

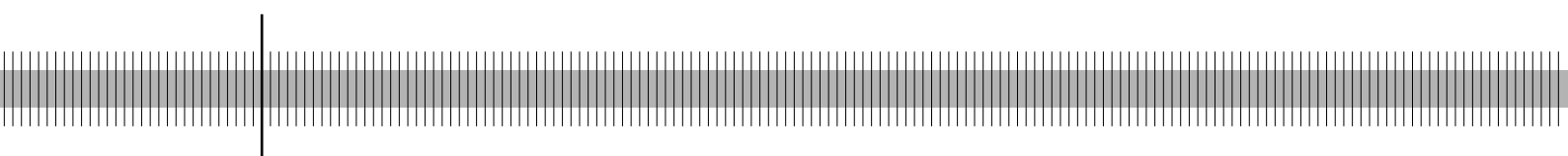
# **The dark and the bright side of liquidity risks: evidence from open-end real estate funds in Germany**

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## **Abstract**

We use a unique and comprehensive data set on open-end real estate funds in Germany to study a liquidity crisis that hit this industry between 2005 and 2006. Since this industry is comparably unregulated our data set permits us to contrast competing explanations of liquidity crisis. We find that fundamental factors matter for the liquidity outflow in normal times. During the crisis, however, they do not play a role. During the panic only strategic complementarities drive withdrawals. Furthermore, we find that funds with a higher load fee suffer from substantially larger outflows in the crisis period, while a higher load fee reduces gross outflows in normal times. As institutional investors predominately invest in funds with a low load fee this is in line with recent theory arguing that complementarities are mitigated by the involvement of large institutional investors who can at least partially correct for the coordination failure resulting from complementarities.

**Keyword** Liquidity Crisis, Runs, Strategic Complementarities

**JEL:** G11, G12, G14, G23

## Non-Technical Summary

The lack of liquidity, though not the origin, is at least an important amplifier of financial crises. Liquidity risks on the balance sheet of various financial intermediaries also played a crucial role in spreading the subprime crisis. As a consequence there are growing demands for a stronger regulation of liquidity risk, in particular for higher regulatory liquidity requirements for banks.

However, from an academic perspective it is far from clear whether a higher regulatory liquidity ratio is indeed preferable or not. One main perspective taken in the literature for instance argues that banking crises are mainly driven by bad fundamentals or bad performance of banks. Although banks' liquidity transformation increases the destabilizing effect of a bad performance, it is exactly this greater fragility which serves as an important device to discipline the bank management according to this view. Only the threat that a bad performance leads to massive liquidity outflows, to a crisis at the respective bank and ultimately to a job loss incentivizes the bank management to do the best they can to improve the bank's performance. A high regulatory liquidity holding undermines this threat and predominantly impairs banks' efficiency.

An opposing view suggests that a higher liquidity ratio can reduce destabilizing self-enforcing effects. The larger the liquidity transformation of a financial intermediary (the more illiquid and long-term the assets relative to the liabilities) the larger the fear of investors that the long-term return of their claims is reduced by a large scale withdrawal by other investors. Accordingly, if investors expect massive withdrawals by others, they have a strong incentive to withdraw their funds themselves. The expectations of a (liquidity) crisis become self-fulfilling. A higher liquidity ratio contains these self-enforcing crisis moments and fosters funds' stability.

This paper tries to assess the explanatory power of these two contrasting views. In doing so it analyzes the liquidity stance of German open-end real estate funds. Compared to banks these financial intermediaries are far less regulated. Therefore, they are much better suited to identify and study the described mechanisms. Even though they are less regulated open-end real estate funds perform a liquidity transformation which is very similar to those of banks: They guarantee the redemption of

shares of any volume at a price which reflects the discounted expected earnings and not the market value of their assets and which adapts only staggeringly to changing market conditions. Thus while funds' assets - predominantly commercial real estate - are fairly illiquid, their liabilities are very liquid.

The present paper uses a unique data set that contains balance sheet information, performance and liquidity status on an individual fund basis from mid 1993 to mid 2007. It therefore also comprises the turn of the year 2005 to 2006 in which the open-end fund industry was suffering from a severe credibility crisis which led to massive liquidity outflows. This permits us to also study to what extent the relative importance of the two mechanisms shifts from non-crisis to crisis times. Thus we can analyze whether poor performance or expected withdrawals of other investors were more important for liquidity outflows in crisis or in non-crisis periods.

Our results show that in non-crisis periods a fund's outflows are driven by both its past performance and its liquidity ratios. Thus in tranquil periods both mechanisms play a role: By withdrawing their funds in response to bad past performance investors discipline on the one hand fund managers since managers remuneration declines as the fund volume drops. Furthermore, a declining liquidity ratio increases the likelihood of a future closure of the fund together with a job loss of the manager. On the other hand liquidity outflow is particularly high at funds with a low liquidity ratio. This suggests that investors tend to redeem their shares at funds with a low liquidity ratio if they expect or observe a given liquidity outflow. In the crisis period, however only the latter effect remains significant. During the panic investors only responded to the threat of a liquidity shortage of their funds resulting expected withdrawals. They did not respond to past performance in that phase. Consequently, our results suggest that a higher regulatory liquidity ratio would increase crisis resilience of open-end real estate funds without undermining essential disciplining mechanisms of the fund management. The disciplining of the management through investors withdrawals is mainly ensured in non-crises periods and does not work through the threat of a liquidity driven fund closure.

A further important result of the present study relates to load fees in channeling liquidity outflows. We find that in non-crisis periods a higher load fee results in lower liquidity outflows. This seems to be in line with intuition, since the load

fee has a fixed cost character. A fund with a lower load fee should therefore attract predominantly investors with a shorter investment horizon which implies that holding the fund's volume constant gross outflows must be larger at any point in time. However, in the crisis period we find a strong positive relation between the load fee and fund gross outflows. This could reflect the involvement of institutional investors in German open-end real estate funds. In particular during the low interest rate phase prior to our crisis period institutional investors used open-end real estate funds to park liquidity at a comparably high yield. Given their relative short investment horizon they likely invested predominately in funds that charged a low load fee. Thus our positive relation between the load fee and the gross outflows in the crisis period could be seen as an indicator for a stabilizing role of institutional investors. This would be in line with recent theoretical findings which argue that large institutional investors are less driven by expectations of the withdrawing decisions of other investors and therefore help contain self-enforcing crisis effects.

## Nichttechnische Zusammenfassung

Liquiditätsrisiken sind, wenn nicht als Ausgangspunkt, so doch zumindest als Verstärkungseffekt für Finanzkrisen von zentraler Bedeutung. Auch für die Ausbreitung der Subprimekrise war das Liquiditätsrisiko verschiedenster Finanzintermediäre entscheidend. Daher wurden in Folge der weltweiten Wirtschafts- und Finanzkrise verschiedentlich Forderungen nach einer stärkeren Regulierung der Liquiditätsrisiken und insbesondere nach einer höheren regulatorischen Liquiditätshaltung seitens der Banken laut.

Aus wissenschaftlicher Sicht ist es allerdings alles andere als eindeutig, ob tatsächlich eine höhere geforderte Liquiditätsquote für Banken sinnvoll ist. Eine der wesentlichen Stoßrichtungen der Literatur zeigt beispielsweise, dass Banken Krisen vor allem durch eine schlechte Ertragslage bedingt werden. Eine Liquiditätstransformation führt dieser Denkrichtung zu Folge zwar zu einer stärkeren Destabilisierung im Falle einer schlechten Rentabilität, diese ist aber als Disziplinierungsinstrument gegenüber dem Bankmanagement elementar. Nur die Angst, dass eine schlechte Ertragsentwicklung zu massivem Liquiditätsabfluss, zu einer Krise der Bank und damit letztlich u.U. zum Jobverlust führt, stellt sicher, dass das Management auch alles tut, um eine gute Ertragsentwicklung zu garantieren. Eine höhere Liquiditätsquote unterminiert diesen Effekt und führt demnach vor allem zu ineffizienteren Banken.

