The growing importance of secondary market activities for open-end real estate fund shares in Germany

Abstract

Shares of open-end real funds are typically traded directly between the investor and the fund management company. However, we provide empirical evidence for the growth of secondary market activities, i.e., the trading of shares on stock exchanges. We find high trading in situations when the fund management company suspends the redemption of shares but lower trading when the issue of shares is suspended. Shares trade with a discount when the fund management company suspends the redemption, whereas shares trade with a premium when the fund management company suspends the issue. We also find evidence that secondary market trading activity is increasing since German regulation introduced a minimum holding period and a mandatory notice period for open-end real estate funds.

JEL Classification: G11, G28, G29

Keywords: Open-end Real Estate Funds, Secondary Market, Trading Restrictions, NAV-Price-Spread

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1 Introduction

Open-end real estate funds (OREFs) are the dominant form for investing in real estate properties in Germany. OREFs are collective investment undertakings that raise capital from a number of investors in order to invest in real estate for the benefit of their investors. In contrast to closed-end funds, which close the issue of additional shares once a desired capital amount is collected, open-end funds remain open for further capital inflows. Therefore, fund management companies issue and redeem shares on request, typically on a daily basis.

German OREFs have successfully managed capital inflows and outflows for many decades since their introduction in 1959. Yet in December 2005 and January 2006, there was a massive request for redemption of shares by investors as a reaction to public rumors that the fund management companies Deutsche Bank and KanAm would have to devaluate the real estate assets of their OREFs. The massive capital outflows forced Deutsche Bank and KanAm to temporarily suspend share redemptions. Three years later, in the wake of the financial crisis, the entire branch of German OREFs experienced massive capital outflows, forcing one-third of the funds to suspend share redemptions. Finally, 18 OREFs had to announce their liquidation. In 2016 and 2017 several funds had to suspend the issue of additional shares because they could not find enough properties in the tight real estate market to profitably invest the capital inflows. In response to the excessive capital inflows and outflows, more restrictive regulatory requirements on the redemption and issue of OREF share requests have been introduced. Fund management companies are now required to suspend the issue and redemption of shares if there is a risk of violating the admissible liquidity ratio of 5% to 49%. In addition, investors are now required to hold their shares for a minimum period of 24 months and have to notify the fund management 12 months in advance if they want to redeem their shares to the fund management company.

The literature on OREFs can be divided in two streams. The first literature stream documents the major characteristics of OREFs. Maurer et al. (2004) estimate the historical short and long-term return characteristics. They find that OREFs exhibit moderate and stable returns with low correlations to equity markets and moderate correlations to bond and money markets. Focke (2006) describes the legal construction and the historical development of German OREFs. The

author concludes that the main benefits of OREFs are risk diversification, low minimum investment volumes, and daily tradability of shares. Maurer et al. (2012) analyze the role of OREFs in multi-asset retirement withdrawal plans. They find that OREFs play an important role in diversifying portfolios; however potential redemption suspensions and devaluations significantly reduce the optimal fraction of OREFs in retirement portfolios. Downs and Sebastian (2016) document a convex flow-performance relationship for OREFs, i.e., investors buy shares of funds that outperformed their peers while they are reluctant to sell shares of funds that underperformed their peers. The second literature stream studies the liquidity crisis of OREFs. Sebastian and Tyrell (2006) emphasize that the open-end architecture provides an efficient instrument to discipline the fund managers and therefore can represent a more adequate solution to securitize real estate assets. Bannier et al. (2008) furthered the argumentation of the disciplining effect that the risk of liquidity runs has on the fund managers. However, the authors note that measures to reduce arbitrage opportunities that result from a staggered appraisal of the real estate assets may increase the resilience of OREFs. Fecht and Wedow (2014) point out that the mismatch of illiquid assets and liquid liabilities also bears the risk of investors withdrawing their funds prematurely because they expect other investors to do the same. They show that investors' expectations on the withdrawal decision of other investors contributed substantially to the massive capital outflows during the liquidity crisis. To reduce the risk of a liquidity crisis, the authors suggested higher liquidity buffers and a separation of share classes for institutional and retail investors. Weistroffer and Sebastian (2015) provide empirical evidence that the real estate assets held by OREFs were likely to have been overvalued prior to the crisis. The authors conclude their results support the view that the crisis was a fundamentally justified run. In a recent paper, Schnejdar et al. (2017) analyze the price-spread of OREFs that are in liquidation due to insufficient liquidity reserves. They show that macroeconomic and fundamental factors such as leverage ratio and liquidity ratio have an effect on the price-spread of OREFs in liquidation.

The present paper contributes to the literature on OREFs studying the impact of restricting the regular issue and redemption process on secondary market activities for OREF shares. Discussing the trading of OREF shares on secondary markets has been thus far neglected in the literature (Maurer et. al, 2004; Focke, 2006; Bannier et al., 2008; Fecht and Wedow, 2014; Weistroffer and Sebastian 2015). Firstly, this paper studies restrictions of individual funds, i.e., funds that temporarily suspended the issue or redemption as well as funds that are being liquidated. Secondly, this paper studies the restrictions on a level, i.e., the impact of the introduction of the minimum holding period together with the notice period. Piecewise linear

regressions show that there are more shares traded on the secondary market when the fund management suspends the issue or redemption process or when a fund is in liquidation. In addition, secondary market trading increases at a higher trend after the introduction of the minimum holding period and the notice period. The results in this paper also show that OREF shares are traded with a discount on secondary markets when the fund management suspends the redemption of shares or when the fund is being liquidated. On the contrary, shares are traded for a premium on secondary markets when fund management suspends the issue of additional shares.

2 Historical Background and Hypothesis Development

2.1 Historical Background

Trading of OREF shares is by construction supposed to occur directly between investors and fund management companies. In situations when direct trading is restricted, investors may also trade their shares on the secondary market. The following chapter reports the historical events that lead to restrictions in the direct trading between investors and fund management companies.[1]

2.1.1 Liquidity Crisis

Since its inception in 1959, German OREFs had been able to satisfy daily issue and redemption requests. However, in 2005/2006, there was a massive and simultaneous request by investors for a redemption of their shares as a reaction to public rumors that the two fund management companies, Deutsche Bank and KanAm, would have to devaluate the real estate assets of their OREFs. The massive capital outflows forced Deutsche Bank and KanAm to temporarily suspend the redemption of shares. Three years later, German OREFs faced an even more severe crisis. In the wake of the financial crisis, the entire branch of OREFs experienced massive outflows such that one-third of the OREFs temporarily had to suspend the redemption of shares and finally 18 OREFs had to announce their liquidation.

2.1.2 Regulatory Changes

At the time of the first liquidity crisis, only simple rules on the redemption suspension existed. These rules stipulated that if there are insufficient liquidity reserves to satisfy the redemption requests, fund management *may* refuse the redemption of shares for a period specified individually in the contractual terms. If after the end of this period there are still insufficient

[1] This study focuses on OREFs that are offered to the general public (*Publikumsfonds*) and neglects real estate funds that are only available to institutional clients (*Spezialfonds*). The latter show different fund characteristics and are subject to different regulatory requirements.

liquidity reserves, fund management has to begin to sell assets at fair value. Fund management may suspend redemption until the asset sales but no longer than one year after the refused redemption request. The one-year period can be extended by the contractual terms for another year. After expiry of this period, the fund management company *may* lend fund assets to raise capital for the redemption of shares.

