# Influential Article Review - Enablers of German Stocks Periodic Return Trends

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*This paper examines investments. We present insights from a highly influential paper. Here are the highlights from this paper: Using a data set of German stocks that includes the financial crisis, this paper identifies market liquidity as the main driver of return seasonality. In comparison, the economic significance of order flow imbalance is markedly weaker. Applying panel regressions and controlling for unobserved effects, we investigate the effects of both variables simultaneously, together with dummies for calendar effects. US macroeconomic news announcements, which have been identified as one driver of return seasonality in previous studies using non-US data, are of little importance for our data set of German stocks. For our overseas readers, we then present the insights from this paper in Spanish, French, Portuguese, and German.*

*Keywords: Turn-of-the-month, Return seasonality, Market liquidity, Order imbalance*

**SUMMARY**

- Table 3 reports the regression results for the seasonal return effects estimated using Eq. . Consistent with other markets, there is pronounced seasonality in German stock returns, and it remains remarkably stable when controlling for stock-specific effects and for several seasonal effects simultaneously: Coefficients are positive and significant 5 days before the end of a month , and then from 3 days before to 2 days after the end of a month . The average daily return is appr. 20–50 bp higher during that period. This is in contrast to previous papers, where positive returns were found to be concentrated on days after the month end.
- Due to the large number of coefficients, the results from Eq. are split across five tables: Table 4 shows the dummy variables for the TOM effect only. For ease of comparison among the independent variables, it is focused on the average effect of each coefficient, which has been calculated by multiplying each coefficient by the average value of the respective independent variable. Average effects have been multiplied by 104. The significance of the coefficients is given, as well. For comparison purposes, the second column gives the original TOM effect from Eq. , where explanatory variables such as liquidity or order imbalances have not been considered. Tables 5, 6, 7 and 8 are structured similarly, but they focus on effects around the quarter end , the year end , across weekdays or months .

- Comparing columns 2 and 3 in Table 4 shows that the TOM effect shrinks markedly when including explanatory variables. Significance and average effects for the coefficients on days − 3 to + 2 are markedly lower with the coefficients on days − 1 to + 2 turning insignificant . Thus, a large part of the TOM effect is explained by liquidity and order imbalance . The interacted variables in columns 4 to 7 show that liquidity variables are the more important driver for the TOM effect when compared to the economic effects of order imbalance . The general relation between order imbalance and returns described by Hanke and Weigerding is statistically significant in our study as well, particularly around the month end, but its economic impact is small with average effects around 1 bp . By contrast, liquidity variables explain return seasonality by up to appr.
- Simple frequency calculations show that the US macroeconomic news announcements that may be significant for the German market cluster on days 1, 3, and 5 after a month end, when data on employment and ISM indices are due. This pattern holds in the correlation between the news announcement dates and the seasonality dummy variables: Table 10 shows that there are positive, double-digit correlations on days 1, 3, and 5 after a month end .

**HIGHLY INFLUENTIAL ARTICLE**

We used the following article as a basis of our evaluation:

Weigerding, M., & Hanke, M. (2018). Drivers of seasonal return patterns in German stocks. Business Research, 11(1), 173–196.

This is the link to the publisher's website:
https://link.springer.com/article/10.1007/s40685-017-0060-0

**INTRODUCTION**

More than four decades ago, Fama (1970) published his seminal paper on efficient capital markets. Many empirical papers that appeared in the 40+ years since then described systematic deviations from the Efficient Markets Hypothesis, often referred to as anomalies. Whereas many such anomalies vanished shortly after their publication, others still persist (for an overview, see Zacks 2011). In particular, seasonal patterns with stock returns on specific days being systematically higher/lower than those on other days (e.g., the so-called turn-of-the-month effect) show remarkable persistence over time. This type of seasonality in returns is well-documented for several countries, and it has been existing for more than 20 years (Liu 2013). The literature considered three main potential reasons for return seasonality: order flow (or order imbalance), market liquidity, and announcements of macroeconomic news (see, e.g., Zwergel 2010).

The present paper documents seasonalities in returns on German stocks and tests these three potential drivers. Using a fixed-effects panel regression methodology, we investigate order imbalance and market liquidity simultaneously, controlling for unobserved effects. Previous studies have focused on only one of these explanations at a time. In addition, our focus on German stocks yields insights into a market which is relevant at the international level, but which has not yet been investigated to the same extent as, e.g., US markets. The paper contributes to the empirical literature in several ways: First, we document a relation between daily liquidity and return patterns of individual stocks, which provides evidence for market liquidity to play an important role for return seasonality. Second, in contrast to other studies, which analyze liquidity considerations of select groups of market participants, we find a link between aggregate order

(flow) imbalance and return seasonality. However, despite its statistical significance, the effect of order imbalance on return seasonality is found to be negligible in economic terms. Third, whereas US macroeconomic news announcements have been documented to be an important driver of return seasonality in stock indices also outside the US (Nikkinen et al. 2007a, 2009), we find no significant effects of these announcements on return seasonality in individual German stocks.

The remainder of the paper is organized as follows: Sect. 2 gives an overview of empirical research on return seasonality and its main potential explanations discussed in the literature. Sect. 3 defines the variables and the regression models used. Sect. 4 describes our data together with the sample selection criteria applied. Sect. 5 presents our results, and Sect. 6 concludes.

## CONCLUSION

This paper sheds light on the drivers behind seasonality in German stock returns. Using a fixed-effects panel regression methodology, we analyzed liquidity and order imbalance simultaneously as potential explanatory factors. We found that market liquidity has the strongest influence on return patterns: Although we use daily data (as opposed to intra-day data), we find that the variation in bid-ask spreads and the Amihud (2002) ratio accounts for a sizeable proportion of return seasonality. Thus, liquidity seems to be a major driver behind calendar effects at the level of individual stocks. Future research should look more deeply into this relationship for intra-day data as the link may be even more pronounced there. Market liquidity considerations could also be the reason why the TOM effect recently has moved to earlier days, a finding from the recent literature that was confirmed in this paper. By contrast, a shift in return patterns cannot be explained by fixed-date macroeconomic news, which cluster in the first third of a month. Accordingly, we do not find evidence that US macroeconomic news announcements drive return patterns on a broader scale.

Its relation to liquidity dynamics may also explain why order flow is considered a seasonality driver. While most previous studies have focused on flow considerations of select investor groups, this paper analyzes order flow imbalances in aggregate, taking into account orders from all investors active in the market. This setup allows to verify that the variation in order imbalance is indeed related to return patterns. However, the impact of a change in order imbalance is small in economic terms. Besides, this study documents that order flow imbalance is subject to recurring patterns. This suggests that the general imbalance-return links found by previous studies may be partly related to calendar effects.

Limitations of our study could be seen in the news announcement variable indicating the announcement dates of US (instead of German) data. Similar to the approach in Nikkinen et al. (2007a), which we follow here, our study neglects news outside the US and the news direction (positive vs. negative). Moreover, we do not apply instrumental variable estimation, which might be another limitation in case there were endogeneity in the data set.

Our study focuses on the channels through which return patterns are affected, and it reveals liquidity as the main channel. To better understand the mechanisms behind this effect, future research should investigate the causes of fluctuations in liquidity. Kamstra et al. (2017), e.g., argue that mood changes may influence risk aversion during a year. While they suggest that mood changes influence stock return through fund flows, we could imagine that behavioral patterns can also explain fluctuations in liquidity. In addition, liquidity patterns around the month, quarter or year end may be driven by regulatory considerations or behavioral drivers. It therefore seems interesting to analyze whether there are common drivers affecting both return and liquidity.