Eine konträre Sichtweise legt dagegen nahe, dass eine höhere Liquiditätsquote destabilisierende und sich selbst verstärkende Effekte eindämmen kann. Je höher die Liquiditätstransformation eines Finanzintermediärs (je illiquider/langfristiger seine Vermögenswerte relativ zu seinen Verbindlichkeiten) umso größer die Angst der Investoren, dass die langfristigen Erträge ihrer Titel durch den frühzeitigen Abzug von Mitteln durch andere Investoren beeinträchtigt werden. Befürchten Investoren demnach einen massiven Mittelabzug, so haben sie selbst auch ein Anreiz ihre Mittel zurück zu fordern. Die Erwartungen einer (Liquiditäts-) Krise werden demnach sich selbsterfüllend. Eine höhere Liquiditätsquote kann diese sich selbst verstärkenden Momente einer Krise eindämmen und so zur Stabilisierung beitragen.

Das vorliegende Papier versucht den Erklärungsgehalt dieser beiden konträren Sichtweisen empirisch abzuwägen. Dabei analysiert es nicht die Liquiditätssituation

von Banken, sondern untersucht den Liquiditätsabfluss offener Immobilienfonds in Deutschland. Im Gegensatz zu Banken sind diese Finanzintermediäre weit weniger reguliert, so dass die Wirkungsweise der beschriebenen Mechanismen besser nachvollzogen werden kann. Darüber hinaus weisen offene Immobilienfonds aber eine ähnliche Liquiditätstransformation wie Banken auf: Sie garantieren die jederzeitige Rücknahme von Anteilscheinen in jeder Höhe zu einem Preis, der den Ertragswert und nicht den Marktwert der Assets reflektiert und der sich nur verzögert an veränderte Marktsituationen anpasst. D.h., die Verbindlichkeiten der Fonds sind sehr liquide, während die Aktivseite mit Gewerbeimmobilien weitgehend illiquide ist.

Die Untersuchung baut auf einem einzigartigen Datensatz auf, der die Bilanz, Liquiditätssituation und Ertragslage jedes einzelnen deutschen offenen Immobilienfonds von Mitte 1993 bis Mitte 2007 umfasst. Er schließt damit auch die Phase einer massiven Vertrauenskrise ein, die um die Jahreswende 2005/2006 zu massiven Liquiditätsabflüssen aus diesem Fondsegment führte. Dies erlaubt es uns, auch zu untersuchen, wie bedeutsam die beiden Mechanismen in Krisen- und Nichtkrisenperioden sind d.h. inwieweit schlechte Ertragsentwicklung oder erwartete Mittelabzüge anderer Investoren für die Mittelabflüsse in Krisen- relativ zu Nichtkrisenphasen verantwortlich sind.

Die Ergebnisse zeigen, dass der Mittelabfluss in Nichtkrisenphasen, sowohl von der vergangenen Ertragsentwicklung als auch von der Liquiditätsausstattung des jeweiligen Fonds abhängt. Demnach spielen in ruhigeren Perioden beide Effekte eine Rolle: Indem sie mit Mittelabzügen auf eine schlechte Ertragsentwicklung reagieren, disziplinieren Anleger einerseits das Fondmanagement: Bei einem geringen Fondvolumen sinkt die volumenabhängige Vergütungskomponente. Außerdem könnte durch rückläufige Liquidität, eine Schließung und damit ein Jobverlust wahrscheinlicher werden. Andererseits ist aber der Mittelabfluss bei Fonds mit geringer Liquiditätsausstattung besonders hoch. Dies deutet darauf hin, dass Anleger bei einem Fond mit geringer Liquiditätsausstattung eher ihre Anteile zurückgeben, wenn sie einen Mittelabfluss beobachten bzw. erwarten. In der Krisenphase geht dagegen nur von der Liquiditätsausstattung ein signifikanter Effekt auf den Mittelabfluss aus. Während der Panik scheinen Anleger in ihrem Abzugsverhalten alleine auf eine mögliche Illiquidität infolge der erwarteten Abflüsse reagiert zu haben und nicht nach der



vergangen Ertragsentwicklung der Fonds differenziert zu haben. Unsere Ergebnisse zeigen somit, dass eine höhere regulatorische Liquiditätsquote die offenen Immobilienfonds krisenfester macht, ohne essentielle Disziplinierungsmechanismen gegenüber dem Fondmanagement auszuhebeln. Die Disziplinierung des Managements über das Abzugsverhalten, scheint vor allem in Nichtkrisenperioden eine Rolle zu spielen und hier nicht über die illiquiditätsbedingte Fondschließung zu wirken.

Ein weiteres interessantes Ergebnis der vorliegenden Studie bezieht sich auf den Ausgabeaufschlag und dessen Effekt auf die Mittelabflüsse. In Nichtkrisenphasen geht ein höherer Ausgabeaufschlag mit geringen Mittelabflüssen einher. Da der Ausgabeaufschlag einen Fixkostencharakter hat, erscheint es auch logisch, dass ein Fond mit geringerem Aufschlag insbesondere Investoren mit kürzerfristigem Investitionshorizont attrahiert und somit bei gleichem Volumen zu jedem Zeitpunkt höhere Abflüsse hat. Interessanterweise ist aber in der Krisenphase der Zusammenhang signifikant positiv: Mit höherem Ausgabeaufschlag steigt der Mittelabfluss. Dies könnte auf den Einfluss institutioneller Investoren zurückzuführen sein. Diese parkten wohl gerade in der Niedrigzinsphase vor der Krisenperiode umfangreich Liquidität in offenen Immobilienfonds. Aufgrund ihres eher kurzfristigen Anlagehorizonts dürften sie dabei eher Fonds mit geringem Ausgabeaufschlag bevorzugt haben. Insofern würde der positive Zusammenhang zwischen Ausgabeaufschlag und Mittelabfluss auf eine stabilisierende Rolle institutioneller Investoren hinweisen und damit jüngste theoretische Ansätze bestätigen. Diese argumentieren, dass große institutionelle Investoren weniger vom Verhalten der anderen Fondsigner und ihren Erwartung hierüber getrieben sind und somit sich selbst verstärkende Kriseneffekte eindämmen.



# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>Related Literature</b>	<b>4</b>
<b>3</b>	<b>Background on open end real estate funds in Germany and the 2005/2006 crisis</b>	<b>7</b>
<b>4</b>	<b>The Data</b>	<b>10</b>
<b>5</b>	<b>Regression Analysis</b>	<b>12</b>
<b>6</b>	<b>Results</b>	<b>14</b>
<b>7</b>	<b>Conclusion</b>	<b>18</b>

## List of Tables

1	Summary Statistics of Key Variables . . . . .	12
2	Fixed Effects Estimation for Outflows: Pre-Crisis Period, Monthly Data from May 1993 to November 2005 . . . . .	24
3	Fixed Effects Estimation for Outflows: Crisis Period, Daily Data from 15th of December 2005 to 31st of May 2006 . . . . .	25
4	Fixed Effects Estimation for Outflows: Post Crisis Period, Daily Data from 1st of June 2006 to 27th of June 2007 . . . . .	26
5	Correlation Matrix for Monthly Data, May 1993 to June 2008 . . . . .	27

## List of Figures

1	Open Real-Estate Funds: Volume in bill. of Euro (rhs) and y-o-y Return in Percent (lhs), 1993-2007 . . . . .	8
2	Open Real-Estate Funds: Monthly Flows in % of Fund Volume, 1993- 2007 . . . . .	9
3	Open Real-Estate Funds: Daily Flows in mill. of Euro, 15th of Dec.2005 to 27th of June 2007 . . . . .	10

# The dark and the bright side of liquidity risks: Evidence from open-end real estate funds in Germany <sup>1</sup>

## 1 Introduction

The ongoing financial crisis has put the regulation of liquidity risks in the focus of the debate about a new financial architecture. However, there are two opposing views on the origin of financial crises which lead to two contrasting perceptions of liquidity risks. According to the fundamental view banking crises are triggered by low asset returns.<sup>2</sup> Responding to bad performance by massive withdrawals depositors exert control over the bank management. Therefore this view emphasizes the bright side of liquidity mismatch: It is an important incentive device.<sup>3</sup> In contrast, following the panic view the crises of financial institutions result from strategic complementarities that arise from the liquidity mismatch. If the assets of a financial institution are less liquid than their liabilities, investors prefer to withdraw their funds prematurely or refuse to rollover short-term claims if they expect other investors to do the same.<sup>4</sup> Thus liquidity risk also has a dark side in that it generates a self-enforcing momentum to banking crisis that can also lead to the failure of solvent banks.