In December 2007, after the first liquidity crisis, the first formal rules on the issue suspension have been introduced. These rules stipulate that the issue of shares *must* be suspended if there is a risk of violating the regulatory liquidity limit of 49%, or another fund individual liquidity limit that is to be specified in the contractual terms. In addition, regulation has introduced the possibility that the contractual terms of OREFs *may* state that the redemption of shares may be carried out only once a month in the event that the total redemption requests exceed a specified limit. In such a case, redemptions must be made by an irrevocable declaration subject to a minimum notice period that can be up to 12 months.

In April 2011, after the second liquidity crisis, more details on the process of redemption suspensions were amended. These amendments required that in the exceptional event of insufficient liquidity reserves to satisfy all the redemption requests, the fund management *must* suspend the redemption of shares. If, even after six months, the liquidity reserves are not sufficient, fund management must sell fund assets on fair value terms and continue to refuse to redeem shares for up to six more months. If, 12 months after the suspension of redemption, the liquidity reserves are still not sufficient, the fund management has to continue to refuse share redemptions and to sell fund assets. However, the sales price can now fall up to 10% below the appraisal value. If, 24 months after the suspension of redemption, the liquidity reserves are still insufficient, fund management has to continue to refuse to redeem shares and to sell fund assets. The sales price may now be up to 20 percent lower than the appraisal value. Finally, if even 30 months after the redemption suspension, the liquidity reserves are not sufficient to satisfy all the redemption requests, the fund management company loses its right to manage the distressed OREF. A fund management company that has officially announced to terminate the management of the fund is obliged to sell all fund assets until the termination becomes effective. From these asset sales, a semi-annual payment is to be made to shareholders. In addition to the process during the exceptional events of insufficient liquidity reserves, a minimum holding period of 24 months and a mandatory notice period of 12 months for share redemptions over EUR 30,000 was introduced.

As of July 2013, the process on the redemption suspension was revised again. Now, in the exceptional event of insufficient liquidity reserves to satisfy all the redemption requests, fund management must suspend the redemption of shares and immediately begin to sell fund assets on fair value terms. If the liquidity is insufficient 12 months after the redemption suspension, the fund management company must continue to refuse the redemption and sell fund assets. The sale price may now be up to 10 percent lower than the appraisal value. If, 24 months after the suspension of redemption, the liquidity reserves are still insufficient, the fund management may sell assets up to 20 percent lower than the appraisal value. Finally, if even 36 months, the liquidity reserves are not sufficient the fund management company loses its right to manage the distresses OREF. In addition to the revision of the process during redemption suspension, the EUR 30,000 allowance was abrogated so that there is a general minimum holding period of 24 months and a mandatory notice period of 12 months.

2.1.3 Issue Stops

In 2016/2017, several OREFs suspended the issue of additional shares. On the one hand, there was a high demand for OREF shares, while on the other hand, there were little profitable investment opportunities for the fund managements to invest incoming capital because the real estate markets were at a very high price level. In addition, the interest rates were on a level around zero; therefore, additional capital could not be hold as liquidity reserves because the low interest rate dilutes the overall fund performance.

2.1.1 Liquidity Management

Fund management companies have also developed different approaches to control the fund liquidity. In contrast to the regulatory requirements, these processes primarily aim to ensure that additional incoming capital can be invested profitably. The liquidity processes of the fund management companies can be divided into three approaches. The first approach represents the most open fund structure. OREFs following this approach issue and redeem shares on a daily basis. Only in situations when the fund liquidity exceeds or falls below a critical threshold, the issue or redemption of shares will be temporarily suspended. The second approach also represents an open structure but limits the number of shares to be issued. Depending on the expected future developments of the real estate markets, funds following this approach will define contingents of shares they will issue during the following months. The third approach is the most restrictive one. Funds following this approach are generally closed for additional capital inflows. If a liquidity requirement arises in the course of time, e.g., for a planned acquisition or redevelopment of a property, the fund management company announces a “cash call”. From the date of the cash call, the fund issues additional shares until the targeted capital

amount has been collected. Having successfully collected the required amount of capital, the fund will be closed again.

2.2 Hypothesis Development

The aim of the present paper is to estimate the secondary market trading activities for OREF shares. The empirical study investigates whether a temporary redemption/issue suspension and the permanent fund liquidation has a significant impact on the trading of OREF shares on secondary markets. In addition, the study investigates if the introduction of the minimum holding period together with the notice period significantly affected secondary market activities for OREF shares.

A major characteristic of OREFs is that their shares can be directly traded between investors and the fund management company. In a direct trading between the investor and the fund management company, the price per share only depends on the total net asset value of the fund and the number of outstanding shares, whereas on the secondary market the price is determined by supply and demand. If investors can trade their shares directly with the fund management company, they will not accept a price premium when purchasing or a price discount when selling fund shares on the secondary market. Therefore, in times when trading with the fund management company is unrestricted, the secondary market price should equal the net asset value per share. In times when the fund management company does not redeem fund shares, there may be investors who are willing to sell their shares on the secondary market and also accept a price discount. On the contrary, investors may be willing to pay a price premium in order to buy fund shares on the secondary market if the fund management company suspends the issue of new fund shares.

2.2.1 Issue Suspension

In the event of that the fund management is not able to profitably invest the capital inflow, the fund management companies will suspend the issue of shares. Potentially, there will be investors who are willing to buy OREF shares on the secondary market for a price above the net asset value per share, and on the other hand there will be shareholders who are willing to sell their shares for a premium.

Hypothesis 1: The secondary market trading of open-end real estate funds is higher when the issue of shares is suspended.

Hypothesis 2: The secondary market price is above the net asset value per share when the issue of shares is suspended.

2.2.2 Redemption Suspension

In the event of excessive redemption requests, fund management companies will suspend the redemption of shares. Once the redemption is suspended, the fund management has to sell real estate assets potentially below fair value in order to provide enough liquidity to satisfy all redemption requests. Shareholders will be willing to sell their shares with a discount on the secondary market because either they need the money immediately or they expect that the fund management will sell the real estate assets at a substantial discount.

Hypothesis 3: The secondary market trading of open-end real estate funds is higher when the redemption of shares to the fund management company is suspended.

Hypothesis 4: The secondary market price is below the net asset value per share when the redemption of shares to the fund management company is suspended.

2.2.3 Liquidation

In the event the fund management was not able to provide enough liquidity to satisfy the redemption requests, the fund has to be liquidated and the revenues are paid out to the shareholders. Similar to the event of a temporary redemption suspension, shareholders may be willing to sell their shares at a discount on the secondary market because either they need the money immediately or they expect the real estate assets to be sold at a substantial discount.

Hypothesis 5: The secondary market trading of open-end real estate funds is higher when the fund is being liquidated.

Hypothesis 6: The secondary market price is below the net asset value per share when the fund is being liquidated.

2.2.4 Minimum Holding Period and Notice Period

Since the introduction of the minimum holding period together with the notice period in April 2011, the redemption of shares has become less flexible. There may be investors who are willing to sell their shares on the secondary market even at a discount instead of waiting until the notice period. Considering that the number of OREF shares increases over time due to additional capital inflows and property revenues that are typically distributed to shareholders in form of additional shares, trading of OREF shares on the secondary market is expected to steadily increase after the regulatory change.

Hypothesis 7: The secondary market trading of open-end real estate funds has been increasing at a faster rate since the introduction of the notice period.

Hypothesis 8: Since the introduction of the notice period, there is a smaller spread between the secondary market price and the net asset value per share.

3 Methodology

3.1 Data

We conduct an empirical analysis on the secondary market activities for a sample of German open-end real estate funds over the period January 2003–October 2017. Our dataset combines information from five different data sources.