## APPENDIX

**TABLE 1**
**NUMBER OF STOCKS INCLUDED IN THE FINAL SAMPLE BY SUBPERIOD (OUT OF 1,225 STOCKS IN THE INITIAL DATA SET)**

| Subperiod | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|
| # stocks | 63 | 62 | 86 | 105 | 127 | 169 | 153 | 127 |

Subperiods 2002 and 2009 do not cover the entire year. In total, 212 stocks are included in the sample

**TABLE 2**
**DESCRIPTIVE STATISTICS FOR THE FINAL SAMPLE (ALL VALUES IN PERCENT)**

| | Return | Bid-ask spread | Amihud (2002) illiquidity | Turnover | Order imbalance |
|---|---|---|---|---|---|
| Mean | − 0.03 | 0.47 | 0.00 | 0.60 | 0.35 |
| Standard deviation | 2.99 | 0.53 | 0.00 | 0.85 | 21.02 |
| Minimum | − 133.18 | 0.00 | 0.00 | 0.00 | − 95.24 |
| Maximum | 84.16 | 14.97 | 0.00 | 41.46 | 94.74 |
| Share of negative values | 50.29 | 0.00 | 0.00 | 0.00 | 48.72 |
| Share of positive values (incl.zero) | 49.71 | 100.00 | 100.00 | 100.00 | 51.28 |
| **Correlation** | | | | | |
| Return | 100.00 | | | | |
| Bid-ask spread | − 2.81 | 100.00 | | | |
| Amihud (2002) illiquidity | − 2.86 | 33.26 | 100.00 | | |
| Turnover | 0.00 | − 12.64 | − 9.27 | 100.00 | |
| Order imbalance | 26.84 | − 1.61 | − 4.69 | 5.11 | 100.00 |
| **Autocorrelation** | | | | | |
| Lag 1 | 3.51 | 52.37 | 40.89 | 67.27 | 25.92 |
| Lag 2 | − 1.24 | 50.85 | 39.08 | 57.89 | 19.11 |
| Lag 3 | − 1.38 | 49.90 | 38.10 | 53.85 | 15.49 |
| Lag 4 | 1.01 | 48.93 | 38.75 | 50.82 | 14.65 |
| Lag 5 | − 2.16 | 48.30 | 36.25 | 49.83 | 13.34 |

**FIGURE 1**
**TURN-OF-THE-MONTH EFFECT IN ORDER IMBALANCE AND LIQUIDITY LEVELS**

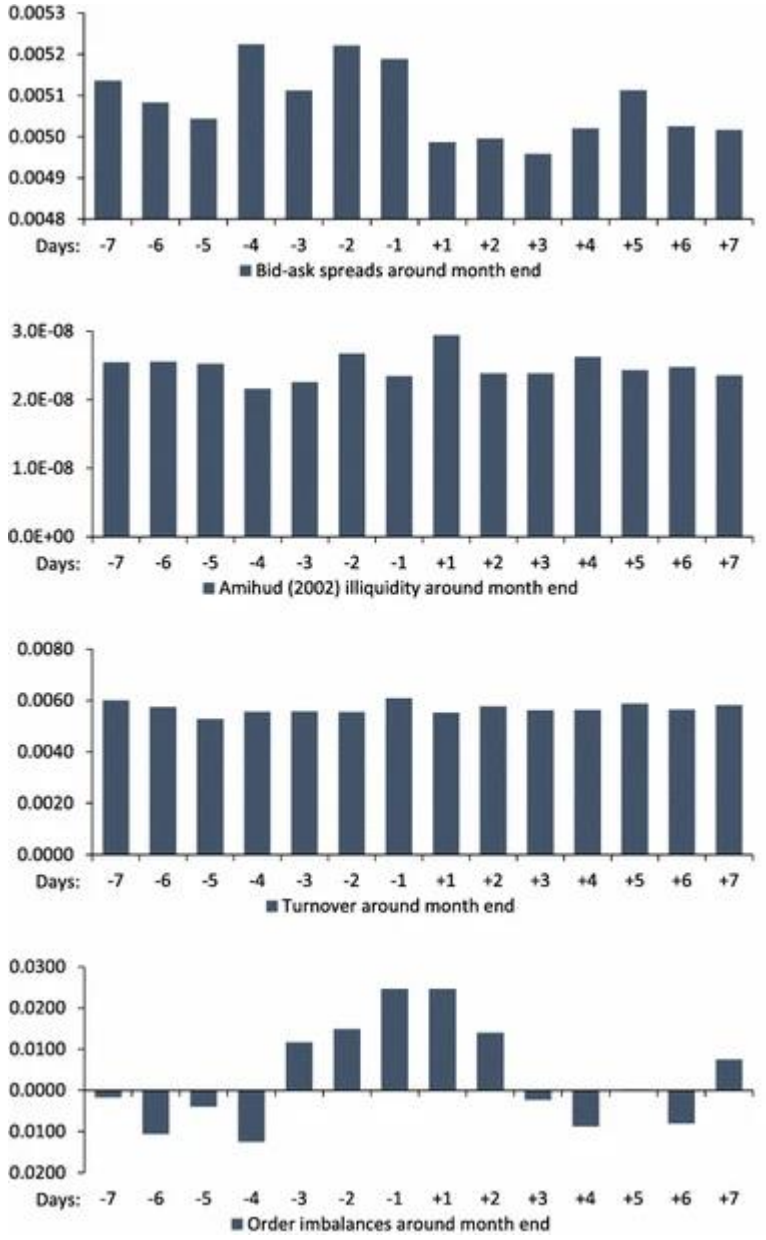

**TABLE 3**
**SEASONALITY IN RETURNS**

| | TOM effect ($M_{d,t}$) | | TOQ effect ($Q_{d,t}$) | | TOY effect ($Y_{d,t}$) | |
|---|---|---|---|---|---|---|
| | Coeff. | Av. effect | Coeff. | Av. effect | Coeff. | Av. effect |
| $d=-7$ | 3 | 3 | 10 | 10 | 40*** | 39 |
| $d=-6$ | 3 | 3 | − 44*** | − 43 | − 39*** | − 39 |
| $d=-5$ | 26*** | 25 | − 16** | − 16 | 42*** | 42 |
| $d=-4$ | 4 | 4 | 3 | 3 | − 38*** | − 38 |
| $d=-3$ | 54*** | 52 | − 53*** | − 52 | 47*** | 47 |
| $d=-2$ | 35*** | 33 | − 50*** | − 49 | 112*** | 111 |
| $d=-1$ | 40*** | 38 | − 13** | − 13 | − 13 | − 13 |
| $d=+1$ | 19*** | 18 | 44*** | 44 | 73*** | 73 |
| $d=+2$ | 39*** | 37 | 11 | 11 | − 66*** | − 66 |
| $d=+3$ | 0 | 0 | 9 | 9 | − 56*** | − 56 |
| $d=+4$ | − 21*** | − 20 | − 35*** | − 35 | 50*** | 50 |
| $d=+5$ | − 17*** | − 16 | 21*** | 21 | − 41*** | − 41 |
| $d=+6$ | 12*** | 12 | − 58*** | − 57 | − 20* | − 20 |
| $d=+7$ | 10*** | 9 | 29*** | 28 | − 25** | − 25 |

| Weekday effect ($W_{w,t}$) | | | Month effect ($N_{n,t}$) | | |
|---|---|---|---|---|---|
| Monday | − 5** | − 4 | January | − 4 | − 4 |
| Tuesday | − 7*** | − 6 | February | − 2 | − 2 |
| Thursday | 1 | 1 | March | 11*** | 10 |
| Friday | 7*** | 6 | April | 24*** | 22 |
| | | | May | − 3 | − 3 |
| | | | June | − 4 | − 4 |
| | | | July | − 4 | − 4 |
| | | | September | − 12*** | − 11 |
| | | | October | − 14*** | − 13 |
| | | | November | − 10*** | − 9 |
| | | | December | 1 | 1 |