Understanding the relative importance of these two views is crucial because they have opposing implications for regulation. While a binding regulatory liquidity holding would undermine the disciplinary role of the liquidity transformation, it would clearly contain the self-enforcing momentum of crisis and reduce the risk of inefficient liquidations of banks.

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<sup>1</sup>Falko Fecht (falko.fecht@ebs.edu) and Michael Wedow (michael.wedow@bundesbank.de). We are grateful to Itay Goldstein and Marcel Tyrell for helpful comments and suggestions. We thank Michael Halling and participants for comments received at the FMA 2008 meeting. The paper represents the authors' personal opinions and not necessarily those of the Deutsche Bundesbank. All remaining errors are of course our own.

<sup>2</sup>Theoretical models taking this perspective are, for instance, Gorton (1985) and Allen and Gale (1998). Empirical studies suggesting that banking crises are driven by business cycle downturns are Gorton (1998) and Calomiris and Mason (1997).

<sup>3</sup>This argument is modeled, for instance, in Calomiris and Kahn (1991) and Diamond and Rajan (2001).

<sup>4</sup>This is the view taken in the classical work by Bryant (1980) and Diamond and Dybvig (1983).

In this paper we therefore try to assess the relative importance of these two views by studying their respective explanatory power for a crisis that hit the German open end real estate fund industry by the end of 2005 and in the early 2006. During this crisis the instability of one fund spread to the whole industry and lead to massive liquidity outflows. Open end real estate funds are relatively unregulated in Germany but nevertheless provide a significant liquidity transformation. Thus compared to studies that focus on the relatively regulated banking sector this crisis episode in Germany is much better suited to tell apart the two opposing views.<sup>5</sup> Our data set comprises detailed balance sheet information for each individual German fund, its returns, the fees charged, and its liquidity outflow before, during, and after the crisis.

Our results show that investors' withdrawal decisions are driven by past returns before and to some extent also directly after the crisis. However, past performance does not have any explanatory power for the liquidity outflows during the crisis. This suggests that during the crisis investors did not differentiate between well and badly managed funds. Investors did not use their withdrawal decision to exert control over the fund management. On the contrary, the sizeable explanatory power of funds' liquidity for their outflows in particular during the crisis suggests that investors more or less only responded in the crisis to strategic complementarities. Thus while in more tranquil periods withdrawals might fulfill their disciplinary role and complementarities are of minor importance, during the crisis the self-enforcing elements put forward by the panic view seem to be prevailing. This suggests that there are significant non-linearities involved in the role of complementarities and that studies that try to assess the importance of complementarities during tranquil times might be misleading.<sup>6</sup>

This view is also supported by our results on the impact of the regional scope of the funds. The troubled fund that triggered the crisis was only invested in German real estate. Furthermore, the ailing German economy depressed German real estate investment returns by that time. However, our results indicate that during the crisis

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<sup>5</sup>For a recent study that tries to assess the disciplinary role of demand deposits in banking see Martinez Peria and Schmukler (2001)

<sup>6</sup>See Chen et al. (2007) for a recent study that assesses the role of complementarities in the U.S. mutual fund market during normal times.

outflows of funds that were only invested in Germany did not significantly vary from outflows at internationally invested funds based in Germany. This suggests that the investors' run was not simply a response to revised expectations about future returns.<sup>7</sup>

A further interesting result concerns the role of load fees. Since load fees have fixed cost character one would expect that investors are willing to pay higher load fee the longer their investment horizon. For the pre-crisis period as well as for the post-crisis period we find that indeed gross outflows are smaller the larger the load fee suggesting that indeed the average investment horizon of investors is larger the larger the load fee. However, during the crisis period we find a strong positive effect of the load fee on outflows. Thus larger load fees and longer average investment horizons do not keep investors from running. Quite the contrary, investors with shorter investment horizons seem to have a stabilizing effect. This might be related to the role of large investors in panics and the fact that institutional investors used on a large scale open end real estate funds to park liquidity. As shown in recent theoretical work by Corsetti et al. (2001) and Bannier (2005) large investors internalize part of the complementarities and therefore respond less to their expectations about the behavior of other investors. Thus instead of herding they react more on fundamentals and thereby limit the destabilizing effect of strategic complementarities. Consequently, if institutional investors had relatively short investment horizons (because they only wanted to park liquidity) they likely preferred those funds with low load fees. This in turn stabilized those funds' outflows during the panic. In order to find more evidence for this reasoning, we also use some low frequency data on the investor structure of the individual real estate funds. However, here we do not find any systematic influence of the fraction of fund shares held by retail investors and outflows.

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<sup>7</sup>This also means that we do not find evidence for the informational contagion put forward by Chari and Jagannathan (1988) and Chen (1999).

## 2 Related Literature

Our paper is related to several strands of the literature. Most importantly, as already discussed in the introduction our paper contributes to the debate about the origins of financial crises. It tries to shed some light on the explanatory power of the two opposing views: the fundamental view and the panic view on financial crisis as contrasted, for instance, in Allen and Gale (2007).

The main theoretical contribution modeling the fundamental view is Allen and Gale (1998) who argue that bank runs are a result of weakened banks' return on assets in a business cycle downturn. This view is supported by the empirical study of Gorton (1998) who finds that historically bank runs are predictable using business cycle data. Calomiris and Mason (1997) find empirical support that individual bank failures were strongly correlated with bad aggregate and individual fundamentals during the great depression. Our paper contrasts with their results since we do not find any evidence that fundamentals help explain the massive withdrawals of funds in the crisis. Neither past performance nor geographical investment scope seems to have an influence on investors' withdrawal decision. From that perspective our paper also tests the theoretical arguments put forward by Chari and Jagannathan (1988) and Chen (1999) who argue that a run results if investors update their return expectations of their bank when observing another bank with a similar portfolio failing. In the case of the German open end real estate funds the fund that initially failed was only invested in Germany. However, investors ran also on those funds that were globally or Europe wide invested.

These results are also related to Calomiris and Kahn (1991) and Diamond and Rajan (2001). They argue that the liquidity risk generated by the maturity transformation serves as a disciplinary device. The threat of a run is necessary to ensure that managers of financial institutions behave and contribute to a high return. But even though managers might behave in equilibrium, bad luck might lead to low returns which trigger a run. Given that we do not find any significant influence of fundamental factors on the cross-sectional distribution of liquidity outflows, our results do not confirm the view that panics are a measure to exert control. Investors in German open end real estate funds did not differentiate between funds



according to their past performance during the crisis. However, in more tranquil periods investors respond significantly to past performance. Thus to that end our paper confirms the findings of a vast literature that indicates that open-end mutual fund investors use past performance as a screening and monitoring device for fund managers. Ippolito (1992), Gruber (1996) and Sirri and Tufano (1998), for example, find evidence that mutual fund flows are positively related to past performance. At the same time, though, Edelen (1999) finds evidence that unexpected flows force fund managers into detrimental liquidity trades and impair funds' performance.<sup>8</sup>

The panic view which goes back to the path breaking work by Bryant (1980) and Diamond and Dybvig (1983) emphasizes that strategic complementarities between the withdrawal decision of depositors arises because the withdrawal of other depositors reduces the expected repayment that a single depositor can realize if he refrains from withdrawing. These complementarities in depositors' strategies can generate a coordination failure and lead to a bank run. The problem with this multiple equilibria view is that the crises are completely unrelated to economic fundamentals. The literature on global games following Carlsson and van Damme (1993) and Morris and Shin (1998) shows that the multiplicity of equilibria does not occur when investors have slightly heterogenous beliefs about economic fundamentals while strategic complementarities still prevail. Goldstein and Pauzner (2005) apply this approach to depository institutions and find that due to the strategic complementarities among depositors marginal changes in fundamentals can lead to a panic and to a sudden increase in withdrawals. Using the liquidity ratio and the interaction between the liquidity ratio and the past performance as explanatory variables for the outflows permits us to study the role that these strategic complementarities played in the crisis. If a fund has a high liquidity ratio even large redemptions by investors (triggered by the crisis of other funds or by deteriorating past performance) do not necessarily have a negative effect on the future redemption rate. From this perspective our paper is also related to the empirical work by Chen et al. (2007). Using US mutual funds data they show that indeed the liquidity outflows are more sensitive to bad performance in funds that hold less liquid assets. In contrast to our

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<sup>8</sup>The results by Jank and Wedow (2008) also confirm that performance drives flows into funds but that enhancing performance may also make funds more vulnerable when market liquidity dries up.

paper, the period they study is a relatively tranquil period without any substantial turmoil in asset markets. But by their very nature strategic complementarities are more important in periods of crises such as the one considered in our paper. And our results show indeed that studying complementarities during tranquil periods does not provide a full picture of their importance. While complementarities seem to amplify withdrawals in response to bad performance in non-crises periods, the purely self-enforcing mechanisms are much more important during crises.

