Management and Business Administration Doctoral School

THESIS EXTRACT

Helena Naffa

The Relationship between Analyst Forecasts, Investment Fund Flows and Market Returns

A Study of Emerging European Equity Markets

Ph.D. Dissertation

Supervisor:

Edina Berlinger, Ph.D

Budapest, 2014

Department of Finance

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Introduction

„Individual expectations about future aggregate outcomes [are] the key feature that distinguishes social sciences and economics from the natural sciences." (Hommes, 2010, p. 2.) Economics engages with individuals as actors, and with their interactions that weave into a system. This system is limited by the ambiguity of investor expectations: what the average opinion of investors is about average opinion. Classical economics dismisses the speculation on expectations by assuming that investment decision-making is rational. Thus, theories on the Efficient Market Hypothesis and the subsequent emergence of the Capital Asset Pricing Model gained popularity. The world as we know it proved that these theories are unrealistic, and behavioural finance emerged as an alternative solution focusing on investors with bounded rationality. In order to relieve the restrictive assumptions of the CAPM, such as the assumption of homogeneous expectations: heterogeneous agent models of investors emerged. This gave rise to my research question to examine how differences of opinion of individual investors may be captured. Since, the opinion of investors cannot be observed directly, I collected sell-side analyst forecasts, a regularly published set of data and I assumed it to be a proxy of investors' expectations on future market returns.

If markets were as efficient as the strong form of the Efficient Market Hypothesis suggests, then prices would already incorporate all available information. Thus, examining analyst opinion data would be redundant to understand equity market returns. However, my experience as a sell-side equity analyst gives me an oversight of the microstructure of the equity markets. When new information emerges, investors adjust their trades instantaneously. As a result, stock prices quickly reflect the new information. Analysts, on the other hand, would revise their fundamental models and adapt their research ideas with a lag (perhaps in a few days time). It is their research product that reflects a more thorough interpretation of the new information. The extent to which prices would fully-reflect the processed new information depends on the work of analysts alongside investors. The equity research industry inspired scientific research to examine the implications of the aggregate opinion of sell-side analysts. Does the dispersion of analyst opinion tell us anything about market returns?

Another separate line of research seeks to understand market returns focused on the relationship between investment funds' aggregate net flows and equity market returns. The research on this topic mostly covers developed markets. Intuitively, fund flows ought to drive returns and vice versa, returns ought to attract flows into the investment funds.

The unconnected research papers motivated me to examine how equity markets work with a view of the market microstructure, taking into account that analyst opinion and fund flows are not independent from one another. Analysts serve their investor clients, who make investment decisions, which are reflected in fund flow data. I became curious to understand how information passes from analysts to their institutional investor clients (fund managers), and onto the individual investors (e.g. retail clients), who induce the fund flows. Eventually, flows into and out of investment funds will lead to trading, that registers different opinions into asset prices. Therefore, examining the relationship between the three elements together, namely analyst forecasts, investment fund flows and asset returns, is justified. It is also a novice approach that I hope would help me find new results to better explain the efficiency of equity markets.

Another interesting aspect of my research is that I examine Emerging European equity markets, a segment that was left untouched by the international literature on both analyst forecasts and fund flows. Furthermore, my empirical research covers a period of 12 years (from Autumn, 2000 – Spring, 2012) which is considered to extend over a complete economic cycle, with sub-periods spanning an economic boom in the early-mid years of the past decade, and the years of the recent financial crisis. It is interesting to see whether results differ in a pre-crisis from a post-crisis period.

This dissertation will first introduce the history of equity market returns. Classical economic theory that presents the Efficient Market Hypothesis, its proponents and opponents is discussed in the first chapter. Then, in chapter 2, I introduce the market microstructure: how markets work. Investors, analysts and brokerage firms are interrelated, and the professional relationship reveals that analysts on the sell-side give their opinion in the form of investment recommendations and target prices on assets they cover. Inventors are the recipients of the research, and also, they are the investment decision-makers. In chapter 3, I present the measurement of analyst opinion, and the methodology of aggregating analyst opinion to cover countries (rather than single stocks) to make them comparable with country-related fund flow data. In chapter 4, I present the literature on the relationship between analyst forecasts and returns. The papers are presented chronologically. This is followed by chapter 5, where I present the literature on the relationship between investment fund flows and market returns. This area of research is covered only by a handful of papers. In chapter 6, I outline my empirical work, introducing the datasets at hand, my hypotheses, the methodology and the results of my empirical examinations.

The relationship between analyst opinion and market returns:

A wide range of published papers tackle the issue of heterogeneous beliefs in the context of asset pricing. Most papers focus on whether the differences in analyst opinion have a significant effect on future stock returns.