Secondary market data is collected from the two websites www.ariva.de and www.finanzen.net. We use two websites because they contain different sets of funds. The website www.ariva.de provides daily information on the trading of OREFs, separately for different exchanges in Germany. The information includes the market prices (high/low and first/last), the numbers of traded shares, and the traded volume in fund currency. The website www.finanzen.net provides daily information on the trading of OREFs separately for different exchanges in Germany. The information includes the market prices (high/low and first/last) and the numbers of traded shares. The daily numbers of traded shares are aggregated by summing up the numbers of traded shares for each OREF across the regional exchanges. Table 1 summarizes information about the OREF trading activities on the different exchanges. In Germany, OREFs are traded on ten exchanges, of which the three exchanges *Frankfurt*, *Hamburg*, *Stuttgart* are dominant. These three exchanges account for 89% of the total number of traded shares.

[Insert Table 1 here]

In the following analysis, we use relative trading volumes that are calculated as the ratio of the traded number of shares relative to the total shares outstanding. This fraction is expressed in percent, i.e., multiplied by 100. The German Investment and Asset Management Association (BVI) provided us with the monthly total net assets under management. To match the monthly information on the total net assets under management with the daily secondary market data, we use linear interpolation technique.

We estimate the daily secondary market price as the simple mean of the high and low price. In those cases where no high and low price is provided, the daily first and last price is used. The daily secondary market price for each OREF is then aggregated using the simple average across

the different exchanges.[2] Information on the daily net asset value per share is obtained from the website www.ariva.de. For three OREFs, the daily net asset values per share were obtained from Thomson Reuters Datastream because www.ariva.de did not provide this information.

Table 2 lists the OREFs covered in our sample combined with information on the inception date, liquidity management approach, and current assets under management (AuM). In total, our sample covers 33 funds. The largest three (six) funds with euro currency manage 50% (80%) of the net assets of all German OREFs. To manage the liquidity, three funds have implemented a cash call approach, three funds define contingents of shares that will be issued in the following months, and the remaining 27 funds work with temporary issue suspensions.

[Insert Table 2 here]

Information on the fund suspensions and liquidations is provided by the website of the German *Bundesanzeiger* (www.bundesanzeiger.de) and the fund management companies themselves. The *Bundesanzeiger* is the official gazette of the German federal authorities and is issued by the Federal Ministry of Justice. By law, fund management companies must announce the redemption suspension of shares and the liquidation of a fund in the *Bundesanzeiger*. In addition, the redemption and liquidation must be published in the annual or semi-annual fund reports. For fund liquidations, the official announcement date is prior to the final notice date due to the required notice period. In the following, we report the date on which the fund management announces that they will liquidate the fund over the next years. Fund management companies are only obliged to report the temporary redemption suspensions and the fund liquidation in the *Bundesanzeiger*. Therefore, we searched for information on the issue suspension of additional shares in the annual reports of the fund management companies.

Figure 1 shows the daily numbers of shares traded on the secondary market relative to the total numbers of shares outstanding multiplied by 100, together with the periods in which the direct trading with the fund management company is restricted. Due to space limitations, we illustrate only the 21 funds with the most observations of trades on the secondary market. The historical numbers of OREF shares traded on the secondary market show three noticeable features. First, it is interesting that the trading volume of OREFs that are not under liquidation is linearly increasing in recent years. Second, for most funds, the numbers of shares that are traded on the

[2] In an unreported analysis, we aggregate the daily secondary market price for each OREF by the weighted prices across the different exchanges. The weight for each exchange is the trading volume in numbers of traded shares relative to the overall trading volume in numbers of traded shares. The weighted market price gives the same regression results as the unweighted market price.

secondary markets is higher during the official issue/redemption suspension and during the liquidation phase. A good example is given by the historical trading volume of the *SEB ImmoInvest P*. Lastly, there are some peaks in the historical trading volumes for funds that have not suspended the issue/redemption of shares and that are still active. For example, the trading volume of *grundbesitz global* exhibits a peak in the years 2007/2008, while the *hausInvest* shows a peak in 2010.

[Insert Figure 1 here]

Figure 2 shows the daily net asset value per share and the secondary market price of German OREFs combined with the liquidation phases and the temporary issue and/or redemption suspensions. Again, we illustrate only the 21 funds with the most observations of trades on the secondary market.

[Insert Figure 2 here]

In general, for funds without sales contingents, the market price tends to equal the net asset value per share in times when the issue and redemption process is not suspended. However, if the fund management restricts the issue or the redemption process, the market price can deviate significantly from the net asset value per share, most obviously during times when the fund management suspends the redemption or is being liquidated. In addition, it is interesting to see that the spread between the NAV and the market price increases the longer the redemption suspension lasts. A potential reason for the widening price-spread is the increasing risk that the fund is not able to provide enough liquidity and therefore has to be liquidated. On the contrary, the price-spread decreases in the course of the liquidation phase. This might be due to the fact that the net asset value decreases and therefore the uncertainty of the revenue of the remaining assets decreases. In the event that a fund suspends only the issue of additional shares, the market price is above the net asset value per share, except for the *grundbesitz Europa.* Lastly, for funds following a contingent approach such as *Deka-ImmobilienEuropa* and *Deka-ImmobilienGlobal* the market price generally shows a higher variation around the net asset value per share.

3.2 Methodology

We use a piecewise linear regression model to analyze the secondary market activities for open-end real estate funds in Germany. Our aim is to investigate the effects of restricting the issue/redemption process on the secondary market prices and trading volumes. To estimate the effect of the temporary issue and redemption suspensions as well as permanent fund liquidations on the trading volume and price-spread, we use four dummy variables. The daily

Issue Dummy equals one if the fund has suspended the issue of new shares and zero otherwise. The daily *Redemption Dummy* equals one if the fund has suspended the redemption of shares and zero otherwise. The daily *Both Dummy* equals one if the fund has suspended both, i.e., the issue and redemption of shares. Lastly, the *Liquidation Dummy* equals one from the day the fund management has announced the liquidation of the fund and therefore stopped the issue and redemption of shares. All four dummy variables are mutually exclusive. The daily trading volume is calculated as the ratio of the traded number of shares relative to the total shares outstanding multiplied by 100. First, we estimate the linear model without a breakpoint by ordinary least squares regression:

$$\begin{aligned} tradingVolume_{i,t} = \alpha_i &+ \beta_1 * date \\ &+ \beta_2 * dummyRedemption_{i,t} \\ &+ \beta_3 * dummyCreation_{i,t} \\ &+ \beta_4 * dummyBoth_{i,t} \\ &+ \beta_5 * dummyLiquidation_{i,t} + \varepsilon_{i,t}. \end{aligned} \tag{1}$$

Then we modify model (1) into a piecewise regression with two segments to estimate the effects of the regulatory changes on the trading volume:

$$\begin{aligned} tradingVolume_{i,t} = a_i &+ \alpha_1 * I(date < regulatoryBreak) \\ &+ \beta_1 * date * I(date < regulatoryBreak) \\ &+ \beta_2 * date * I(date \geq regulatoryBreak) \\ &+ \beta_3 * dummyRedemption_{i,t} \\ &+ \beta_4 * dummyCreation_{i,t} \\ &+ \beta_5 * dummyBoth_{i,t} \\ &+ \beta_6 * dummyLiquidation_{i,t} + \varepsilon_{i,t.} \end{aligned} \tag{2}$$

We include fund fixed effects in these two regression models to account for the fund individual total numbers of outstanding shares. We set the breakpoint between the two segments to equal the regulatory break of April 5 2011, which represents the introduction of the minimum holding period together with the notice period. In later robustness analysis, the optimal breakpoint will be estimated from the historical data.