One way to contain the liquidity risk and its adverse effect on funds' performance is to charge a high load fee and thereby attract rather long-term oriented investors. This argument has been formally modeled, for instance, by Nanda et al. (2000). Similar to our results Chordia (1996) finds that indeed load fees dissuade investors with large liquidity risks from short-term investment and redemption. However, an issue that has not been addressed in the literature so far is, to what extent these mechanisms still work during panics, i.e. whether investors still care about the paid load fee during panics or whether investors with different investment horizon respond differently if they anticipate large scale redemptions of other investors with its negative effect on performance.

The application of global games to financial crisis has also shown that complementarities and the resulting amplification of crises can be mitigated by large investors. Given their larger average size institutional investors know that it is likely that their decision is pivotal for the default of the financial institution. Thus they tend to internalize the implication of their own decision, do not rely too much on their expectations about the decision of others and therefore contribute to more resilient financial institutions. This was first pointed out by Corsetti et al. (2001) in the context of currency crises.<sup>9</sup> Chen et al. (2007) present a formal model of this argument for mutual funds and test it for US open end mutual funds. They find that funds primarily held by institutional investors suffer less from effects induced by complementarities than mutual funds. While our direct low frequency measure of the share of institutional investors does not indicate any significant effect on outflows during the crisis, the impact of the load fee might actually capture this effect. Related is also the study of Del Guercio and Tkac (2002) and James and Karceski

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<sup>9</sup>See also Bannier (2005) for the role of informational advantages of institutional investors in this reasoning.

(2006) who show that the involvement of institutional investors seems to contribute to a better screening and monitoring of mutual funds. Funds with a larger share held by institutional investors tend to perform better.

The remainder of the paper is organized as follows: Section 3 presents a short institutional description of the German open end real estate fund industry and gives some background information on the crisis. In section 4 we describe our data set and in section 5 our estimation approach. Section 6 gives the results and section 7 draws some conclusions.

### **3 Background on open end real estate funds in Germany and the 2005/2006 crisis**

Open-end real estate funds are the most important retail investment vehicle for real estate in Germany.<sup>10</sup> In 2007 these funds managed in total about 85 bn Euro which amounted to roughly 10% of German investment funds' assets.

Compared with other retail financial institutions open-end real estate funds are relatively unregulated.<sup>11</sup> Open-end real estate funds are obliged to hold between 5% and 49% of their assets in liquid reserves, i.e. cash and securities. When liquid reserves drop below 5% the management of the fund has the option to suspend redemption. During this period the fund has to obtain additional resources by liquidating some assets or by increasing his debt ratio. To do so the fund can suspend redemption up to two years. However, up to 2005 no fund ever had to resort to this measure. The book value of the real estate held by funds is assessed by external experts once a year based on the expected future return on these assets. To avoid large jumps in the book value a 12th of the real estate is evaluated every month. Together with liquid reserves these book values are the basis for the quoted redemption price.

While in most other countries open-end real estate funds disappeared, often as a

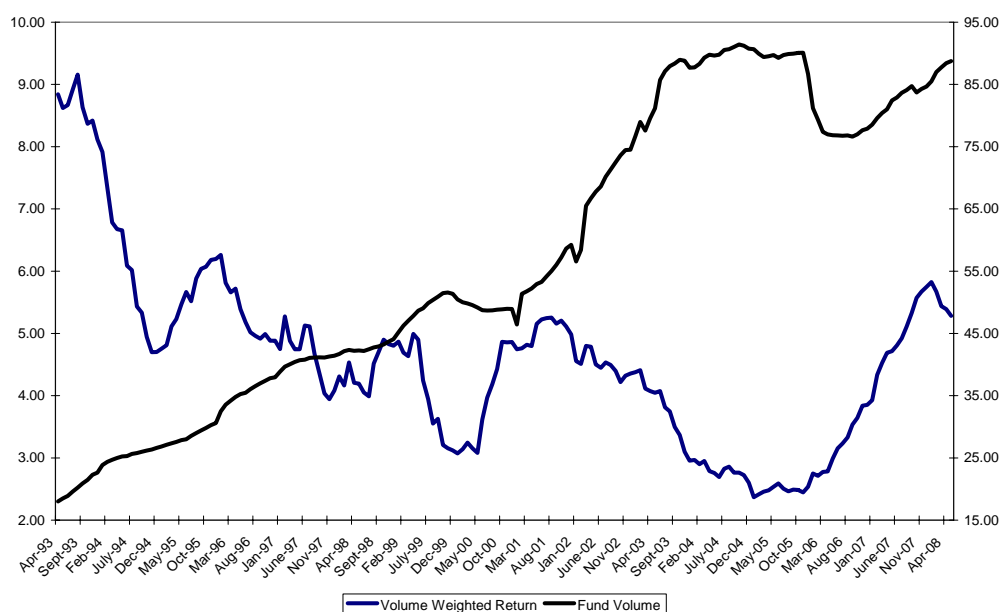
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<sup>10</sup>This section gives only a brief overview of the institutional background and of the crisis. For a more detailed description see Bannier et al. (2008).

<sup>11</sup>See Maurer et al. (2004) for a more detailed account of role, legal environment and financial characteristics of open-end real estate funds.

consequence of severe crises, they are still quite successful in Germany. Between 1993 and 2003 capital invested in these fund more than quintupled, whereby particularly in the aftermath of the stock market downturn in 2001 large amounts of capital flew into open-end real estate funds (see Figure 1). However, starting in 2004 fund volumes stagnated. At the same time the anyway rather low but very stable returns of these funds reached a historical low and continued to decline. Withdrawal of funds at individual open-end real estate funds started and triggered a liquidity shortage, for instance, at the fund managed by the investment company owned by DekaBank, HypoVereinsbank, and Commerzbank. In all cases, however, the banks stepped in and provided liquidity often by buying up shares or real estate from their respective funds.

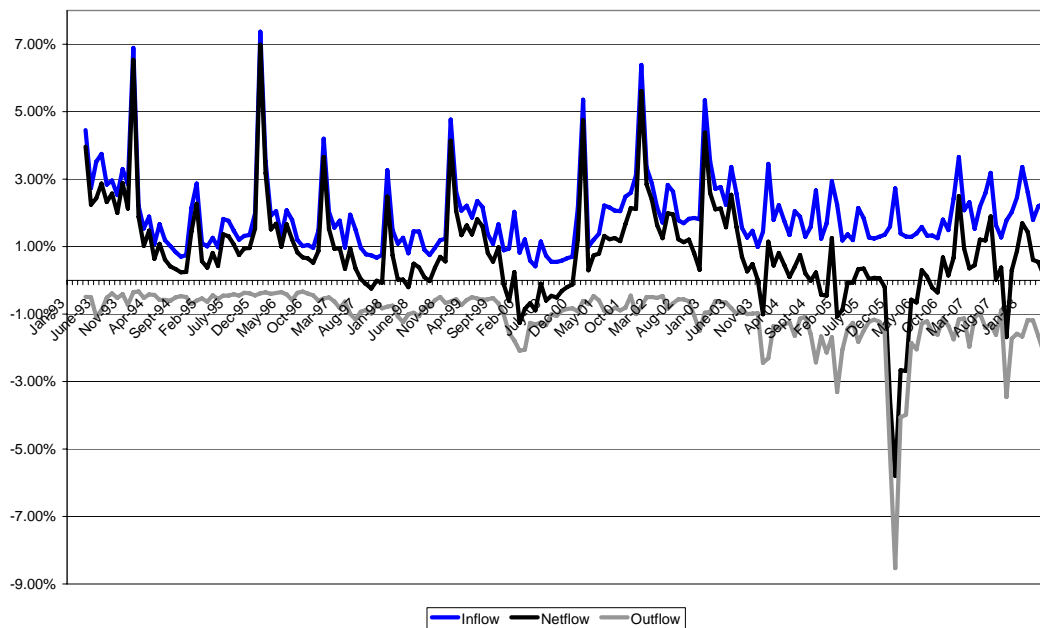
Figure 1: Open Real-Estate Funds: Volume in bill. of Euro (rhs) and y-o-y Return in Percent (lhs), 1993-2007



