real estate projects. But not only the regulatory rules are responsible for this, also some economic implications ask for the pricing of sometimes highly risky projects. It is not surprising that the cry out was so loud in the real estate market. Risk had never been a topic in real estate investment. As we have demonstrated, investors do not have the means to evaluate the risks in their property portfolios.

This leaves some questions to the regulatory authorities. It is certain that the market of real estate finance can not be treated different from other capital markets. Risks have to be priced and the appropriate functions have to be demanded by the capital adequacy guidelines. It is not testable in what timeframe the real estate market is able to adapt to new risk valuation technologies. The transition period may cause some further shortage of capital to investment projects with all economic implications. Actions may be considered that establish risk pricing technologies and support the intermediaries in their role. If real estate investment vehicles are placed in capital markets, they need to rated by established agencies. This is the way the US real estate market took out of that crisis. But the direct property rating as performed in the US will not be transferable without difficulties to a market with a completely different structure. Regulation authorities will have to find measures that treat the risks according to market's needs. What these exactly are, should be the topic of some further research from this point. The present study identified the existence and the reasons for the credit crunch in Germany that is linked to a lack of risk pricing in real estate investment. It also gives indications for a future treatment of real estate risk and the institutions that could be concerned with the risk pricing that could be the basis for a further investigation of risk pricing regulation in German real estate investment in order to enhance real estate finance again.

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