TOM turn-of-the-month , TOQ turn-of-the-quarter, TOY turn-of-the-year effect, estimated using the fixedeffects panel regression from Eq. (14). Dependent variable: daily closing mid-quote return. Independent variables: dummy variables for days around month ends, quarter ends, and year ends, and for weekdays and months. Stock-specific effects are controlled. t-statistics and p-values are based on heteroskedasticityrobust standard errors following White (1980). Coefficients and average effects have been multiplied by 104. The latter are calculated by multiplying the coefficient by the average value of the independent variable. ***, ** and * denote significance at the 1, 5 and 10% level respectively

**TABLE 4**
**EFFECTS OF LIQUIDITY AND ORDER IMBALANCE ON RETURNS, PART 1: TURN OF THE MONTH EFFECT**

| | Non-interacted avrg. TOM from | | Average effect for TOM ($M_{d,t}$) from Eq. (15) interacted with | | | |
|---|---|---|---|---|---|---|
| | Eq. (14) (for comparison) | Eq. (15) | Bid-ask spread | Amihud (2002) ratio | Turnover | Order imbalance |
| $d = -7$ | 3 | 12 | − 9* | − 3 | 1 | 0*** |
| $d = -6$ | 3 | 14 | 0 | − 4* | − 7 | 0** |
| $d = -5$ | 25*** | 8 | 0 | 0 | 17** | 0** |
| $d = -4$ | 4 | 0 | 2 | 1 | 2 | 1*** |
| $d = -3$ | 52*** | 35*** | 5 | 1 | 9 | 0 |
| $d = -2$ | 33*** | 18** | 8 | 6*** | − 2 | 1** |
| $d = -1$ | 38*** | 0 | 13** | 2 | 14 | − 1*** |
| $d = +1$ | 18*** | − 10 | 7 | − 4* | 16* | 1* |
| $d = +2$ | 37*** | 11 | 12** | 3 | 4 | 1* |
| $d = +3$ | 0 | 8 | 1 | 1 | − 8 | 0 |
| $d = +4$ | − 20*** | − 12 | 9* | − 11*** | − 6 | 0 |
| $d = +5$ | − 16*** | − 25*** | 6 | 2 | 1 | 0 |
| $d = +6$ | 12*** | − 9 | 12*** | − 1 | 10* | 0 |
| $d = +7$ | 9*** | 6 | 3 | − 1 | − 2 | 0 |

Table shows average economic effects for the fixed-effects panel regressions from Eq. (14) (for comparison purposes, see Table 3) and Eq. (15). Dependent variable: daily closing mid-quote return. Independent variables shown in this table: dummy variables for days around month ends and their interacted terms (for other effects see Tables 5, 6, 7 and 8). Stock-specific effects are controlled for. tstatistics and p-values are based on heteroskedasticity-robust standard errors following White (1980). Coefficients and average effects have been multiplied by 104. The latter have been calculated by multiplying each coefficient by the average value of the respective independent variable. ***, ** and * denote significance at the 1, 5 and 10% level respectively

**TABLE 5**
**EFFECTS OF LIQUIDITY AND ORDER IMBALANCE ON RETURNS, PART 2: TURN OF THE QUARTER EFFECT**

| | Non-interacted avrg. TOQ from | | Average effect for TOQ ($Q_{d,t}$) from Eq. (15) interacted with | | | |
|---|---|---|---|---|---|---|
| | Eq. (14) (for comparison) | Eq. (15) | Bid-ask spread | Amihud (2002) ratio | Turnover | Order imbalance |
| $d = -7$ | 10 | − 31** | 21** | 7 | 15 | 0*** |
| $d = -6$ | − 43*** | − 28* | − 9 | − 10*** | 3 | 1 |
| $d = -5$ | − 16** | − 4 | − 6 | − 1 | − 8 | 0 |
| $d = -4$ | 3 | − 12 | 17* | 0 | 3 | 0 |
| $d = -3$ | − 52*** | − 18 | − 5 | − 7 | − 37** | 0 |
| $d = -2$ | − 49*** | 104* | − 52*** | − 15*** | − 88* | 1 |
| $d = -1$ | − 13** | 20 | − 14 | − 4 | − 13 | 1 |
| $d = +1$ | 44*** | 63*** | − 14 | 5 | − 16 | − 4*** |
| $d = +2$ | 11 | 14 | − 6 | − 8* | 9 | 0 |
| $d = +3$ | 9 | − 15 | 0 | − 7** | 24* | 0*** |
| $d = +4$ | − 35*** | 24 | − 18 | − 8 | − 29 | 1** |
| $d = +5$ | 21*** | 38*** | − 10 | − 13** | − 1 | 0 |
| $d = +6$ | − 57*** | 36** | − 38*** | − 24*** | − 37*** | 1*** |
| $d = +7$ | 28*** | 27 | − 13 | 10* | 2 | − 2*** |

Table shows average economic effects for the fixed-effects panel regressions from Eq. (14) (for comparison purposes, see Table 3) and Eq. (15). Dependent variable: daily closing mid-quote return. Independent variables shown in this table: dummy variables for days around quarter ends and their interacted terms (for other effects see Tables 4, 6, 7 and 8). Stock-specific effects are controlled for. tstatistics and p-values are based on heteroskedasticity-robust standard errors following White (1980). Coefficients and average effects have been multiplied by 104. The latter have been calculated by multiplying each coefficient by the average value of the respective independent variable. ***, ** and * denote significance at the 1, 5 and 10% level respectively

**TABLE 6**
**EFFECTS OF LIQUIDITY AND ORDER IMBALANCE ON RETURNS, PART 3: TURN OF THE YEAR EFFECT**

| | Non-interacted avrg. TOY from | | Average effect for TOY ($Y_{d,1}$) from Eq. (15) interacted with | | | |
|---|---|---|---|---|---|---|
| | Eq. (14) (for comparison) | Eq. (15) | Bid-ask spread | Amihud (2002) ratio | Turnover | Order imbalance |
| $d = -7$ | 39*** | 13 | − 10 | − 2 | 27 | 0 |
| $d = -6$ | − 39*** | − 20 | 13 | 3 | − 18 | 0 |
| $d = -5$ | 42*** | − 61* | 50** | 8 | 40** | 0 |
| $d = -4$ | − 38*** | 14 | − 27** | − 9 | − 15 | 0 |
| $d = -3$ | 47*** | − 64** | 21 | 10 | 96*** | − 1 |
| $d = -2$ | 111*** | − 166** | 79*** | 24** | 160*** | 0 |
| $d = -1$ | − 13 | − 40* | 17 | − 1 | 11 | 3*** |
| $d = +1$ | 73*** | − 24 | 16 | 24*** | 55** | − 10*** |
| $d = +2$ | − 66*** | 37 | 27 | 14 | − 1 | − 1 |
| $d = +3$ | − 56*** | − 16 | − 2 | − 1 | − 31* | − 3** |
| $d = +4$ | 50*** | − 14 | 2 | 7 | 40* | − 2** |
| $d = +5$ | − 41*** | − 16 | − 7 | 15** | − 27 | 0 |
| $d = +6$ | − 20* | − 20 | 15 | 17** | − 14 | − 2 |
| $d = +7$ | − 25** | − 15 | 2 | − 11** | 0 | 0 |