We use the same linear model to estimate the effects of the temporary issue and redemption suspensions as well as permanent fund liquidations on the spread between the net asset value per share and the secondary market price. The price-spread is calculated according to Lee et al. (1991), Barkham and Ward (1999), and Schnejdar et al. (2016) as the difference between the net asset value per share and the secondary market price divided by the net asset value per share. In contrast to the previous models, no fund fixed effects are included:

$$
\begin{aligned}
priceSpread_{i,t} = {} & \alpha + \beta_1\, date \\
& + \beta_2\, dummyRedemption_{i,t} \\
& + \beta_3\, dummyCreation_{i,t} \\
& + \beta_4\, dummyBoth_{i,t} \\
& + \beta_5 dummyLiquidation_{i,t} + \varepsilon_{i,t.}
\end{aligned} \tag{3}
$$

Again, we also estimate the piecewise regression with the breakpoint equal to April 5 2011 to estimate the effects of the regulatory changes on the price-spread:

$$
\begin{aligned}
priceSpread_{i,t} = {} & \alpha_1 * I(date < regulatoryBreak) \\
& + \alpha_2 * I(date \geq regulatoryBreak) \\
& + \beta_1 * date * I(date < regulatoryBreak) \\
& + \beta_2 * date * I(date \geq regulatoryBreak) \\
& + \beta_3 * dummyRedemption_{i,t} \\
& + \beta_4 * dummyCreation_{i,t} \\
& + \beta_5 * dummyBoth_{i,t} \\
& + \beta_6 * dummyLiquidation_{i,t} + \varepsilon_{i,t.}
\end{aligned} \tag{4}
$$

Finally, we use a Wald F-test test to compare each of the linear models with the corresponding piecewise linear models. Formally, we test for the null hypothesis that the coefficients of the simple linear model equal the coefficients of the piecewise linear model. If the resulting F-statistic results in a rejection of the null hypothesis, we can conclude that the intercept and the trend differ for the period before and after the introduction of the minimum holding period together with the notice period.

4 Results

4.1 Trading Volume

Table 3 summarizes the ordinary least squares results for model (1) and model (2). We estimate both models for each dummy variable separately and for the full specifications including all dummy variables in the respective model. This allows us to see the individual effects of the temporary trading suspensions and the liquidation on the secondary market trading volume. Columns one to five report the results for the simple linear model, and columns six to ten show the piecewise linear model estimates. Robust standard errors are reported in parentheses.

According to hypothesis 1, the expected sign of the issue dummy should be positive, i.e., in situations when the fund management suspends the issue of additional shares, there tends to be higher trading activity on secondary markets. The model estimates are significant and negative when estimated in isolation. In the fully specified models, the issue dummy estimate is not significant and positive with a value of 0.00007 for the simple linear model but significant and

negative with a value of -0.00129 for the piecewise linear model. These regression results suggest rejecting hypothesis 1.

According to hypothesis 3, the expected sign of the redemption dummy should be positive, i.e., in situations when the fund management suspends the redemption of shares, there will be higher trading activity on secondary markets. The estimates are positive and significant for all models, confirming hypothesis 3. In detail, the estimate is 0.01512 for the fully specified linear model and 0.01623 for the fully specified piecewise linear model.

According to hypothesis 5, the expected sign of the liquidation dummy should be positive, i.e., the secondary market trading is higher when a fund is being liquidated. Again, the model estimates are positive and significant for all model specifications, confirming hypothesis 5. However, compared to redemption coefficients, the liquidation confidents are lower. The estimate is 0.01237 for the fully specified linear model and 0.01393 for the fully specified piecewise linear model. Therefore, the marginal effect on the secondary market trading is lower than that of the redemption suspension.

According to hypothesis 7, in the piecewise linear model the expected sign of Date should be positive and ΔDate should be negative, i.e., the secondary market trading of open-end real estate funds is increasing at a higher rate since the introduction of the notice period. The piecewise linear regression model has two segments: one segment covers the period before the introduction of the minimum holding period together with the notice period, and one segment covers the period after the introduction. In columns 6 to 10, the Date coefficient is the trend in the segment covering the period after the introduction of the notice period, while the ΔDate coefficient is the difference between the trend components in the segment after the introduction of the notice period and before the introduction of the notice period. The estimates for Date are positive and significant for all model specifications. The ΔDate estimates are negative and significant for all model specifications. For the fully specified model, the trend coefficient for the second segment of the piecewise regression is 0.00001, implying that trading of OREF shares on the secondary market increases after the introduction of the notice period. Before the introduction of the notice period, secondary market trading also increased in the course of time but with a lower trend of 0.000006=0.00001-0.000004. Combining the information on the estimates for Date and ΔDate confirms hypothesis 7.

[Insert Table 3 here]

Table 4 reports the Wald-test statistics for a comparison of model (1) and (2). The resulting F statistic of 225.16 indicates that the null hypothesis stating that the estimates of both models are equivalent is rejected. The Wald-test supports the previous conclusion of an existing structural break in the time-series of the secondary market trades. As the estimated trend after the introduction of the notice period is higher than before, we find additional statistical support for confirming hypothesis 7.

[Insert Table 4 here]

4.2 Price-spread

Table 5 summarizes the ordinary least-squares results for model (3) and model (4). Again, we estimate the two models for each dummy variable separately and fully specified with all dummy variables estimated in one model. Columns one to five report the results for the simple linear model, and columns six to ten show the piecewise linear model estimates. Robust standard errors are reported in parentheses.

According to hypothesis 2, the expected sign of the issue dummy should be negative, i.e., the secondary market price is above the net asset value per share when the issue of shares is suspended. The model estimates are significant and negative when estimated in isolation. In the fully specified models, the issue dummy estimate is significant and negative with a value of -0.02 for the simple linear model but not significant and negative with a value of -0.0001 for the piecewise linear model. These results suggest to reject hypothesis 2.

According to hypothesis 4, we expect the sign of the redemption dummy to be positive, i.e., the secondary market price is below the net asset value per share when the redemption of shares to the fund management company is suspended. The model estimates are positive and significant for all models, confirming hypothesis 4. In detail, the estimate is 0.14 for the fully specified linear model and 0.13 for the fully specified piecewise linear model.

According to hypothesis 6, i.e., the secondary market price is below the net asset value per share when the fund is being liquidated, the sign of the liquidation dummy should be positive. The model estimates are positive and significant for all models, confirming hypothesis 6. In detail, the estimate coefficient is 0.28 for both the fully specified linear model and for the fully specified piecewise linear model.

According to hypothesis 8, in the piecewise linear model the expected sign of constant should be positive, i.e., since the introduction of the notice period, there is a small positive spread between the net asset value per share and secondary market price because there are investors

who are willing to sell their shares on the secondary market at a discount instead of awaiting the notice period. In columns six to ten, the constant coefficient represents the intercept of the regression in the segment covering the period after the introduction of the minimum holding period together with the notice period. The Date coefficient is the trend in the segment after the introduction of the notice period. The estimates for Constant are positive and significant for all piecewise linear model specifications. The Date estimates are marginally negative and significant for all model specifications. For the fully specified model, the constant is 2.09, indicating the market price is below the net asset value per share. The trend coefficient for the second segment of the piecewise regression is around zero, implying that the positive price-spread has not changed since the regulatory change in April 2011. Combining the information on the estimates in the second segment confirms hypothesis 8.

[Insert Table 5 here]

Table 6 reports the Wald-test statistics for model (3) and model (4). The resulting F statistic of 3001.4 indicates the null hypothesis that the estimated coefficients of the simple linear model and the piecewise linear model are equivalent is rejected. This supports the conclusion that the introduction of the minimum holding period together with the notice period had a significant impact on the price-spread.