On December 11, 2005, Deutsche Bank announced that an unscheduled reevaluation of its biggest (\$7.2 billion) real estate fund, Grundbesitz Invest, was unavoidable

and would very likely lead to a devaluation of the redemption price. This led to a dramatic withdrawal of funds not only from Grundbesitz Invest but also from most other German open-end real estate funds. At Grundbesitz Invest this run absorbed most of the fund's liquidity. Since Deutsche Bank refused to provide additional liquidity, redemption had to be suspended on 13th of December, 2005. Yet the dramatic liquidity outflow continued at other funds (see figure 2).

Figure 2: Open Real-Estate Funds: Monthly Flows in % of Fund Volume, 1993-2007

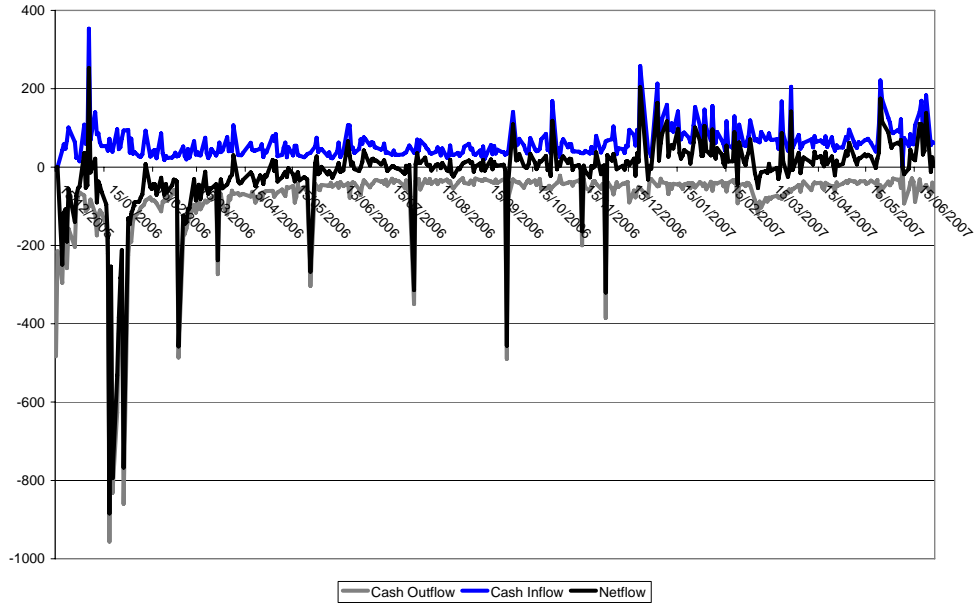


On January, 17th and 19th two additional funds managed by investment company KanAm had to be closed after a rating agency set their recommendation on *sell*.<sup>12</sup> Given the already alarmed investors the sell recommendation accelerated the liquidity outflow leading ultimately to the closure of the two funds and a renewed upsurge of outflows in other funds (see in particular figure 3). The following

<sup>12</sup>The decision of the rating agency was primarily based on a link of the investment company with a partner in the US which the rating agency argued would trigger a run on the fund and thus the suspension of convertibility.

months saw a decline in aggregate outflows which were only shortly interrupted by the reopening of the 3 previously closed funds.<sup>13</sup> Net flows again turned positive by around June 2006 and have since largely remained on this shore.

Figure 3: Open Real-Estate Funds: Daily Flows in mill. of Euro, 15th of Dec.2005 to 27th of June 2007



## 4 The Data

The data used in the analysis comes from three different data bases of the Bundesbank which each offer a different observation frequency. First, our data set contains daily data on the the liquidity status of each individual open-end real estate fund in Germany. This daily data was collected as a consequence of the ongoing difficulties of the German open-end real estate funds at the end of 2005. The data comprise

<sup>13</sup>DB Grundbesitz Invest restarted redemption of shares on the 3rd of March, KanAm Grundinvest on the 31th of March and KanAm US-Grundinvest on the 13th of April. Further peaks in Figure 3 are due to sales of shares by banks which supported funds.

384 trading days from the 15th of December 2005 until the 27th of June 2007. The information therein includes in- and outflows as well as the liquidity position of 33 up to 39 funds.<sup>14</sup> The number of reporting funds varies given that three funds were temporarily closed down during the crisis and because five additional funds started reporting which were issued in the second half of 2006.

Second, the Bundesbank collects monthly data on a range of balance sheet items for real estate funds covering also information on the *Load Fee*, *Debt*, *Liquidity* and *Size* of each fund.<sup>15</sup> We use this data in our analysis of the pre-crisis period. The data also contains a 12-month rolling *Return* for each fund adjusted for dividends and net of management fee. This relatively large rolling window appears warranted given the large persistence of returns.<sup>16</sup>

Third, data on the involvement of households measured by the percentage of total outstanding shares held by households on a quarterly basis are added. This data is covered by the variable *Private*.

Finally, we add variables containing information on the geographic focus and age in years for each fund. The geographic focus is given by a dummy variable equal to 1 if a fund's majority of investments is located in Germany. A further dummy (*Non-Retail*) was added for funds that are not truly mutual funds. A number of mutual funds have high minimum investment requirements or are only accessible for certain types of institutional investors. We therefore include a dummy for *Non-Retail Fund* equal to one if a fund stipulates such requirements which limit the accessibility by retail investors.

Table 1 contains summary statistics for key variables and Table 5 the correlation matrix.

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<sup>14</sup>The *outflow* of funds is given by the value of actual share redemptions and excludes dividend payments. This is particularly important for open real estate funds since that they are obliged by law to pay out 90 % of any capital gains.

<sup>15</sup>The load fee is calculated on the basis of the difference between issue and redemption price and is expressed as a ratio over the redemption price. In the empirical analysis, we use the load fee lagged by one month.

<sup>16</sup>Calculation is based on the Bundesverband Investment and Asset Management e.V (BVI).

Table 1: Summary Statistics of Key Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
<b>Quarterly Data: 2005Q4 to 2007Q1</b>					
<i>Private Investors</i>	235	0.45	0.35	0.00	0.96
<b>Monthly Data: May 1993 to June 2008</b>					
<i>Outflow Ratio</i>	3365	1.4%	3.1%	0.0%	84.3%
<i>12-month Return</i>	3365	4.7%	1.9%	-0.6%	16.6%
<i>Liquidity Ratio</i>	3365	32.3%	14.7%	2.2%	100.0%
<i>Debt Ratio</i>	3365	12.8%	12.5%	0.0%	89.6%
<i>Load Fee</i>	3365	4.9%	1.0%	0.0%	12.7%
<i>Age</i>	3365	17.6	13.2	1.0	45.0
<i>Geo.Focus</i>	3365	0.42	0.49	0.00	1.00
<i>Non-Retail Funds</i>	3365	0.10	0.30	0.00	1.00
<b>Daily Data: 15th of Dec. 2005 to 27th of June 2007</b>					
<i>Outflow Ratio</i>	7970	0.1%	0.5%	0.0%	22.4%
<i>Liquidity Ratio</i>	7937	24.4%	12.9%	0.0%	100.0%
<i>Netflow Ratio</i>	7947	0.0%	0.6%	-22.2%	12.4%

Private Investors is the share of private investors in a fund. Outflow (Netflow) ratio is the absolute outflow (netflow) over the volume of the fund. The 12-month return is a 12-month rolling return for any given month. The liquidity ratio is given by the ratio of liquid assets over the volume of the fund. The debt ratio is given by total debt over the volume of the fund. The load fee is the difference between issue and redemption price as a ratio of the redemption price. Age is given in years since establishment of the fund. Geo. Focus is a dummy equal to one if a fund's assets are predominantly located in Germany. Non-retail fund is a dummy equal to one if a fund has investor restrictions in place.