Table shows average economic effects for the fixed-effects panel regressions from Eq. (14) (for comparison purposes, see Table 3) and Eq. (15). Dependent variable: daily closing mid-quote return. Independent variables shown in this table: dummy variables for days around year ends and their interacted terms (for other effects see Tables 4, 5, 7 and 8). Stock-specific effects are controlled for. t-statistics and p-values are based on heteroskedasticity-robust standard errors following White (1980). Coefficients and average effects have been multiplied by 104. The latter have been calculated by multiplying each coefficient by the average value of the respective independent variable. ***, ** and * denote significance at the 1, 5 and 10% level respectively

**TABLE 7**
**EFFECTS OF LIQUIDITY AND ORDER IMBALANCE ON RETURNS, PART 4: WEEKDAY EFFECT**

| | Non-interacted avrg. weekday effect from | | Average weekday effect ($W_{w,t}$) from Eq. (15) interacted with | | | |
|---|---|---|---|---|---|---|
| | Eq. (14) (for comparison) | Eq. (15) | Bid-ask spread | Amihud (2002) ratio | Turnover | Order imbalance |
| Monday | − 4** | 0 | 0 | 3** | − 5 | 0*** |
| Tuesday | − 6*** | − 13*** | 6** | 1 | 4 | 0 |
| Thursday | 1 | − 4 | 5** | 2* | 0 | 0* |
| Friday | 6*** | − 6 | 7*** | 1 | 5 | 0*** |

Table shows average economic effects for the fixed-effects panel regressions from Eq. (14) (for comparison purposes, see Table 3) and Eq. (15). Dependent variable: daily closing mid-quote return. Independent variables shown in this table: dummy variables for weekdays and their interacted terms (for other effects see Tables 4, 5, 6 and 8). Stock-specific effects are controlled for. t-statistics and p-values are based on heteroskedasticity-robust standard errors following White (1980). Coefficients and average effects have been multiplied by 104: The latter have been calculated by multiplying each coefficient by the average value of the respective independent variable. ***, ** and * denote significance at the 1%, 5% and 10% level respectively

**TABLE 8**
**EFFECTS OF LIQUIDITY AND ORDER IMBALANCE ON RETURNS, PART 5: MONTH EFFECT**

| | Non-interacted avrg. month effect from | | Average month effect ($N_{n,t}$) from Eq. (15) interacted with | | | |
|---|---|---|---|---|---|---|
| | Eq. (14) (for comparison) | Eq. (15) | Bid-ask spread | Amihud (2002) ratio | Turnover | Order imbalance |
| January | − 4 | − 16* | 0 | 4*** | 11 | 0 |
| February | − 2 | − 1 | 0 | 1 | 11 | 0*** |
| March | 10*** | − 19** | 9** | 2 | 18** | 0 |
| April | 22*** | − 2 | 3 | 6*** | 13* | 1*** |
| May | − 3 | − 7 | − 4 | 2 | 7 | 0 |
| June | − 4 | − 13 | 5 | 1 | 6 | 0* |
| July | − 4 | − 1 | − 2 | 3* | − 3 | 0 |
| September | − 11*** | 7 | − 7* | − 2 | − 5 | 0 |
| October | − 13*** | − 9 | 0 | 3 | − 1 | 1*** |
| November | − 9*** | − 17** | 5 | 0 | 5 | 0*** |
| December | 1 | 2 | − 6 | 4*** | 3 | 0** |

Table shows average economic effects for the fixed-effects panel regressions from Eq. (14) (for comparison purposes, see Table 3) and Eq. (15). Dependent variable: daily closing mid-quote return. Independent variables shown in this table: dummy variables for months and their interacted terms (for other effects see Tables 4, 5, 6 and 7). Stock-specific effects are controlled for. t-statistics and p-values are based on heteroskedasticity-robust standard errors following White (1980). Coefficients and average effects have been multiplied by 104. The latter have been calculated by multiplying each coefficient by the average value of the respective independent variable. ***, ** and * denote significance at the 1%, 5% and 10% level respectively

**TABLE 9**
**CORRELATION OF EXPLANATORY VARIABLES AND ERROR TERMS (ALL VALUES IN PERCENT)**

| Explanatory variable | Correlation |
|---|---|
| Bid-ask spread | 0.15 |
| Amihud (2002) illiquidity | 0.31 |
| Turnover | 1.10 |
| Order imbalance | 1.09 |

Correlation between error terms from Eq. (15) and variables

**TABLE 10**
**CORRELATION OF NEWS ANNOUNCEMENT DATES WITH DUMMY VARIABLES**

| Correlation with $M_{d,t}$ | | $Q_{d,t}$ | $Y_{d,t}$ | $W_{w,t}$ | | $N_{n,t}$ | |
|---|---|---|---|---|---|---|---|
| $d = -7$ | 3.5 | − 5.5 | − 1.8 | Monday | − 6.9 | January | 0.6 |
| $d = -6$ | − 4.6 | − 5.7 | − 2.5 | Tuesday | − 6.8 | February | − 2.5 |
| $d = -5$ | − 10.3 | − 5.8 | − 2.4 | Thursday | − 6.8 | March | − 1.4 |
| $d = -4$ | − 9.9 | − 5.8 | − 2.8 | Friday | 22.0 | April | 3.6 |
| $d = -3$ | − 10.1 | − 5.9 | − 2.8 | | | May | − 6.1 |
| $d = -2$ | − 10.0 | − 5.3 | − 1.5 | | | June | − 1.1 |
| $d = -1$ | − 9.1 | − 3.7 | − 2.0 | | | July | 3.6 |
| $d = +1$ | 36.4 | 22.1 | − 1.0 | | | September | − 1.4 |
| $d = +2$ | 1.7 | 2.6 | 8.3 | | | October | 2.8 |
| $d = +3$ | 29.0 | 15.1 | 0.5 | | | November | 0.0 |
| $d = +4$ | 4.8 | 6.8 | 1.7 | | | December | 3.0 |
| $d = +5$ | 13.4 | 6.8 | 3.9 | | | | |
| $d = +6$ | − 7.8 | − 3.4 | − 1.7 | | | | |
| $d = +7$ | − 9.4 | − 5.8 | − 2.9 | | | | |

Correlation numbers in percent

**TABLE 11**
**SEASONALITY IN RETURNS AFTER REMOVING NEWS EFFECTS**

| | TOM effect ($M_{d,t}$) | | TOQ effect ($Q_{d,t}$) | | TOY effect ($Y_{d,t}$) | |
|---|---|---|---|---|---|---|
| | Coeff. | Av. effect | Coeff. | Av. effect | Coeff. | Av. effect |
| $d = -7$ | 2 | 2 | 9 | 9 | 42*** | 42 |
| $d = -6$ | 3 | 2 | − 45*** | − 44 | − 39*** | − 39 |
| $d = -5$ | 25*** | 24 | − 17** | − 16 | 42*** | 42 |
| $d = -4$ | 3 | 3 | 2 | 2 | − 37*** | − 37 |
| $d = -3$ | 53*** | 51 | − 54*** | − 53 | 48*** | 48 |
| $d = -2$ | 28*** | 27 | − 45*** | − 44 | 112*** | 112 |
| $d = -1$ | 27*** | 25 | − 1 | − 1 | − 12 | − 12 |
| $d = +1$ | − 4 | − 3 | 43*** | 43 | 97*** | 97 |
| $d = +2$ | 35*** | 33 | 14* | 14 | − 65*** | − 65 |
| $d = +3$ | 2 | 2 | 11 | 11 | − 62*** | − 62 |
| $d = +4$ | − 23*** | − 22 | − 31*** | − 31 | 49*** | 48 |
| $d = +5$ | − 22*** | − 21 | 23*** | 23 | − 41*** | − 41 |
| $d = +6$ | 10*** | 9 | − 56*** | − 55 | − 20* | − 20 |
| $d = +7$ | 8** | 7 | 31*** | 31 | − 25** | − 25 |
| Weekday effect ($W_{w,t}$) | | | | Month effect ($N_{n,t}$) | | |
| Monday | − 5** | − 4 | | January | − 7* | − 6 |
| Tuesday | − 7*** | − 6 | | February | − 1 | − 1 |
| Thursday | 1 | 1 | | March | 10*** | 10 |
| Friday | 5*** | 4 | | April | 21*** | 19 |
| | | | | May | − 3 | − 3 |
| | | | | June | − 5* | − 5 |
| | | | | July | − 7** | − 6 |
| | | | | September | − 12*** | − 11 |
| | | | | October | − 17*** | − 16 |
| | | | | November | − 10*** | − 9 |
| | | | | December | 0 | 0 |