[Insert Table 6 here]

5 Robustness Analysis

5.1 Breakpoint Estimation

In the previous section, the breakpoint for the piecewise linear regression was set to equal to regulatory change on April 5, 2011. In the following section, we estimate the optimal breakpoint(s) endogenously from the data instead of exogenously specifying it as a date on which the minimum holding period together with the notice period was introduced.

Figure 3 displays the residual sum of squared errors for the estimated piecewise linear models with different daily breaks ranging from January 6, 2003 to October 18, 2017. Panel A shows the results for model (2) with the relative numbers of traded shares as the dependent variable. Panel B shows the results for model (4) with the price-spread as the dependent variable. The shapes of the two graphs are highly similar, i.e., the shapes are horizontal in the first six years then drop sharply, and they are horizontal for the following five years then finally sharply increase to the level of the first years. A good fit for model (2) with the relative numbers of traded shares as the dependent variable can be reached when the break date is set to a day

between the end of 2011 and mid-2013. With a minimum residual sum of squared errors of 0.0213, the optimal breakpoint is given for July 24, 2012. In comparison, for model (4) with the price-spread as the dependent variable, a good fit can be reached when the break date is set to a day between early 2011 to mid-2014. The lowest residual sum of squared errors is 0.0565 for a breakpoint on October 25, 2011.

[Insert Figure 3 here]

The estimated residual sum of square curves supports the previous results that there is a structural break in the aftermath of the second liquidity crisis of OREFs. The reforming process for the regulation on OREFs began in 2010 and finally led to the revision of the law in April 2011. The coincidence of the structural break in the data and the reform date gives a strong indication that the minimum holding period together with the notice period has a structural effect on the secondary market trading for OREF shares.

5.2 Excluding Deka and WestInvest Funds

The fund management companies Deka and Westinvest do not officially suspend the creation of additional shares. Instead, they define contingents of shares that they will issue in the following year. If the contingent of shares is sold, no additional capital is accepted. Figure 2 shows that in the years 2016–2017 the secondary market price for the Deka and Westinvest funds is above the net asset value per share. This negative price-spread indicates that the fund management in these years issued no additional shares and investors had to buy shares on the secondary market. However, because there is no official notification that the fund management suspended the creation of additional shares, the estimated coefficients, in particular the creation dummy of models (3) and (4), may be distorted.

Table 7 summarizes the results of the ordinary least-squares regression for model (3) and model (4). Each column reports the model estimates and the corresponding robust standard errors in parentheses.

[Insert Table 7 here]

Comparing Table 5 and Table 7 shows that the effects of the temporary issue suspensions are more pronounced when the funds that use contingents to control the liquidity are excluded. In contrast to the results summarized in **Table *5***, the issue estimates are negative and significant for all models now. In particular, the issue estimate for the fully specified piecewise linear model is significant with a value of -0.001. Therefore, hypothesis 4 can be confirmed, i.e., the

secondary market price is above the net asset value per share when the issue of shares is suspended.

6 Conclusion

There is extensive literature on the characteristics and on the liquidity crisis of OREFs. However, the trading of OREF shares on the secondary market has been neglected in the literature so far.

The present paper provides a detailed analysis on the secondary market activities for OREF shares. We combine historical data on share prices and trading volumes from several stock exchanges in Germany with fund management announcements on fund liquidations and temporary issue or redemption suspensions.

We find that shares are traded on the secondary market in particular when direct trading between investors and the fund management company is restricted. In the event that the fund management suspends the issue of additional shares, investors trade their shares on the secondary market for a potential premium, i.e., the secondary market price is higher than the net asset value per share. In the contrary event that the fund management suspends the redemption of shares, investors trade their shares at a substantial discount. Interestingly, shares of funds that are being liquidated are still traded on the secondary market but with a substantial discount. Finally, we also find that the relative numbers of shares that are traded on the secondary market is increasing since the introduction of the minimum holding period together with the notice period. Our findings provide important information for investors and their financial advisors. Investors should consider the possibility that OREF shares may also be traded on the secondary market even if direct trading with the fund management companies is suspended. The historical data shows that the secondary market price can be substantially above the net asset value per share, and shareholders can earn this premium when they sell it on the market instead of giving it back to the fund management company for the net asset value per share. In the exceptional event that redemption to the fund management is not possible, shareholders can still sell their shares on the secondary market but for a potential discount. Interestingly, the lower secondary market price can be observed not only for funds that suspend the redemption of shares, but also for funds that are not exposed to any sort of liquidity problems.

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Table 1: Listing of stock exchanges in the sample

This table reports summary statistics on the trading of open-end real estate funds separately for the exchanges in Germany over the period January 2003–October 2017. The first column (*Trades*) reports the total number of trades. The second column (*Daily Traded Shares*) reports the average, standard deviation, minimum, and maximum of traded shares per day. The third column (*Traded Shares*) reports the total number of traded shares in the observation period.

		Daily Traded Shares				
	Trades	Mean	Std	Min	Max	Traded Shares
Berlin	15,316	3,814	7,055	5	240,125	13,848,447
Düsseldorf	14,788	4,217	9,505	1	409,060	13,250,045
Frankfurt	28,220	15,863	14,158	60	263,885	46,144,444
Hamburg	43,661	60,958	60,213	103	536,453	229,934,798
Lang & Schwarz	33	245	240	1	916	4,410
München	11,753	1,985	2,340	3	28,408	5,745,319
Quotrix	155	679	1,076	2	8,683	93,075
Stuttgart	26,865	23,214	196,280	20	10,280,838	64,720,598
Tradegate	14,848	6,087	9,633	106	80,901	11,218,656
Valora Effekten Handel	2	430	476	93	766	859

Table 2: Listing of open-end real estate funds in the sample

This table reports the funds covered in the sample. The assets under management (AuM) are provided by Morningstar by the end of November 2017 in millions. The assets under management are reported in euros, except for fund #18, for which AuM is reported in USD.