Literature on negative relationship

Diether, Malloy, and Scherbina (2002) (henceforth DMS) and Johnson (2004) report a negative relationship between the dispersion of analysts' earnings forecasts and future returns, and show that dispersion in earnings forecasts is not suitable as a proxy for risk. Diamond and Verrecchia (1987) and Hong and Stein (1999) found no significant relationship between the two, and several other researchers like Malkiel (1982), Barry and Brown (1985) accounted for a positive correlation and consider dispersion as a possible proxy for risk. In response to the contradicting evidence, Qu et al. (2004) argued that the mixed results were due to the wrong definition of the risk measure. They said that it is the variability in dispersion and not the level of dispersion per se that is important. They show that the variability of analysts' earnings forecasts – being a systematic pricing factor – is a good proxy for risk.

Literature on positive relationship

Several papers document that dispersion of analysts' earnings forecasts is positively correlated with future returns and also with risk measures such as the market beta. Malkiel (1982) argues that dispersion is actually a better proxy for risk than the traditional market beta, because he accounts for a higher correlation coefficient between dispersion and expected future returns, than between the beta and expected returns. This result contradicts the findings of DMS. This may be attributed to the methodology applied. The expected future returns are derived using the dividend discount model, while DMS and Johnson (2004) used ex-poste returns. Malkiel (1982) estimated his model during 1960s and there is evidence (Bodie et al., 2003, p. 403.) that in the 1950-1999 time period the two valuations differ substantially, indicating that their results are data specific.

Barry and Brown (1985) built a theoretical model of differential information, which predicts a positive relationship between the divergence of analyst opinions and excess returns. They argue that the increase of the relevant available information has two consequences at the same time. On the one hand it reduces the divergence of analysts' opinion, and on the other hand it reduces the estimation risk. Lower estimation risk means lower risk, and according to the basic risk-return trade-off it implies lower subsequent expected excess returns. In this way divergence of opinions can be used as a proxy for systematic risk. The main set-back to their model is that it lacks empirical evidence, it remains only a hypothesis.

The Relationship between Fund flows and Market Returns

In recent years, several academic papers studied investment fund flows and their effect on prices and yields as investment funds might contribute to the stabilization or destabilization of the financial markets (Bengtsson, 2009). Furthermore, money in- and outflows to investment funds may have an impact on equity returns as it was shown by Fridson (2000), on commodity prices like gold prices (Warther, 1995) and on stock prices as well (Warther, 1995; Fortune 1998). Moreover, since it might influence the stock prices it might have an effect on stock market returns, as shown by Warther (1995) and Goetzmann and Massa (1999).

Applied Methodology

The database collected for the empirical research of my dissertation is truly unique. The source of the data on analysts' forecasts was Bloomberg. The database includes 7 countries that are part of the EMEA region, which is an abbreviation for Europe, Middle East and Africa. My focus area within EMEA region is on Austria, Czech Republic, Poland, Hungary, Romania, Russia and Turkey, which I will collectively refer to as Emerging Europe.

I proceeded on to grouping data in order to obtain a weekly time-series of forecast mean, and dispersion. I introduce the following notation system.

s – stock where s (1….S) S is the total number of stocks within a country.

a – analyst where a (1….A) A is the total number of analyst in our database.

t – time where t (1…..T)

R – recommendation R (1,2,3,4,5)

$R_{s,t,a}$ is the latest recommendation given for stock s valid on week t by analyst a.

Average of recommendations of a given **stock** on a given week.

$$\frac{\sum_{a=1}^{A} R_{s,t,a}}{A} = R_{s,t}$$

1. Equation

Dispersion is measured by the standard deviation of recommendations of a given stock on a given week.

$$\sqrt{\frac{\sum_{a} (R_{s,a} - R_{s,t})^2}{A}} = \sigma_{s,t}$$

2. Equation

If an analyst doesn't publish a new recommendation on a given week, I consider the latest recommendation published to be valid up to 3 months time. If no update is given within the next 3 months, I consider the recommendation out of date and exclude it.

The database contained several recommendations by the same analyst for the same stock during the same week. In such cases, I considered the most recent recommendation.

To create country recommendations, I aggregated individual stock recommendations weighting them with their respective weights in the country's main stock index. Index weights are tracked for each month.

$w_{s,t}$ is the weight of the stock in the country index on week t.

I proceed to calculate the average and standard deviation of the country recommendations.

Average recommendation for a given country on a given week:

$$\sum_{s=1}^{S} R_{st} \cdot w_{st} = R_t$$

3. Equation

Standard deviation of recommendations for a given country on a given week:

$$\sum_{s=1}^{S} \sigma_{st} \cdot w_{st} = \sigma_t$$

4. Equation

Now, I have established weekly time series of average opinion represented by the average recommendations, and the heterogeneity of expectations proxied by the standard deviation of recommendation for each of the seven countries of the Emerging European region.