TOM turn-of-the-month, TOQ turn-of-the-quarter, TOY turn-of-the-year effect, estimated using the fixedeffects panel regression from Eq. (14). Dependent variable: residuals from Eq. (16). Independent variables: dummy variables for days around month ends, quarter ends, and year ends, and for weekdays and months. Stock-specific effects are controlled. t-statistics and p-values are based on heteroskedasticityrobust standard errors following White (1980). Coefficients and average effects have been multiplied by 104. The latter are calculated by multiplying the coefficient by the average value of the independent variable. ***, ** and * denote significance at the 1, 5 and 10% level respectively

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**TRANSLATED VERSION: SPANISH**

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

**VERSION TRADUCIDA: ESPAÑOL**

A continuación se muestra una traducción aproximada de las ideas presentadas anteriormente. Esto se hizo para dar una comprensión general de las ideas presentadas en el documento. Por favor, disculpe cualquier error gramatical y no responsabilite a los autores originales de estos errores.

## INTRODUCCIÓN

Hace más de cuatro décadas, Fama (1970) publicó su artículo seminal sobre los mercados de capitales eficientes. Muchos documentos empíricos que aparecieron en los más de 40 años desde entonces describían desviaciones sistemáticas de la hipótesis de los mercados eficientes, a menudo denominadas anomalías. Mientras que muchas de estas anomalías desaparecieron poco después de su publicación, otras persisten (para una visión general, véase Zacks 2011). En particular, los patrones estacionales con rendimientos de las existencias en días específicos son sistemáticamente más altos/menores que los de otros días (por ejemplo, el llamado efecto de cambio de mes) muestran una persistencia notable a lo largo del tiempo. Este tipo de estacionalidad en los rendimientos está bien documentado para varios países, y ha existido durante más de 20 años (Liu 2013). La literatura examinó tres posibles razones para la estacionalidad del retorno: el flujo de órdenes (o el desequilibrio de la orden), la liquidez del mercado y los anuncios de noticias macroeconómicas (véase, por ejemplo, Zwergel 2010).

El presente documento documenta las estacionalidades en las devoluciones de las existencias alemanas y pone a prueba a estos tres potenciales conductores. Utilizando una metodología de regresión de panel de efectos fijos, investigamos simultáneamente el desequilibrio de órdenes y la liquidez del mercado, controlando los efectos no observados. Estudios previos se han centrado en sólo una de estas explicaciones a la vez. Además, nuestro enfoque en las acciones alemanas arroja información sobre un mercado que es relevante a nivel internacional, pero que aún no se ha investigado en la misma medida que, por ejemplo, los mercados estadounidenses. El documento contribuye a la literatura empírica de varias maneras: En primer lugar, documentamos una relación entre la liquidez diaria y los patrones de rentabilidad de las acciones individuales, lo que proporciona evidencia para que la liquidez del mercado desempeñe un papel importante para la estacionalidad del retorno. En segundo lugar, a diferencia de otros estudios, que analizan las consideraciones de liquidez de grupos selectos de participantes en el mercado, encontramos un vínculo entre el desequilibrio de orden agregado (flujo) y la estacionalidad de retorno. Sin embargo, a pesar de su importancia estadística, se constata que el efecto del desequilibrio de orden en la estacionalidad de la rentabilidad es insignificante en términos económicos. En tercer lugar, mientras que los anuncios de noticias macroeconómicas de Estados Unidos han sido documentados como un importante motor de la estacionalidad de la rentabilidad en los índices bursátiles también fuera de los Estados Unidos (Nikkinen et al. 2007a, 2009), no encontramos efectos significativos de estos anuncios sobre la estacionalidad de la rentabilidad en las acciones alemanas individuales.

El resto del documento se organiza de la siguiente manera: Secta. 2 ofrece una visión general de la investigación empírica sobre la estacionalidad del retorno y sus principales explicaciones potenciales discutidas en la literatura. Secta. 3 define las variables y los modelos de regresión utilizados. Secta. 4 describe nuestros datos junto con los criterios de selección de muestra aplicados. Secta. 5 presenta nuestros resultados, y Sect. 6 concluye.

## CONCLUSIÓN

Este artículo arroja luz sobre los conductores detrás de la estacionalidad en las devoluciones de acciones alemanas. Utilizando una metodología de regresión de panel de efectos fijos, analizamos la liquidez y el desequilibrio de órdenes simultáneamente como posibles factores explicativos. Encontramos que la liquidez del mercado tiene la mayor influencia en los patrones de rentabilidad: aunque utilizamos datos diarios (a diferencia de los datos intradía), encontramos que la variación en los diferenciales de solicitud de oferta y la relación Amihud (2002) representa una proporción considerable de estacionalidad de retorno. Por lo tanto, la liquidez parece ser un importante impulsor de los efectos del calendario a nivel de acciones individuales. La investigación futura debe mirar más profundamente en esta relación para los datos intradía,

ya que el enlace puede ser aún más pronunciado allí. Las consideraciones de liquidez del mercado también podrían ser la razón por la que el efecto TOM se ha trasladado recientemente a días anteriores, una constatación de la literatura reciente que se confirmó en este documento. Por el contrario, un cambio en los patrones de retorno no puede explicarse por las noticias macroeconómicas de fecha fija, que se agrupan en el primer tercio de un mes. En consecuencia, no encontramos pruebas de que los anuncios de noticias macroeconómicas de los Estados Unidos impulsen los patrones de retorno a una escala más amplia.

Su relación con la dinámica de liquidez también puede explicar por qué el flujo de órdenes se considera un impulsor de la estacionalidad. Si bien la mayoría de los estudios anteriores se han centrado en las consideraciones de flujo de grupos de inversores selectos, este documento analiza los desequilibrios del flujo de órdenes en conjunto, teniendo en cuenta las órdenes de todos los inversores activos en el mercado. Esta configuración permite verificar que la variación en el desequilibrio de orden está realmente relacionada con los patrones de retorno. Sin embargo, el impacto de un cambio en el desequilibrio de orden es pequeño en términos económicos. Además, este estudio documenta que el desequilibrio de flujo de orden está sujeto a patrones recurrentes. Esto sugiere que los enlaces generales de retorno de desequilibrio encontrados por estudios anteriores pueden estar en parte relacionados con los efectos del calendario.

Las limitaciones de nuestro estudio se pueden ver en la variable de anuncio de noticias que indica las fechas de anuncio de los datos de EE. UU. (en lugar de alemán). Similar al enfoque en Nikkinen et al. (2007a), que seguimos aquí, nuestro estudio descuida las noticias fuera de los EE.UU. Y la dirección de las noticias (positiva frente a negativa). Además, no aplicamos la estimación de variables instrumentales, que podría ser otra limitación en caso de que hubiera endogeneidad en el conjunto de datos.