#	Fund	ISIN	Inception	Liquidity Management	AuM
1	Ampega Real Estate Plus	DE0009847483	04.10.2007	Trading Suspensions	118.8
2	AXA Immoselect	DE0009846451	03.06.2002	Trading Suspensions	43.3
3	AXA Immosolutions	DE000A0J3GM1	26.10.2006	Trading Suspensions	12.5
4	Catella Real Estate-Focus Nordic Cities	DE000A0MY559	03.09.2007	Trading Suspensions	115.9
5	CS EUROREAL	DE0009805002	06.04.1992	Trading Suspensions	1,055.3
6	CS Property Dynamic	DE0009751354	04.10.2006	Trading Suspensions	109.6
7	DEGI Global Business	DE000A0ETSR6	01.11.2005	Trading Suspensions	10.3
8	DEGI International	DE0008007998	17.02.2003	Trading Suspensions	123.0
9	Deka-ImmobilienEuropa	DE0009809566	20.01.1997	Contingents	15,249.6
10	Deka-ImmobilienGlobal	DE0007483612	28.10.2002	Contingents	4,851.7
11	Fokus Wohnen Deutschland	DE000A12BSB8	03.08.2015	Cash-Calls	n.a.
12	grundbesitz europa	DE0009807008	27.10.1970	Trading Suspensions	6,253.4
13	grundbesitz Fokus Deutschland	DE0009807081	03.11.2014	Trading Suspensions	424.7
14	grundbesitz global	DE0009807057	25.07.2000	Trading Suspensions	2,871.8
15	hausInvest	DE0009807016	07.04.1972	Trading Suspensions	13,272.3
16	INTER ImmoProfil	DE0009820068	18.03.1998	Trading Suspensions	156.1
17	KanAm grundinvest	DE0006791809	15.11.2001	Trading Suspensions	946.3
18	KanAm US-grundinvest	DE0006791817	20.05.2003	Trading Suspensions	17.2
19	KanAm Leading Cities Invest	DE0006791825	15.07.2013	Cash-Calls	n.a.
20	Morgan Stanley P2 Value	DE000A0F6G89	04.11.2005	Trading Suspensions	47.6
21	RP Immobilienanlagen & Infrastruktur T	DE000A0KEYG6	03.05.2007	Trading Suspensions	10.7
22	SEB Global Property	DE000SEB1A96	02.11.2006	Trading Suspensions	79.2
23	SEB ImmoInvest P	DE0009802306	02.05.1989	Trading Suspensions	993.1
24	SEB ImmoPortfolio Target Return	DE0009802314	15.10.2001	Trading Suspensions	99.7
25	SemperReal Estate T	AT0000615158	13.08.2004	Trading Suspensions	834.2
26	Stratego Grund	DE000A0ERSF5	01.09.2005	Trading Suspensions	n.a.
27	TMW Immobilien Weltfonds P	DE000A0DJ328	01.06.2005	Trading Suspensions	36.9
28	UBS (D) 3 Sector Real Estate Europe	DE0009772681	13.10.2003	Trading Suspensions	33.6
29	UniImmo: Deutschland	DE0009805507	01.07.1966	Trading Suspensions	12,157.3
30	UniImmo: Europa	DE0009805515	01.04.1985	Trading Suspensions	12,192.1
31	UniImmo: Global	DE0009805556	01.04.2004	Trading Suspensions	3,479.3
32	WERTGRUND WohnSelect D	DE000A1CUAY0	20.04.2010	Cash-Calls	251.6
33	WestInvest InterSelect	DE0009801423	02.10.2000	Contingents	6,706.0

Figure 1: Relative trading volume in percent over time

This figure shows the daily numbers of shares traded on the secondary market relative to the total numbers of shares outstanding multiplied by 100, as well as temporary trading suspensions and permanent fund liquidations as announced by the fund management company for German open-end real estate funds. The period in which the fund management suspended the issue of additional shares is highlighted in green, the redemption suspension is in blue, and the suspension of the issue and the redemption is in yellow. The period in which the fund is being liquidated is highlighted in red.

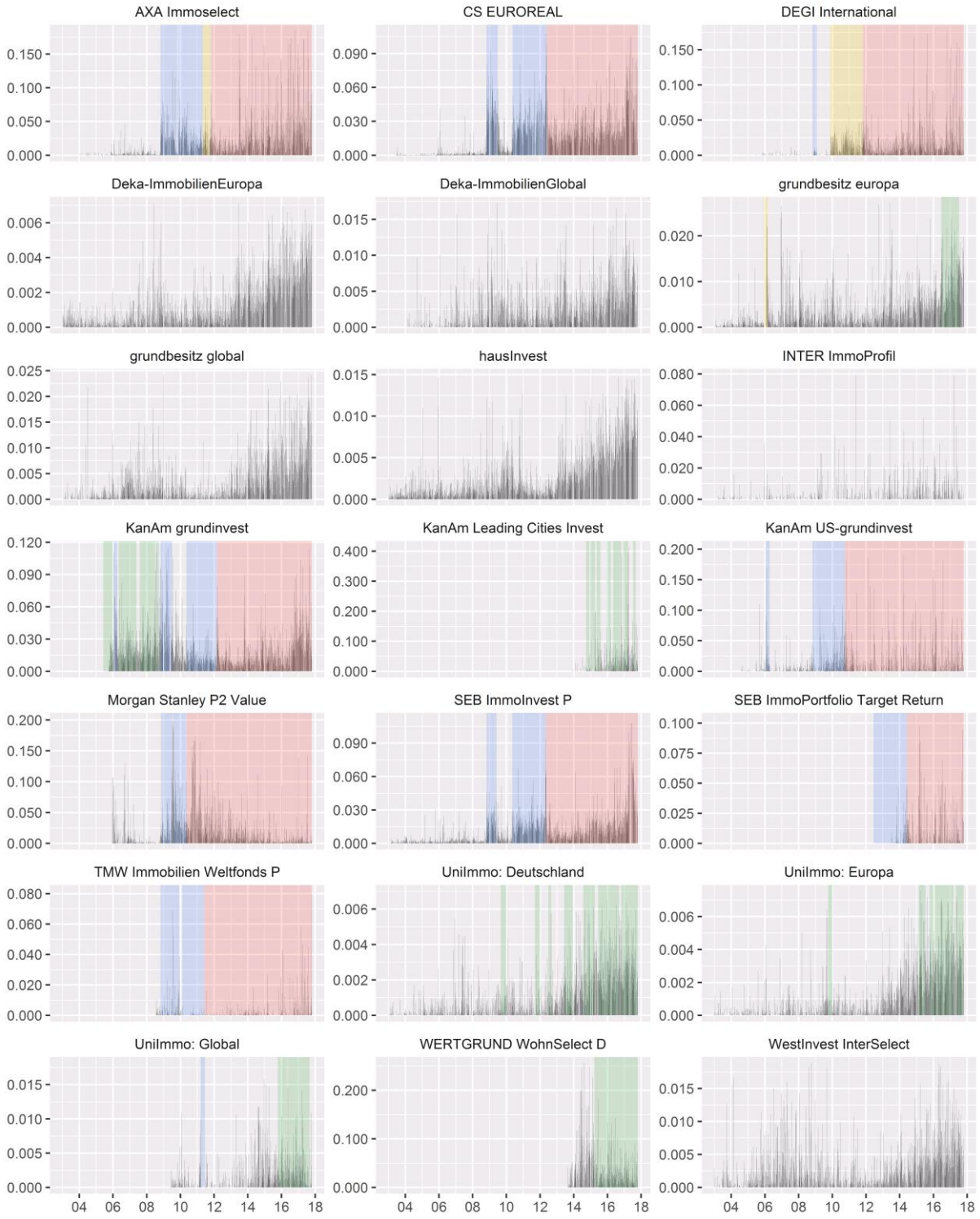

Figure 2: Fund price development over time

This figure shows the net asset value per share (*red line*) and the secondary market price per share (*black line*) in the respective fund currency, as well as temporary trading suspensions and permanent fund liquidations as announced by the fund management company for German open-end real estate funds. The period in which the fund management suspended the issue of additional shares is highlighted in green, the redemption suspension is in blue, and the suspension of the issue and the redemption is in yellow. The period in which the fund is being liquidated is highlighted in red.