Data on Investment Fund Flows

The source of fund flow data is the Emerging Portfolio Fund Research (EPFR) database that gathers information from investment funds on their flows globally. It publishes fund flow reports on a daily, weekly and monthly basis and the data are available to subscribers for a fee.

The fund flow data gathered during my research work are for the same seven countries included in the analyst forecast database, namely Austria, Czech Republic, Hungary, Poland, Romania, Russia and Turkey – collectively called Emerging Europe. The data covers weekly fund flows for equity investment from 27th October, 2000 to 10th August, 2011 that makes up a time-series of 564 observations for each country. Also, I have data for assets under management (AUM) for each week.

The comparison of flow data across countries faces two problems. One is that the countries differ in the magnitude of assets and the volume of the flows. Another problem is that

compilation of data by EPFR expanded as years passed by, and currently the dataset covers more funds than at initiation. Therefore, for analysis purposes, I will compute flows in relative terms as a percentage of total assets under management. This will normalise the data to allow for comparisons of countries that have different flow sizes and will also handle the problem of the extension of coverage through time.

Also, as the data are denominated in USD, changes in flows will reflect not only investor behaviour, but also the effects of foreign exchange rate fluctuations.
My database includes all funds and country-dedicated funds. All funds include full coverage of EPFR funds and take the pro-rata share of a fund's investments into a country, based on the disclosure of the fund manager. Country-dedicated funds are a sub-set of the all funds data. They include flow from funds only dedicated to investing to a particular country. For analysis purposes, I will use the all funds data to capture the more extended set of fund data.

Results of Empirical Tests

In this chapter, I present my hypotheses and the results of the empirical tests I conducted with the aim of identifying possible relationships and causality between analyst opinion, fund flows and market returns. As shown in figure 1, a relationship may exist between any of the three variables.
My proposition is that the functioning and compensation of the equity research industry indicates that the market does reimburse their efforts, subsequently assigns an economical value to their information-processing work. From this stems my assumption that market efficiency in its strongest form does not hold in practice and that the semi-strong form would not hold without the existence of equity research.

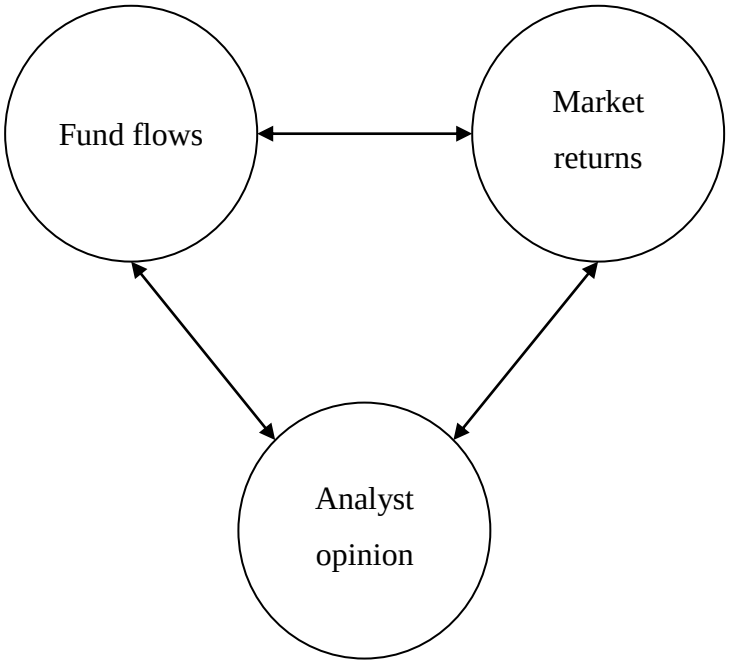

Figure 1: The inter-relations between analyst forecasts, investment fund flows and market returns. Source: author.

H1: A relationship exists between index returns and average analyst opinion (recommendation and target prices).

Average target price for BET (1,2,5 lags), BUX (1,2 lags), ISE (3-8 lags) and Micex (1-4 lags) indices Granger-caused USD-based returns negatively.

This means that higher target prices for Romanian, Hungarian, Turkish and Russian stocks 1-3 weeks earlier led to lower dollar returns.

Average recommendations for ATX (1 lag) Granger-caused local currency and dollar-based returns negatively. Conversely, average recommendations for BET (2,5,6,7,8 lags) and BUX (2 lags) Granger-caused local currency returns positively.

This means that average recommendations gave mixed results regarding the direction of the relationship, with significant causality for the Austrian (1 lag), Romanian (2,5,6,7,8 lags) and Hungarian (2 lags) indices.

One might infer that target prices prove to be a more consistent indicator to analyst opinion, and have a more straightforward effect on average returns, albeit in a negative direction, whereas past recommendations provide ambiguous signals in predicting weekly returns.