## 5 Regression Analysis

Since we are interested in explaining the relative liquidity shock of the open-end real estate funds we use as endogenous variable the Euro value of outflow of each fund divided by its size, i.e. its balance sheet total in Euro. We also normalize the liquidity and the debt of each fund by dividing it by the size of the respective fund to get the liquidity and debt *ratio*. Return is given by the rolling 12-month return and measured in per cent. The load fee is calculated as the difference between the issue and redemption price and is given as ratio over the redemption price. In order to avoid any bias as result of endogeneity we use lagged values for all our right hand side variables.

We estimate the gross outflows separately for the pre-crisis, crisis, and post-crisis period. We do so for two reasons: Firstly, studying the different periods separately allows us to see whether investors' motives for withdrawing their funds varies between crises and non-crises times. In particular this permits us to study whether complementarities become more severe in crises periods. Secondly, the crisis



lasted only five months. Thus using monthly data does not allow us to develop a detailed picture of the crisis period. Using the daily data we are able to give a much more clear cut analysis of the crisis. However, using data at different frequencies for the different periods apparently limits the comparability of the results across periods.

Consequently, for the pre-crisis period for which we dispose only of monthly data we estimate the following equation:

$$\frac{Outflow_{i,m}}{Size_{i,m}} = \alpha + \beta_1 Return_{i,m-1} + \beta_2 \frac{Liquidity_{i,m-1}}{Size_{i,m}} + \beta_3 \frac{Debt_{i,m-1}}{Size_{i,m}} + \beta_4 Load Fee_{i,m-1} + \dots + \epsilon_{i,m}. \quad (1)$$

We try to explain the relative outflow of fund  $i$  in month  $m$  by fund  $i$ 's past return, liquidity ratio, and load fee etc. in that respective month.

For the crisis and post-crisis period we have daily data available. For those two periods our specification is

$$\frac{Outflow_{i,t}}{Size_{i,m}} = \alpha + \beta_1 Return_{i,m-1} + \beta_2 \frac{Liquidity_{i,t-1}}{Size_{i,m}} + \beta_3 \frac{Debt_{i,m-1}}{Size_{i,m}} + \beta_4 Load Fee_{i,m-1} + \dots + \epsilon_{i,t}. \quad (2)$$

where *Outflow* and *Liquidity* is given for each fund  $i$  on day  $t$ . *Return*, *Debt* and *Load Fee* are also for these periods given at a monthly frequency.  $\epsilon$  represents the error term, where we assume  $\epsilon_{i,t} \sim \text{iid}(0, \sigma_\epsilon^2)$ , is independent. We focus on outflows instead of net flows for three reasons. First, from the theoretical perspective complementarities are relevant for outflows only. Secondly, as Figure 2 shows the behavior of in- and outflows differ widely. Third and related there is the potential that banks provided support to open-end real estate funds thus leading to a bias in actual flows.

We primarily rely on the fixed effects estimator since this estimator will be consistent in the presence of any correlation between the explanatory variables and the fixed effect but also show the results for the random effects estimator. Irrespective of the estimator the direction of the effects remain largely unchanged.

## 6 Results

Our first set of estimations covers the pre-crisis period from April 1994 to November 2005 using the available monthly data. The estimation results are reported in table 2. Each column reports the results for an estimation of funds' outflow and gives the coefficients of the explanatory variable in the respective row. The absolute value of the respective z-statistics are reported in brackets below each coefficient.

Most importantly is the negative effect of past returns on gross outflows. Thus fundamentals matter for withdrawal decisions. Withdrawals at a specific fund are the higher the worse the past performance of that respective fund was. This also confirms our hypothesis that investors' withdrawal decisions serves as a disciplining device. If fund managers know that a low performance induces larger outflows they have stronger incentives to ensure a high return because their remuneration is typically related to the volume of funds under management. Furthermore, due to the liquidity transformation higher liquidity outflows depress future returns since fund managers might be forced into detrimental fire sales or to raise debt at unfavorable conditions.<sup>17</sup> So also future performance related remuneration will be reduced by the withdrawals. Moreover, lower future returns increase future outflow and the anticipation of this vicious circle can lead to a run on the fund and its closure. Also this threat might have a disciplining effect on fund managers.<sup>18</sup>

The second evident effect that we find is that funds that had a higher previous liquidity ratio experience lower outflows. Since we focus here on gross outflow, i.e. withdrawals only, our result indicates that withdrawals are larger if a fund holds fewer liquidity. This suggest that there are complementarities at play: At a fund that holds less liquidity a withdrawal of some investors will induce more other investors to withdraw, too, because the expected negative effects of the withdrawal on future performance is larger. A higher liquidity ratio enables a fund to redeem a larger number of shares without liquidation costs.<sup>19</sup> However, the sensitivity of outflows to lower returns is reduced by a higher liquidity ratio (see column 8 in table

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<sup>17</sup>See Edelen (1999) who provides direct evidence of this effect for open end mutual investment funds in the U.S.

<sup>18</sup>Martinez Peria and Schmukler (2001) find evidence for this effect in the Latin American banking sector.

<sup>19</sup>It might be interesting to note that a potential endogenous effect would run in opposite direction: Funds that anticipate higher liquidity outflows would hold higher liquidity ratios.

2). Thus at funds with a high liquidity ratio the sensitivity of outflows to return shocks was smaller. In line with the argument of the global games literature the response to bad fundamentals was less amplified by strategic complementarities at funds that had a high liquidity ratio.<sup>20</sup>

However, we do not find evidence for a dampening effect of institutional investors on outflows in the pre-crisis period. The return sensitivity of open end real estate funds that are classified as non-retail fund is not significantly lower than the sensitivity of retail funds (see column 7 in table 2).

With respect to the load fee our hypothesis is that a larger load fee deters short-term investors. Thus the average holding period of investors should increase. Consequently, for a fund of given size with a larger load fee the gross outflows should be lower. The estimated coefficients have in all cases the expected size. However, they are generally not significant.

We also report the results of the baseline regression using the random effects model in column 6 of table 2. Compared with the coefficients of the fixed effects model in column 5 the results remain stable. The Hausman test indicates for the pre-crisis period no significant difference between the estimates of the two models which suggests to use the random effects results for efficiency reasons.

Our second set of estimations makes use of the daily data for the crisis period between mid of December 2005 and end of May 2006. The results are reported in table 3. While the coefficient of previous returns has the expected sign, it is generally not significant for this period. During the crisis period investors seem to have paid less attention to funds' past performance when taking their withdrawal decisions. However, this might also reflect the fact that the past return is at monthly frequency while the liquidity outflow is for this period on a daily basis.

The liquidity ratio of the fund is available in the same frequency as the withdrawals. In contrast to past returns, the liquidity status has indeed a significant and relatively strong effect on the gross liquidity outflow. Thus during the crisis investors withdrew their funds particularly from those funds that ran a low liquidity ratio. This suggests that investors were driven by the concern over a liquidity crisis

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<sup>20</sup>See, for instance, Chen et al. (2007) who argue along that line.

of funds due to excessive withdrawals. At funds with higher liquidity ratios this concern were smaller and withdrawals therefore lower. The sensitivity of outflow to the liquidity ratio seems to have been much higher during the crisis than before indicating that indeed strategic complementarities became much more a worry in the wake of the panic. However, there is also a different interpretation of our results. The crisis was triggered by the announcement of Deutsche Bank that real estate held by its fund had to be devaluated. Consequently, devaluation expectations might have been lower at funds that held a relatively high liquidity ratio. This might also explain why outflows at those funds were smaller.