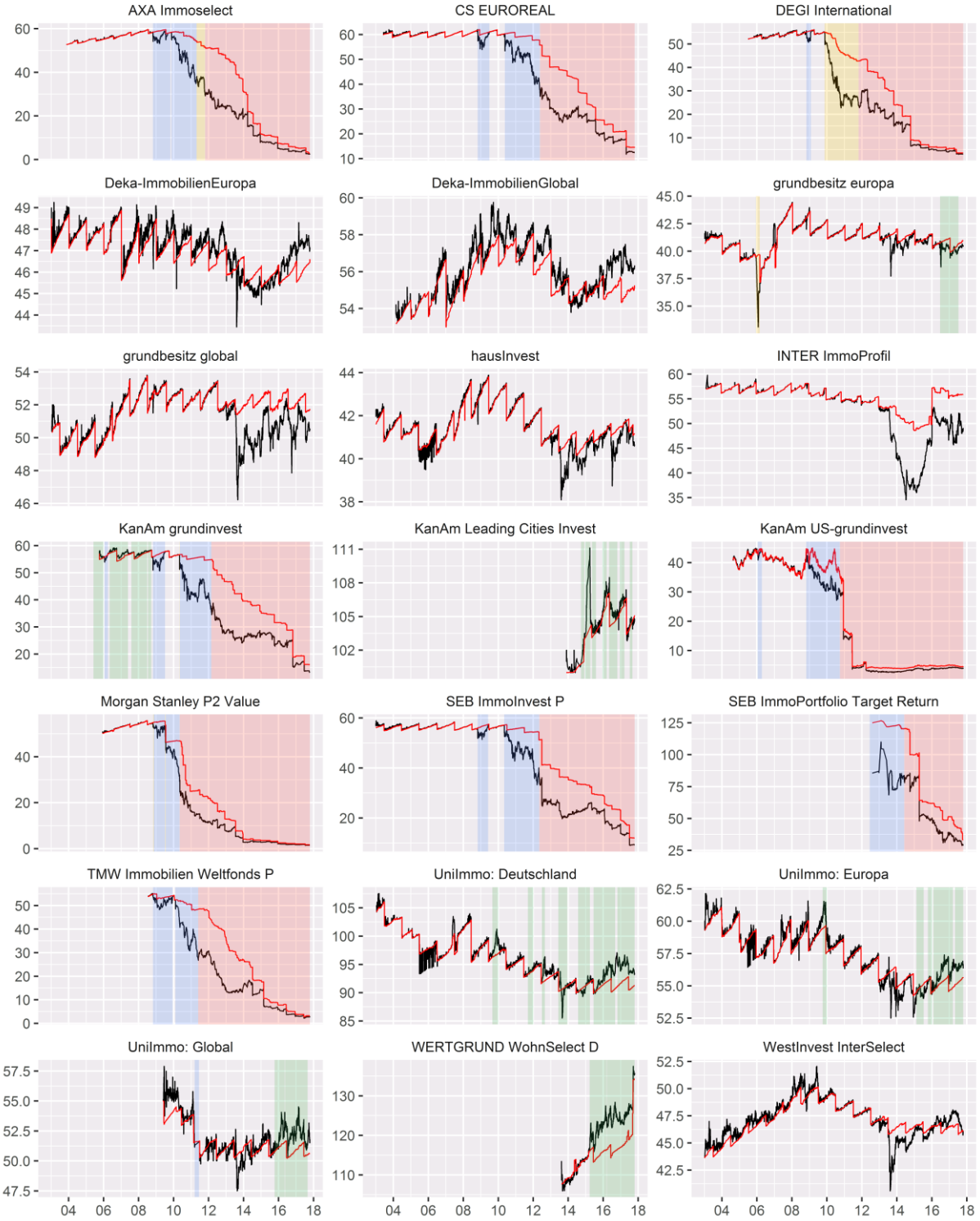

Table 3: Trading of open-end real estate funds on the secondary market

This table reports the results of unbalanced panel regressions examining the daily trading of open-end real estate funds on the secondary market. The dependent variable is *Trading Volume* relative to the total numbers of shares outstanding multiplied by 100. The independent variables are the trading day (*Date*), a daily dummy variable (*Issue dummy*) that equals one if the fund has suspended the issue of new shares, a daily dummy variable (*Redemption dummy*) that equals one if the fund has suspended the redemption of shares, a daily dummy variable (*Both dummy*) that equals one if the fund has suspended the issue and redemption of shares, and a daily dummy variable (*Liquidation dummy*) that equals one from that day the fund management has announced the liquidation of the fund and therefore liquidation stopped the issue and redemption of shares. All four dummy variables are mutually exclusive. Column 1 reports the estimates for the overall linear regression, whereas column 2 reports the estimates for the piecewise linear regression with a breakpoint set to the date of the regulation changes on April 5, 2011. The coefficient (*ΔDate*) reports the difference in the slope before the regulation change. Robust standard errors are reported in parentheses.

	Trading Volume									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Date	0.000002***	0.000003***	0.000002***	0.000002***	0.000001***	0.00001***	0.00001***	0.000005***	0.000004***	0.00001***
	(0.0000001)	(0.0000001)	(0.0000001)	(0.0000000)	(0.0000001)	(0.0000003)	(0.0000002)	(0.0000002)	(0.0000002)	(0.0000003)
ΔDate						-0.000002***	-0.000003***	-0.000001***	-0.0000005*	-0.000004***
						(0.0000003)	(0.0000003)	(0.0000003)	(0.0000003)	(0.0000003)
Issue dummy	-0.00315***				0.00007	-0.00423***				-0.00129**
	(0.00052)				(0.00055)	(0.00055)				(0.00058)
Redemption dummy		0.00799***			0.01512***		0.00848***			0.01623***
		(0.00039)			(0.00041)		(0.00041)			(0.00041)
Both dummy			0.00569***		0.01433***			0.00595***		0.01663***
			(0.00096)		(0.00096)			(0.00095)		(0.00095)
Liquidation dummy				0.00432***	0.01237***				0.00632***	0.01393***
				(0.00033)	(0.00035)				(0.00035)	(0.00036)
Fund Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	52,928	52,928	52,928	52,928	52,928	52,928	52,928	52,928	52,928	52,928
R^2	0.41	0.40	0.39	0.40	0.41	0.40	0.40	0.40	0.40	0.42
Adjusted R^2	0.39	0.40	0.39	0.40	0.41	0.40	0.40	0.40	0.40	0.41
Rsd Std. Error	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02

Table 4: Testing for a structural break in the trading volume of OREFs on the secondary market

This table reports the summary statistics resulting from a Wald-test that examines if the trading of open-end real estate funds exhibits a structural break after the regulation change on April 5, 2011. The test compares the overall linear model (1) with the piecewise linear model (2), whereby a heteroscedasticity-consistent covariance matrix is used. The first column shows residual degrees of freedom (*Res.DF*), the second column reports the degrees of freedom difference between the two models (*Df*), the third column reports the F test statistic (*F*), and the last column reports the corresponding p-value (*Pr(>F)*).

Res.Df	Df	F	Pr(>F)
52895			
52893	2	225.16	< 2.2e-16 ***

Table 5: Price-spreads of open-end real estate funds

This table reports the results of unbalanced panel regressions examining the daily price-spreads of open-end real estate funds. The dependent variable is the difference between the net asset value per share and the secondary market price per share divided by the net asset value per share (*Price-spread*). The independent variables are the trading day (*Date*), a daily dummy variable (*Issue dummy*) that equals one if the fund has suspended the issue of new shares, a daily dummy variable (*Redemption dummy*) that equals one if the fund has suspended the redemption of shares, a daily dummy variable (*Both dummy*) that equals one if the fund has suspended the issue and redemption of shares, and a daily dummy variable (*Liquidation dummy*) that equals one from that day the fund management has announced the liquidation of the fund and therefore stopped the issue and redemption of shares. All four dummy variables are mutually exclusive. Columns 1-5 report the estimates for the overall linear regression, whereas columns 6-10 report the estimates for the piecewise linear regression with a breakpoint set to the date of the regulation changes on April 5, 2011. The coefficient (*ΔConstant*) reports the difference in the intercept before the regulation change and the coefficient (*ΔDate*) reports the difference in the slope before the regulation change. Robust standard errors are reported in parentheses.