Nuestro estudio se centra en los canales a través de los cuales se ven afectados los patrones de retorno, y revela liquidez como canal principal. Para comprender mejor los mecanismos detrás de este efecto, la investigación futura debe investigar las causas de las fluctuaciones en la liquidez. (2017), por ejemplo, argumentan que los cambios de humor pueden influir en la aversión al riesgo durante un año. Si bien sugieren que los cambios de humor influyen en el retorno de las acciones a través de los flujos de fondos, podríamos imaginar que los patrones de comportamiento también pueden explicar las fluctuaciones en la liquidez. Además, los patrones de liquidez alrededor del mes, trimestre o año final pueden ser impulsados por consideraciones regulatorias o conductores de comportamiento. Por lo tanto, parece interesante analizar si hay factores comunes que afectan tanto al retorno como a la liquidez.

## TRANSLATED VERSION: FRENCH

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

## VERSION TRADUITE: FRANÇAIS

Voici une traduction approximative des idées présentées ci-dessus. Cela a été fait pour donner une compréhension générale des idées présentées dans le document. Veuillez excuser toutes les erreurs grammaticales et ne pas tenir les auteurs originaux responsables de ces erreurs.

## INTRODUCTION

Il y a plus de quatre décennies, Fama (1970) a publié son article fondateur sur l'efficacité des marchés financiers. De nombreux articles empiriques publiés au cours des plus de 40 ans depuis lors ont décrit des écarts systématiques par rapport à l'hypothèse des marchés efficaces, souvent appelées anomalies. Alors que de nombreuses anomalies de ce type ont disparu peu de temps après leur publication, d'autres persistent encore (pour un aperçu, voir Zacks 2011). En particulier, les tendances saisonnières, les rendements des stocks sur des jours spécifiques étant systématiquement plus élevés/inférieurs à ceux des autres jours (p. Ex., l'effet dit de tour du mois) montrent une persistance remarquable au fil du temps. Ce type de

saisonnalité des rendements est bien documenté pour plusieurs pays, et il existe depuis plus de 20 ans (Liu 2013). La documentation a examiné trois raisons potentielles principales de la saisonnalité des rendements : le flux des commandes (ou le déséquilibre des commandes), la liquidité du marché et les annonces d'actualités macroéconomiques (voir, par exemple, Zwergel 2010).

Le présent documente les variations saisonnières des rendements des stocks allemands et teste ces trois facteurs potentiels. À l'aide d'une méthodologie de régression des panneaux d'effets fixes, nous étudions simultanément le déséquilibre des commandes et la liquidité du marché, en tenant compte des effets non observés. Les études précédentes se sont concentrées sur une seule de ces explications à la fois. En outre, notre focalisation sur les actions allemandes donne un aperçu d'un marché qui est pertinent au niveau international, mais qui n'a pas encore fait l'objet d'une enquête dans la même mesure que, par exemple, les marchés américains. L'article contribue à la littérature empirique de plusieurs façons : Tout d'abord, nous documentons une relation entre la liquidité quotidienne et les modèles de rendement des actions individuelles, ce qui fournit des preuves que la liquidité du marché joue un rôle important pour la saisonnalité des rendements. Deuxièmement, contrairement à d'autres études, qui analysent les considérations de liquidité de certains groupes de participants au marché, nous trouvons un lien entre le déséquilibre des commandes agrégées (flux) et la saisonnalité des rendements. Toutefois, malgré son importance statistique, l'effet du déséquilibre de l'ordre sur la saisonnalité du rendement s'est avéré négligeable sur le plan économique. Troisièmement, alors que les annonces de nouvelles macroéconomiques américaines ont été documentées comme un moteur important de la saisonnalité des rendements dans les indices boursiers également en dehors des États-Unis (Nikkinen et al., 2007a, 2009), nous ne trouvons aucun effet significatif de ces annonces sur la saisonnalité des rendements dans les actions allemandes individuelles.

Le reste du document est organisé comme suit: Sect. 2 donne un aperçu de la recherche empirique sur la saisonnalité du retour et de ses principales explications potentielles discutées dans la littérature. Secte. 3 définit les variables et les modèles de régression utilisés. Secte. 4 décrit nos données ainsi que les critères de sélection de l'échantillon appliqués. Secte. 5 présente nos résultats, et sect. 6 conclut.

## CONCLUSION

Ce document met en lumière les facteurs derrière la saisonnalité des rendements boursiers allemands. À l'aide d'une méthodologie de régression des panneaux d'effets fixes, nous avons analysé simultanément le déséquilibre de la liquidité et des commandes en tant que facteurs explicatifs potentiels. Nous avons constaté que la liquidité du marché a la plus forte influence sur les modèles de rendement : bien que nous utilisions les données quotidiennes (par opposition aux données intra-journalières), nous constatons que la variation des écarts entre les offres et les demandes et le ratio Amihud (2002) représentent une proportion importante de la saisonnalité des rendements. Ainsi, la liquidité semble être un facteur majeur derrière les effets de calendrier au niveau des actions individuelles. Les recherches futures devraient examiner plus en profondeur cette relation pour les données intra-journées, car le lien pourrait y être encore plus prononcé. Les considérations relatives à la liquidité du marché pourraient également être la raison pour laquelle l'effet TOM est récemment passé à des jours plus tôt, une conclusion tirée de la littérature récente qui a été confirmée dans le présent document. En revanche, un changement dans les modèles de retour ne peut s'expliquer par les nouvelles macroéconomiques à date fixe, qui se regroupent dans le premier tiers d'un mois. Par conséquent, nous ne trouvons pas de preuves que les annonces de nouvelles macroéconomiques américaines entraînent des modèles de rendement à plus grande échelle.

Son rapport à la dynamique de la liquidité peut également expliquer pourquoi le flux de commandes est considéré comme un moteur de saisonnalité. Alors que la plupart des études précédentes se sont concentrées sur les considérations de flux de certains groupes d'investisseurs, ce document analyse les déséquilibres de flux de commandes dans l'ensemble, en tenant compte des ordres de tous les investisseurs actifs sur le marché. Cette configuration permet de vérifier que la variation dans le déséquilibre de l'ordre est en effet liée aux modèles de retour. Toutefois, l'impact d'un changement de déséquilibre de l'ordre est faible sur le plan économique. En outre, cette étude documente que le déséquilibre des débits d'ordre est

sujet à des schémas récurrents. Cela suggère que les liens généraux déséquilibre-retour trouvés par des études antérieures peuvent être en partie liés aux effets du calendrier.

Les limites de notre étude ont pu être vues dans la variable d'annonce de nouvelles indiquant les dates d'annonce des données américaines (au lieu de l'allemand). Semblable à l'approche dans Nikkinen et coll. (2007a), que nous suivons ici, notre étude néglige les nouvelles en dehors des États-Unis et la direction des nouvelles (positive vs négative). En outre, nous n'appliquons pas d'estimation variable instrumentale, ce qui pourrait constituer une autre limitation au cas où il y aurait endogenité dans l'ensemble de données.

Notre étude se concentre sur les canaux par lesquels les modèles de rendement sont affectés, et elle révèle la liquidité comme principal canal. Pour mieux comprendre les mécanismes qui sous-tendent cet effet, les recherches futures devraient étudier les causes des fluctuations de la liquidité. Kamstra et coll. (2017), p. Ex., soutiennent que les changements d'humeur peuvent influer sur l'aversion au risque au cours d'une année. Bien qu'ils suggèrent que les changements d'humeur influencent le rendement des actions par le biais des flux de fonds, nous pourrions imaginer que les modèles comportementaux peuvent également expliquer les fluctuations de la liquidité. En outre, les modèles de liquidité s'ternisant autour du mois, du trimestre ou de la fin de l'exercice peuvent être motivés par des considérations réglementaires ou des facteurs comportementaux. Il semble donc intéressant d'analyser s'il existe des facteurs communs qui affectent à la fois le rendement et la liquidité.