In contrast to the pre-crisis period, for the crisis period complementarities did not amplify the liquidity drain in response to bad performance. Since past performance does apparently not explain outflows during the crisis, it is not surprising that this effect was also not amplified by complementarities. However, the significant negative coefficient of the interaction term of the liquidity ratio and past performance is puzzling (see column 8 of table 3). According to this result funds with a high liquidity ratio should have a higher sensitivity of outflows to past return which is at odds with the results from the global games literature.

We also included a dummy variable for the geographical focus of the fund in our estimations. In 2005/2006 real estate investment experienced very low returns only in Germany and not on a European or global level. Therefore, the devaluation and closure of Deutsche Bank's fund only revealed information about the performance of German real estate investment. Consequently, if indeed investors updated their beliefs about the future returns of real estate funds based on the closure decision of Deutsche Bank they would have run only on domestically invested funds. However, our estimations indicate that investors did not differentiate between funds according to their investment scope. This further strengthens the view that it was not the more severe downgrade of return expectations why investors withdrew particularly from funds with a low liquidity ratio but rather the fear from more severe return effects of excessive withdrawal of other investors.<sup>21</sup>

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<sup>21</sup>Notice that one could also argue that a high liquidity ratio was an indication of high future performance in the presence of very weak real estate returns. While this might have been true for some funds that were solely invested in Germany this argument does not hold for Germany based funds that were globally invested.

The debt ratio can be viewed as a second measure for a fund's liquidity. There is a regulatory upper limit imposed on the debt ratio of open-end real estate funds of 50 % that limits their ability to obtain liquidity when needed. Consequently, a higher debt ratio should have a positive effect on outflows. However, one may think of a negative effect when refinancing of real estate with debt is relatively cheaper. In that case a high debt ratio signals higher future returns. These two counterbalancing effects might explain why we do not find a significant effect of the debt ratio on outflows during the crisis.

Interestingly, a further robust result of our estimations indicates that the outflow was larger at funds that charges a higher load fee. A larger upfront fee, which also means a larger fee to reinvest in a fund, does not contain investors incentives to withdraw during a run. The tilt towards longer-term investors that could supposedly be achieved by charging a higher load fee does not limit investors tendency to panic. On the contrary, funds with a higher load fee might have attracted particularly small long-term oriented retail investors while institutional investors that are more concerned with asset liquidity were deterred from buying shares. Following the findings of the global games literature complementarities are most severe among small retail investors, while large institutional investors contain them. This might explain why the load fee did not reduce the liquidity outflow but rather spurred the withdrawals during the crisis.<sup>22</sup>

To explore this argument further we use quarterly data on the investor structure of the individual funds in column 9 of table 3. The ratio of shares held by of private investors permits us to study whether the coordination problem and ultimately complementarities are indeed more severe if small retail investors account for a larger fraction of investors. In addition, interacting the fraction of shares held by private investors with the return also allows us to study whether the investors' response to lower past performance is more amplified by strategic complementarities given a larger fraction of small retail investors. However, neither the fraction of private investors nor its interaction with past performance has a significant effect on outflows according to our estimates (see column 9 and 10 in table 3). Similarly the

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<sup>22</sup>The random effects coefficients are reported in column 6. The Hausman test is significant which indicates that the coefficients are inconsistent in the random effects model. We thus only refer to the results of fixed effect model.

interaction of the dummy variable for non-retail funds with the past performance has no significant impact on withdrawal decision. Thus with this lower frequency data we cannot confirm the view that institutional investors stabilized the liquidity outflow.

In the third set of estimations we study the post-crisis period using the data on the daily liquidity outflows starting on the 1st of June 2006 and show the results in table 4. For this period we find only few robustly significant determinants of the redemption of shares. The past return as well as the liquidity ratio have puzzlingly in few estimates a positive effect on outflows. However, mostly they are insignificant. Interestingly, when an interaction term between the liquidity ratio and the past performance is included (see column 8) both past performance and the liquidity ratio have the expected significant negative sign. Furthermore, in this specification we find that a higher liquidity ratio dampens the effect of past performance on outflows which is again in line with the predictions of the global games literature.

Further robustly significant results for this sub-period are, first, a negative effect of the load fee on outflows which is again in line with the view that a high load fee increases the expected investment horizon and therefore reduces the average withdrawals. Second, we find a robust negative effect of the debt ratio on the outflows. Thus withdrawals at funds with a relatively high debt ratio were lower. This might reflect the already mentioned effect that in a low interest rate environment a high leverage might bring about high expected returns.

## 7 Conclusion

In this paper we studied the outflows of funds from German open-end real estate funds before, during and after a crisis period in 2005 and 2006. We disentangle the effects that contributed to these massive withdrawals. We find that in contrast to the pre-crisis period during the panic fundamentals did not matter: funds' past performance had no significant impact on investors withdrawal decision. Furthermore, the sensitivity of outflows to past performance was only more severe at funds with a low liquidity ratio in the pre-crisis period. But we find that during the crisis strategic complementarities became more important for outflows. Particularly during the

panic (but also to a lesser extent in the pre-crisis period) funds with a low liquidity ratio experienced more dramatic outflows. This suggests that a main driving force of the crisis were investors' worries about massive withdrawals of other investors and its depressing effect on future returns. Thus while our results indicate that the liquidity transformation of open-end funds might serve during normal times as a disciplining device since investors respond to bad performance, during a crisis fundamentals do not play a role and the liquidity risk only generates strategic complementarities and the self-enforcing mechanisms leading to liquidity crisis. Thus a higher regulatory liquidity ratio would increase crisis resilience of open-end real estate funds without undermining essential disciplining mechanisms of the fund management. The disciplining of the management through investors' withdrawals is mainly ensured in non-crises periods and does not work through the threat of a fund's closure due to a liquidity shortage.

A load fee also seems to have a positive effect on the average holding period of investors in normal times. It thereby contains withdrawals in non-crises periods. However, we do not find evidence that investors with longer-term investment horizons have a lower tendency to panic during a crisis. On the contrary, the load fee had a significant positive effect on withdrawals during the crisis. Since particularly institutional investors used the funds to park liquidity, they might have been the share holders with the shortest investment horizon. Thus at funds with a high load fee only a low fraction of shares were held by institutional investors. Large institutional investors are supposed to have a stabilizing role since they contain the amplification through strategic complementarities. Consequently, those funds that had a higher load fee and thus fewer institutional investors might therefore have experienced more severe outflows. Hence, our findings support the view that the involvement of institutional investors did not necessarily contribute to the severity of the crisis.

A major policy implication of our results is that the suspension of convertibility that is required if the liquidity ratio drops below 5% is indeed beneficial. Obviously, a mandatory minimum liquidity ratio might depress funds' returns. However, the average asset returns of most open end real estate funds were not substantially above money market rates suggesting that overall fund returns were not impaired by the

regulatory liquidity holding. Furthermore, as discussed in the paper mandatory liquidity holdings could in principle undermine the disciplinary role of the liquidity transformation as a run never leads to a liquidation of the fund. However, according to our findings investors do not respond to fundamentals during panics. They do not differentiate between funds that performed well and those that underperform. Thus the liquidity transformation does not serve as a disciplinary device since it does not amplify incentives to withdraw from ailing funds. Consequently, a mandatory liquidity holding cannot undermine this disciplinary effect.

We find complementarities that amplify incentives to withdraw as response to bad performance only for non-crises period, i.e. periods when funds were not affected by liquidity shortages. Those complementarities might have a disciplinary effect but they are not constraint by a minimum liquidity requirement.

A suspension of convertibility triggered by a shortfall of the liquidity ratio below some threshold contains, however, the complementarities that constitute to a pure panic. The strong response of withdrawals to actual liquidity holdings indicates that investors were particularly worried about funds' illiquidity and resulting detrimental fire sales during the crisis. This effect should be in principle eliminated by a suspension of convertibility. However, a low threshold level for the liquidity ratio dilutes the stabilizing impact of a suspension of convertibility. Only at a relatively high threshold investors no longer need to worry that excessive withdrawals force a fund into detrimental fire sales of assets. Thus the fact that complementarities still play a prominent role at a mandatory liquidity ratio of 5% suggests that it might be beneficial to increase that threshold.