	Price-spread									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	-1.41***	-1.20***	-1.15***	0.11***	0.05***	1.61***	2.17***	1.95***	2.99***	2.09***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.06)	(0.06)	(0.06)	(0.04)	(0.03)
Date	0.0000***	0.0000***	0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0001***	-0.0000***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ΔConstant						-2.88***	-3.02***	-3.04***	-4.03***	-2.14***
						(0.06)	(0.07)	(0.06)	(0.04)	(0.03)
ΔDate						0.0001***	0.0001***	0.0001***	0.0001***	0.0001***
						(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Issue dummy	-0.15***				-0.02***	-0.13***				-0.0001
	(0.001)				(0.001)	(0.001)				(0.001)
Redemption dummy		0.08***			0.14***		0.08***			0.13***
		(0.002)			(0.002)		(0.002)			(0.002)
Both dummy			0.28***		0.35***			0.23***		0.32***
			(0.003)		(0.003)			(0.003)		(0.003)
Liquidation dummy				0.26***	0.28***				0.26***	0.28***
				(0.001)	(0.001)				(0.001)	(0.001)
Fund Fixed Effects	No	No	No	No	No	No	No	No	No	No
Observations	55,479	55,479	55,479	55,479	55,479	55,479	55,479	55,479	55,479	55,479
R^2	0.19	0.12	0.18	0.62	0.80	0.26	0.22	0.26	0.70	0.83
Adjusted R^2	0.19	0.12	0.18	0.62	0.80	0.26	0.22	0.26	0.70	0.83
Rsd Std. Error	0.13	0.13	0.13	0.09	0.06	0.12	0.12	0.12	0.08	0.06

Table 6: Testing for a structural break in the price-spread of OREFs on the secondary market

This table reports the summary statistics resulting from a Wald-test that examines if the price-spread of open-end real estate funds exhibits a structural break after the regulation change on April 5, 2011. The test compares the overall linear model (3) with the piecewise linear model (4), whereby a heteroscedasticity-consistent covariance matrix is used. The first column shows residual degrees of freedom (*Res.DF*), the second column reports the degrees of freedom difference between the two models (*Df*), the third column reports the F test statistic (*F*), and the last column reports the corresponding p-value (*Pr(>F)*).

Res.Df	Df	F	Pr(>F)
55473			
55471	2	3001.4	< 2.2e-16 ***

Figure 3: Estimated break dates for the piecewise linear regression

This figure shows the residual sum of squares (RSS) estimates for the piecewise linear models with different potential break dates. Panel A shows the RSS for estimates of model (2) with numbers of traded OREF shares as the dependent variable. Panel B shows the RSS for estimates of model (4) with the price-spread as the dependent variable. The models are estimated for different daily breaks ranging from January 6, 2003, to October 18, 2017. The vertical line shows the official date of the regulatory changes of April 5, 2011.

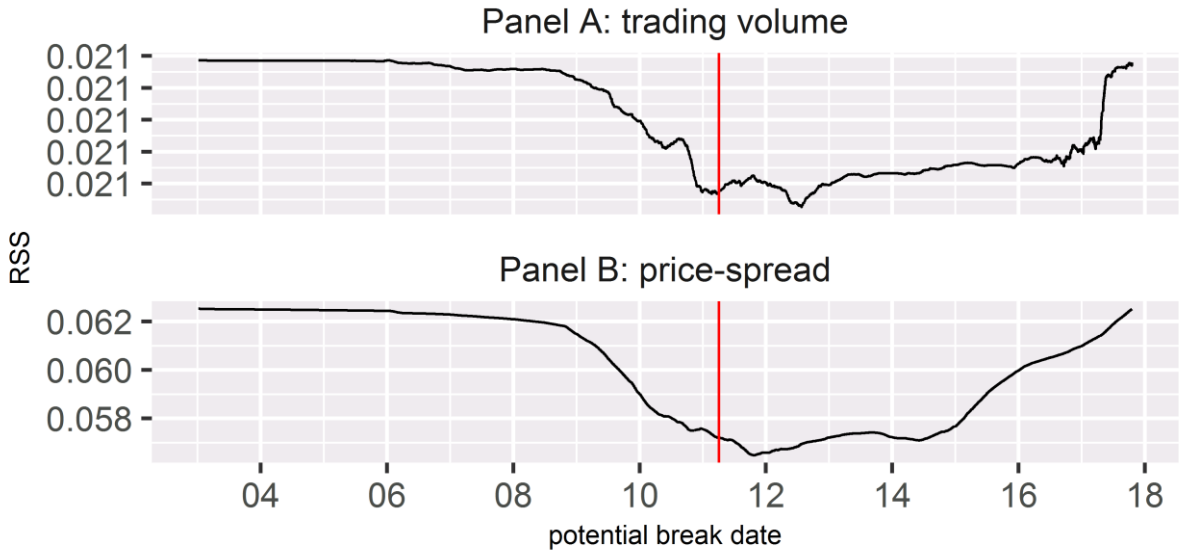

Table 7: Price-spreads of open-end real estate funds (subsample)

This table reports the results of unbalanced panel regressions examining the daily price-spreads of open-end real estate funds. The sample excludes three funds that exhibit a contingent approach instead of temporarily suspending the trading of shares. The dependent variable is difference of net asset value per share and the secondary market price per share divided by the net asset value per share (*Price-spread*). The independent variables are the trading day (*Date*), a daily dummy variable (*Issue dummy*) that equals one if the fund has suspended the issue of new shares, a daily dummy variable (*Redemption dummy*) that equals one if the fund has suspended the redemption of shares; a daily dummy variable (*Both dummy*) that equals one if the fund has suspended the issue and redemption of shares, and a daily dummy variable (*Liquidation dummy*) that equals one from that day the fund management has announced the liquidation of the fund and therefore stopped the issue and redemption of shares. All four dummy variables are mutually exclusive. Columns 1-5 report the estimates for the simple linear regression, whereas columns 6-7 report the estimates for the piecewise linear regression with a breakpoint set to the date of the regulation changes on April 5, 2011. The coefficient (*ΔConstant*) reports the difference in the intercept before the regulation change and the coefficient (*ΔDate*) reports the difference in the slope before the regulation change. Robust standard errors are reported in parentheses.

	Price-spread									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	-1.67***	-1.36***	-1.31***	0.12***	0.05***	1.90***	2.77***	2.51***	3.52***	2.46***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.06)	(0.06)	(0.06)	(0.04)	(0.03)
Date	0.0000***	0.0000***	0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0001***	-0.0001***	-0.0001***	-0.0001***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ΔConstant						-3.46***	-3.95***	-3.87***	-4.81***	-2.60***
						(0.07)	(0.07)	(0.07)	(0.05)	(0.04)
ΔDate							0.0001***	0.0001***	0.0001***	0.0001***
						(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Issue dummy	-0.18***				-0.02***	-0.15***				-0.001*
	(0.001)				(0.001)	(0.001)				(0.001)
Redemption dummy		0.07***			0.14***		0.06***			0.13***
		(0.002)			(0.002)		(0.002)			(0.002)
Both dummy			0.26***		0.35***			0.21***		0.31***
			(0.003)		(0.003)			(0.003)		(0.003)
Liquidation dummy				0.26***	0.28***				0.25***	0.27***
					(0.001)	(0.001)				(0.001)
Fund Fixed Effects	No	No	No	No	No	No	No	No	No	No
Observations	46,180	46,180	46,180	46,180	46,180	46,180	46,180	46,180	46,180	46,180
R^2	0.25	0.13	0.19	0.59	0.78	0.34	0.27	0.31	0.70	0.83
Adjusted R^2	0.25	0.13	0.19	0.59	0.78	0.34	0.27	0.30	0.70	0.83
Rsd Std. Error	0.13	0.14	0.13	0.09	0.07	0.12	0.13	0.12	0.08	0.06