## TRANSLATED VERSION: GERMAN

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

## ÜBERSETZTE VERSION: DEUTSCH

Hier ist eine ungefähre Übersetzung der oben vorgestellten Ideen. Dies wurde getan, um ein allgemeines Verständnis der in dem Dokument vorgestellten Ideen zu vermitteln. Bitte entschuldigen Sie alle grammatikalischen Fehler und machen Sie die ursprünglichen Autoren nicht für diese Fehler verantwortlich.

## EINLEITUNG

Vor mehr als vier Jahrzehnten veröffentlichte Fama (1970) sein wegweisendes Papier über effiziente Kapitalmärkte. Viele empirische Arbeiten, die in den mehr als 40 Jahren seither erschienen, beschrieben systematische Abweichungen von der Hypothese der effizienten Märkte, die oft als Anomalien bezeichnet werden. Während viele solcher Anomalien kurz nach ihrer Veröffentlichung verschwanden, bestehen andere immer noch fort (siehe Zacks 2011). Insbesondere saisonale Muster mit Lagerrenditen an bestimmten Tagen, die systematisch höher/niedriger sind als an anderen Tagen (z. B. Der sogenannte Wendeeffekt), zeigen eine bemerkenswerte Beharrlichkeit im Laufe der Zeit. Diese Art der Saisonalität der Renditen ist für mehrere Länder gut dokumentiert und besteht seit mehr als 20 Jahren (Liu 2013). Die Literatur berücksichtigte drei Hauptgründe für die Saisonale Rendite: Auftragsfluss (oder Auftragsungleichgewicht), Marktliquidität und Ankündigungen makroökonomischer Nachrichten (siehe z.B. Zwergel 2010).

Das vorliegende Papier dokumentiert saisonalitäten Renditen deutscher Aktien und testet diese drei potenziellen Treiber. Mit Hilfe einer Methode der Regression des Fixed-Effects-Panels untersuchen wir gleichzeitig Das Auftragsungleichgewicht und die Marktliquidität und kontrollieren dabei unbeobachtete Effekte. Frühere Studien konzentrierten sich auf nur eine dieser Erklärungen zu einer Zeit. Darüber hinaus liefert unser Fokus auf deutsche Aktien Einblicke in einen international relevanten Markt, der aber noch nicht im gleichen Maße untersucht wurde wie z.B. Die US-Märkte. Das Papier trägt in mehrfacher Hinsicht zur empirischen Literatur bei: Erstens dokumentieren wir einen Zusammenhang zwischen täglicher

Liquidität und Renditemustern einzelner Aktien, was belegt, dass marktliche Liquidität eine wichtige Rolle für die Renditesaisonalität spielen kann. Zweitens finden wir im Gegensatz zu anderen Studien, die Liquiditätsüberlegungen ausgewählter Gruppen von Marktteilnehmern analysieren, einen Zusammenhang zwischen aggregiertem Auftragsungleichgewicht (Flow)-Ungleichgewicht und Renditesaisonalität. Trotz ihrer statistischen Signifikanz wird jedoch festgestellt, dass die Auswirkungen des Ordnungsungleichgewichts auf die saisonale Rendite in wirtschaftlicher Hinsicht vernachlässigbar sind. Drittens: Während die makroökonomischen Nachrichtenmeldungen in den USA als wichtiger Treiber der Saisonalen Rendite in Aktienindizes auch außerhalb der USA (Nikkinen et al. 2007a, 2009) dokumentiert wurden, finden wir keine signifikanten Auswirkungen dieser Ankündigungen auf die saisonale Rendite in einzelnen deutschen Aktien.

Der Rest des Papiers ist wie folgt organisiert: Sekte. 2 gibt einen Überblick über empirische Forschungen zur Renditesaisonalität und deren Hauptmögliche Erklärungen, die in der Literatur diskutiert werden. Sekte. 3 definiert die Variablen und die verwendeten Regressionsmodelle. Sekte. 4 beschreibt unsere Daten zusammen mit den angewandten Stichprobenauswahlkriterien. Sekte. 5 präsentiert unsere Ergebnisse, und Sekte. 6 schließt.

## SCHLUSSFOLGERUNG

Dieses Papier beleuchtet die Treiber hinter der Saisonalität der deutschen Aktienrenditen. Mit Hilfe einer Methode der Fixed-Effects-Panel-Regression analysierten wir Liquidität und Auftragsungleichgewicht gleichzeitig als mögliche erklärende Faktoren. Wir stellten fest, dass die Marktliquidität den stärksten Einfluss auf die Renditemuster hat: Obwohl wir tägliche Daten (im Gegensatz zu Intra-Day-Daten) verwenden, stellen wir fest, dass die Variation der Bid-Ask-Spreads und das Amihud(2002)-Verhältnis einen beträchtlichen Anteil der Renditesaisonalität ausmacht. Somit scheint die Liquidität ein wichtiger Treiber für Kalendereffekte auf der Ebene der einzelnen Aktien zu sein. Zukünftige Forschung sollte tiefer in diese Beziehung für Intra-Day-Daten, da die Verbindung dort noch ausgeprägter sein kann. Marktliquiditätsüberlegungen könnten auch der Grund dafür sein, dass sich der TOM-Effekt in letzter Zeit auf frühere Tage verlagert hat, ein Ergebnis aus der jüngsten Literatur, die in diesem Papier bestätigt wurde. Im Gegensatz dazu lässt sich eine Verschiebung der Renditemuster nicht durch makroökonomische Nachrichten mit festem Datum erklären, die sich im ersten Drittel eines Monats gruppieren. Dementsprechend finden wir keine Beweise dafür, dass makroökonomische Nachrichtenankündigungen in den USA die Renditemuster in einem breiteren Maßstab antreiben.

Sein Zusammenhang mit der Liquiditätsdynamik könnte auch erklären, warum der Auftragsfluss als Saisonaler treiber angesehen wird. Während sich die meisten früheren Studien auf Strömungsüberlegungen ausgewählter Investorengruppen konzentriert haben, analysiert dieses Papier die Ungleichgewichte des Auftragsflusses insgesamt unter Berücksichtigung von Aufträgen aller am Markt tätigen Investoren. Mit diesem Setup kann überprüft werden, ob die Abweichung in der Reihenfolge des Ungleichgewichts tatsächlich mit Rückgabemustern zusammenhängt. Die Auswirkungen einer Änderung des Ordnungsungleichgewichts sind jedoch in wirtschaftlicher Hinsicht gering. Außerdem dokumentiert diese Studie, dass ein Ordnungsflussungleichgewicht wiederkehrenden Mustern unterliegt. Dies deutet darauf hin, dass die allgemeinen Ungleichgewicht-Return-Links, die in früheren Studien gefunden wurden, teilweise mit Kalendereffekten zusammenhängen können.

Einschränkungen unserer Studie waren in der Nachrichtenankündigungsvariablen zu sehen, die die Ankündigungsdaten von US-Daten (anstelle deutscher Daten) angibt. Ähnlich wie in Nikkinen et al. (2007a), dem wir hier folgen, vernachlässigt unsere Studie Nachrichten außerhalb der USA und die Nachrichtenrichtung (positiv vs. Negativ). Darüber hinaus wenden wir keine instrumentelle Variablenschätzung an, was eine weitere Einschränkung für den Fall darstellen könnte, dass der Datensatz eine Endogeneität enthält.

Unsere Studie konzentriert sich auf die Kanäle, durch die Renditemuster beeinflusst werden, und zeigt Liquidität als Hauptkanal. Um die Mechanismen, die diesem Effekt zugrunde liegen, besser zu verstehen, sollte die zukünftige Forschung die Ursachen von Liquiditätsschwankungen untersuchen. Kamstra et al.