On a more general note, a higher mandatory liquidity ratio should not only stabilize liquidity outflows it should also stabilize asset price developments. On the one hand, if funds are no longer forced into detrimental fire sales during crises devaluations of commercial real estate should be less pronounced. On the other hand, if funds are forced to hold on to more liquidity when attracting new funds the pace at which they can invest in new real estate is slower and the risk of the emergence of potential real estate bubbles is limited.



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Table 2: Fixed Effects Estimation for Outflows: Pre-Crisis Period, Monthly Data from May 1993 to November 2005

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Return_{i,m-1}$	-0.002*** [9.63]	-0.002*** [6.72]	-0.002*** [6.62]	-0.002*** [6.50]	-0.002*** [6.48]	-0.002*** [6.50]	-0.002*** [11.64]	-0.003*** [5.77]
$Liquidity\ Ratio_{i,m-1}$		-0.008** [2.30]	-0.009** [2.38]	-0.009** [2.44]	-0.010*** [2.58]	-0.010** [2.52]	-0.010*** [4.88]	-0.027*** [3.71]
$Debt\ Ratio_{i,m-1}$			-0.004 [0.62]	-0.005 [0.72]	-0.004 [0.62]	-0.005 [0.71]	-0.004 [1.03]	-0.008 [1.14]
$Load\ Fee_{i,m-1}$				-0.179 [1.60]	-0.18 [1.61]	-0.175 [1.57]	-0.187*** [3.06]	-0.175 [1.56]
$Age$					-0.001 [1.00]	-0.001 [0.86]	-0.001* [1.86]	0.00 [0.27]
$Non - Retail * Return_{i,m-1}$							0.001 [1.36]	
$Return * Liquidity\ Ratio_{i,m-1}$								0.004*** [2.77]
Constant	0.021*** [19.66]	0.023*** [18.49]	0.024*** [12.46]	0.033*** [5.47]	0.037*** [5.14]	0.045*** [3.65]	0.036*** [9.16]	0.040*** [5.55]
$R^2$	0.04	0.04	0.04	0.04	0.04	0.04	0.13	0.04
No. of Obs.	2435	2435	2435	2435	2435	2435	2426	2435
No. of Funds	29	29	29	29	29	29	28	29
Hausman Chi2-value								3.81

Absolute value of t-statistics in brackets. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%  
 Column 6 shows results using the random effects estimator for comparison and reports the Hausman test.

Table 3: Fixed Effects Estimation for Outflows: Crisis Period, Daily Data from 15th of December 2005 to 31st of May 2006

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$Return_{i,m-1}$	-0.051 [1.00]	-0.044 [0.87]	-0.055 [1.07]	-0.043 [0.84]	-0.085 [1.62]	-0.046*** [2.72]	-0.061 [1.10]	0.069 [0.74]	-0.102* [1.71]	-0.254 [1.62]
$Liquidity\ Ratio_{i,t-1}$		-0.016*** [3.92]	-0.017*** [4.07]	-0.015*** [3.52]	-0.015*** [3.67]	-0.004** [2.32]	-0.016*** [3.79]	0.008 [0.57]	-0.022*** [4.67]	-0.023*** [4.75]
$Debt\ Ratio_{i,m-1}$			-0.006 [1.54]	-0.005 [1.36]	-0.006 [1.43]	0.007*** [5.20]	-0.005 [1.29]	-0.006 [1.03]	-0.002 [0.44]	-0.003 [0.49]
$Load\ Fee_{m-1}$				7.206*** [3.41]	7.188*** [3.42]	0.030* [1.78]	6.972*** [3.31]	6.522** [2.32]	7.372*** [2.64]	7.176** [2.56]
$Age$					-0.006*** [3.53]	-0.001*** [2.83]	-0.006*** [3.65]	-0.007*** [3.44]	-0.007*** [3.47]	-0.007*** [3.46]
$Non - Retail * Return_{i,m-1}$										
$Return * Liquidity\ Ratio_{i,m-1}$								-0.728** [2.39]		
$Private$									0.002 [0.65]	-0.006 [0.45]
$Private * Return_{i,m-1}$										0.216 [1.05]
Constant	0.003 [1.23]	0.009*** [3.09]	0.010*** [3.43]	-0.333*** [3.31]	-0.318*** [3.16]	0.005* [1.72]	-0.306*** [3.04]	-0.295** [2.24]	-0.326** [2.49]	-0.310** [2.36]
No. of Obs.	2192	2158	2158	2158	2158	2158	2158	1957	1957	1957
No. of Funds	26	26	26	26	26	26	26	26	26	26
$R^2$	0.13	0.14	0.14	0.14	0.15	0.13	0.15	0.16	0.15	0.16
Hausman Chi2-value						43.77***				

Absolute value of t-statistics in brackets. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Time dummies included but not shown. Column 6 shows results using the random effects estimator for comparison and reports the Hausman test.

Table 4: Fixed Effects Estimation for Outflows: Post Crisis Period, Daily Data from 1st of June 2006 to 27th of June 2007

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$Return_{i,m-1}$	0.013*** [3.37]	0.011*** [2.59]	0.005 [1.21]	0.003 [0.72]	0.002 [0.49]	0.008** [2.11]	0.002 [0.37]	-0.064*** [6.19]	0.00 [0.06]	-0.011 [0.83]
$Liquidity\ Ratio_{i,t-1}$		0.002*** [3.41]	0.001 [1.62]	0.00 [0.53]	0.00 [0.38]	0.001** [2.11]	0.00 [0.35]	-0.010*** [6.37]	0.00 [0.55]	0 [0.59]
$Debt\ Ratio_{i,m-1}$			-0.009*** [6.71]	-0.005*** [3.83]	-0.005*** [3.68]	-0.003*** [4.08]	-0.005*** [3.69]	-0.005*** [3.41]	-0.005*** [3.90]	-0.005*** [3.84]
$Load\ Fee_{i,m-1}$				-0.161*** [10.56]	-0.159*** [10.46]	-0.046*** [6.29]	-0.159*** [10.40]	-0.121*** [7.49]	-0.159*** [10.45]	-0.157*** [10.15]
$Age$					-0.001 [1.58]	0.00 [1.57]	-0.001 [1.63]	-0.001** [2.57]	-0.001* [1.77]	-0.001* [1.79]
$Non - Retail * Return_{i,m-1}$							0.01 [0.45]			
$Return * Liquidity\ Ratio_{i,t-1}$								0.211***		
$Private$								[6.80]	-0.003	-0.003*
$Private * Return_{i,m-1}$								[0.21]	[1.55]	[1.77]
Constant	0 [0.21]	-0.001 [0.19]	0.002 [0.57]	0.009*** [2.89]	0.011*** [3.25]	0.002 [1.31]	0.011*** [3.26]	0.013*** [3.75]	0.012*** [3.59]	0.013*** [3.66]
No. of Obs.	5778	5727	5727	5727	5727	5727	5727	5727	5727	5727
No. of Funds	29	29	29	29	29	29	29	29	29	29
$R^2$	0.04	0.04	0.05	0.06	0.07	0.05	0.07	0.07	0.07	0.07
Hausman Chi2 value						112.11				

Absolute value of t-statistics in brackets. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Time dummies included but not shown. Column 6 shows results using the random effects estimator for comparison and reports the Hausman test.

Table 5: Correlation Matrix for Monthly Data, May 1993 to June 2008

	<i>Outflow Ratio</i>	<i>Return</i>	<i>Liquidity Ratio</i>	<i>Debt Ratio</i>	<i>Load Fee</i>	<i>Age</i>	<i>Geo.Focus</i>	<i>Non-Retail</i>
<i>Outflow Ratio</i>	1.00							
<i>Return</i>	-0.13	1.00						
<i>Liquidity Ratio</i>	-0.04	0.39	1.00					
<i>Debt Ratio</i>	0.08	0.00	-0.24	1.00				
<i>Load Fee</i>	0.02	-0.05	0.22	-0.32	1.00			
<i>Age</i>	0.04	-0.29	-0.33	-0.24	0.04	1.00		
<i>Geo.Focus</i>	-0.03	-0.23	-0.23	-0.42	0.08	0.69	1.00	
<i>Non-Retail</i>	-0.12	0.01	-0.24	-0.05	-0.39	-0.15	0.12	1.00

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