(2017) argumentieren z.B., dass Stimmungsschwankungen die Risikoaversion während eines Jahres beeinflussen können. Während sie darauf hindeuten, dass Stimmungsschwankungen die Aktienrendite durch Fondsflüsse beeinflussen, könnten wir uns vorstellen, dass Verhaltensmuster auch Liquiditätsschwankungen erklären können. Darüber hinaus können Liquiditätsmuster rund um den Monats-, Quartals- oder Jahresendabschnitt durch regulatorische Erwägungen oder Verhaltenstreiber angetrieben werden. Es scheint daher interessant zu analysieren, ob es gemeinsame Treiber gibt, die sowohl die Rendite als auch die Liquidität beeinflussen.

**TRANSLATED VERSION: PORTUGUESE**

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

**VERSÃO TRADUZIDA: PORTUGUÊS**

Aqui está uma tradução aproximada das ideias acima apresentadas. Isto foi feito para dar uma compreensão geral das ideias apresentadas no documento. Por favor, desculpe todos os erros gramaticais e não responsacule os autores originais responsáveis por estes erros.

**INTRODUÇÃO**

Há mais de quatro décadas, o Fama (1970) publicou o seu artigo seminal sobre mercados de capitais eficientes. Muitos artigos empíricos que apareceram nos mais de 40 anos desde então descreveram desvios sistemáticos da hipótese dos mercados eficientes, muitas vezes referidos como anomalias. Enquanto muitas dessas anomalias desapareceram pouco depois da sua publicação, outras ainda persistem (para uma visão geral, ver Zacks 2011). Em particular, os padrões sazonais com retornos de existências em dias específicos sendo sistematicamente mais elevados/inferiores aos de outros dias (por exemplo, o chamado efeito turn-of-the-month) mostram uma persistência notável ao longo do tempo. Este tipo de sazonalidade em retornos está bem documentado para vários países, e existe há mais de 20 anos (Liu 2013). A literatura considerou três principais razões potenciais para a sazonalidade do retorno: fluxo de encomendas (ou desequilíbrio da ordem), liquidez do mercado e anúncios de notícias macroeconómicas (ver, por exemplo, Zwergel 2010).

O presente documento documenta sazonalidades nas devoluções das existências alemãs e testa estes três potenciais condutores. Utilizando uma metodologia de regressão de painéis de efeitos fixos, investigamos simultaneamente o desequilíbrio da ordem e a liquidez do mercado, controlando efeitos não observados. Estudos anteriores focaram-se apenas numa destas explicações de cada vez. Além disso, o nosso foco nas ações alemãs dá insights a um mercado relevante a nível internacional, mas que ainda não foi investigado na mesma medida que, por exemplo, os mercados norte-americanos. O trabalho contribui para a literatura empírica de várias formas: Em primeiro lugar, documentamos uma relação entre a liquidez diária e os padrões de retorno de stocks individuais, o que fornece provas de que a liquidez do mercado desempenha um papel importante para a sazonalidade do retorno. Em segundo lugar, ao contrário de outros estudos, que analisam considerações de liquidez de grupos selecionados de participantes no mercado, encontramos uma ligação entre o desequilíbrio da ordem agregada (fluxo) e a sazonalidade do retorno. No entanto, apesar da sua importância estatística, o efeito do desequilíbrio da ordem na sazonalidade do retorno é considerado insignificante em termos económicos. Em terceiro lugar, enquanto os anúncios de notícias macroeconómicas dos EUA foram documentados como um importante motor da sazonalidade do retorno nos índices de ações também fora dos EUA (Nikkinen et al. 2007a, 2009), não encontramos efeitos significativos destes anúncios sobre a sazonalidade do retorno em cada uma das unidades populacionais alemãs.

O restante do papel é organizado da seguinte forma: Seita. 2 dá uma visão geral da pesquisa empírica sobre a sazonalidade do retorno e as suas principais explicações potenciais discutidas na literatura. A seita.

3 define as variáveis e os modelos de regressão utilizados. A seita. 4 descreve os nossos dados juntamente com os critérios de seleção da amostra aplicados. A seita. 5 apresenta os nossos resultados, e Seita. 6 conclui.

## CONCLUSÃO

Este artigo lança luz sobre os condutores por detrás da sazonalidade nas ações alemãs. Utilizando uma metodologia de regressão de painéis de efeitos fixos, analisámos simultaneamente o desequilíbrio de liquidez e ordem como potenciais fatores explicativos. Constatámos que a liquidez do mercado tem a maior influência nos padrões de retorno: Embora utilizemos dados diários (em oposição aos dados intra-dias), constatamos que a variação dos spreads de licitação e do rácio Amihud (2002) representa uma proporção considerável de sazonalidade de retorno. Assim, a liquidez parece ser um dos principais impulsionadores dos efeitos do calendário ao nível das existências individuais. A investigação futura deverá aprofundar esta relação para os dados intra-dias, uma vez que a ligação pode ser ainda mais pronunciada nesse país. As considerações de liquidez no mercado podem também ser a razão pela qual o efeito TOM se mudou recentemente para os dias anteriores, uma constatação da literatura recente que foi confirmada neste artigo. Em contrapartida, uma mudança nos padrões de retorno não pode ser explicada por notícias macroeconómicas de data fixa, que se aglomeram no primeiro terço de um mês. Por conseguinte, não encontramos provas de que os anúncios de notícias macroeconómicas dos EUA conduzam os padrões de retorno a uma escala mais ampla.

A sua relação com a dinâmica de liquidez também pode explicar por que o fluxo de encomendas é considerado um condutor de sazonalidade. Embora a maioria dos estudos anteriores se tenha centrado em considerações de fluxo de grupos de investidores selecionados, este artigo analisa os desequilíbrios de fluxo de ordem em conjunto, tendo em conta as encomendas de todos os investidores ativos no mercado. Esta configuração permite verificar se a variação do desequilíbrio de ordem está realmente relacionada com os padrões de retorno. No entanto, o impacto de uma mudança de ordem é pequeno em termos económicos. Além disso, este estudo documenta que o desequilíbrio do fluxo de encomenda está sujeito a padrões recorrentes. Isto sugere que as ligações gerais de devolução de desequilíbrios encontradas por estudos anteriores podem estar parcialmente relacionadas com os efeitos do calendário.

Limitações do nosso estudo podem ser vistas na variável de anúncio de notícias que indica as datas de anúncio dos dados dos EUA (em vez de alemães). À semelhança da abordagem em Nikkinen et al. (2007a), que seguimos aqui, o nosso estudo negligencia as notícias fora dos EUA e a direção noticiosa (positiva vs. Negativo). Além disso, não aplicamos estimativas variáveis instrumentais, o que pode ser outra limitação no caso de haver endogeneidade no conjunto de dados.

O nosso estudo centra-se nos canais através dos quais os padrões de retorno são afetados, e revela a liquidez como o canal principal. Para melhor compreender os mecanismos subjacentes a este efeito, a investigação futura deve investigar as causas das flutuações da liquidez. Kamstra et al. (2017), por exemplo, argumentam que as mudanças de humor podem influenciar a aversão ao risco durante um ano. Embora sugiram que as mudanças de humor influenciam o retorno das ações através dos fluxos de fundos, podemos imaginar que os padrões comportamentais também podem explicar flutuações na liquidez. Além disso, os padrões de liquidez em torno do mês, trimestre ou final do ano podem ser impulsionados por considerações regulamentares ou condutores comportamentais. Por conseguinte, parece interessante analisar se existem condutores comuns que afetam tanto o retorno como a liquidez.