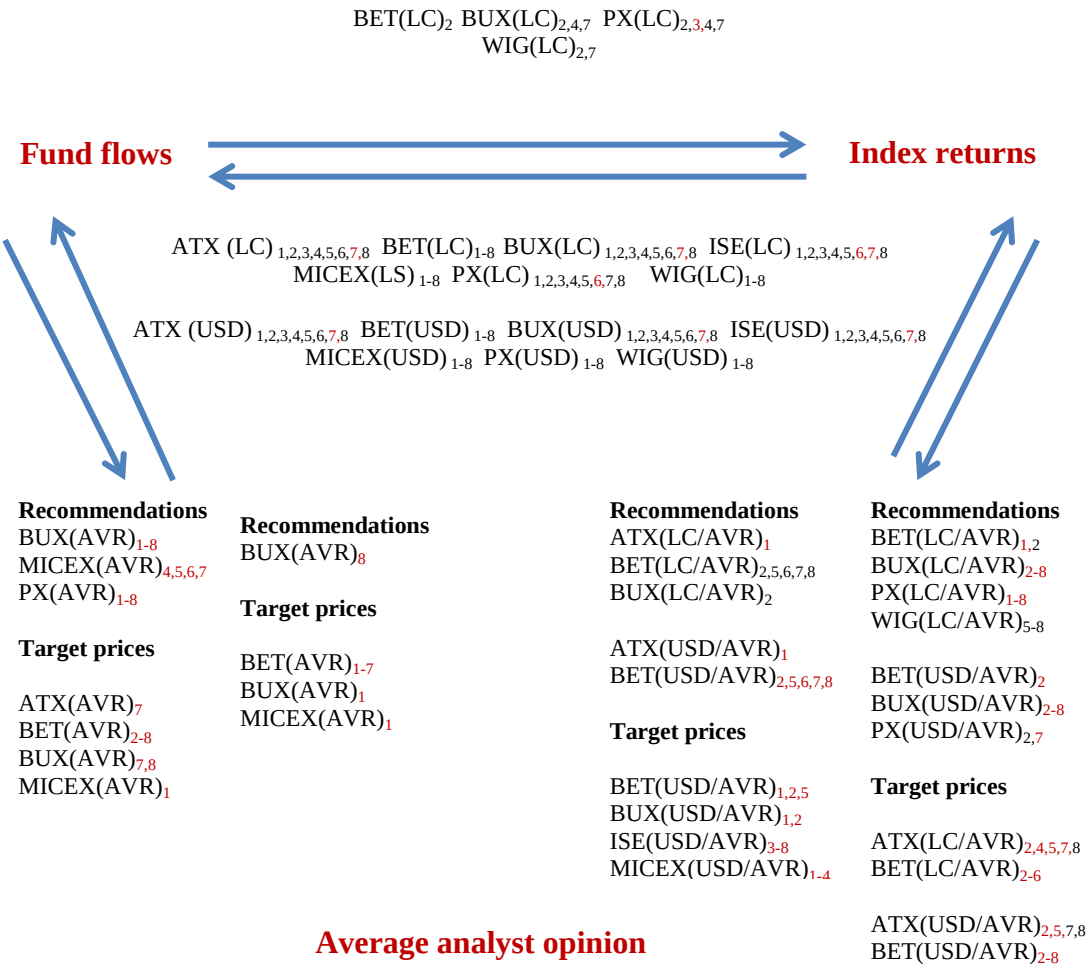

Figure 2: Full period Granger-causality for given markets with specified lags. Numbers in red indicate a negative relationship; the others indicate a positive relationship.

To further explore this effect, I repeated the same test on two parts of the data, the first covered the period from 25th September, 2006 to 14th September, 2008, a period of economic boom, when stock markets saw an upward trend. This period I called the pre-crisis period.

The second, the post-crisis period covers the period from 14th September, 2008 to 8th August, 2011. 15th September, 2008 was the day chosen to divide the data into pre- and post-crisis is the memorable day when Lehman Brothers announced filing for bankruptcy; its share price fell 90% on that trading day.

In the pre-crisis period, average target prices for ATX (1 lag), BUX (1,2,6 lags) and ISE (2-8 lags) Granger-caused local currency returns negatively. Average target price for ISE (1,2,7,8 lags) Granger-caused USD-based returns negatively.

Recommendations proved less effective in explaining index returns in the pre-crisis period.

The impact of recommendations was less apparent in the post-crisis period, but corroborated previous results with two examples of causation. Average recommendation for ATX (1,2 lags) and BET (2,3 lags) Granger-caused local currency returns negatively; furthermore ATX (1 lag) and BET (2,3 lags) Granger-caused USD-based returns negatively.

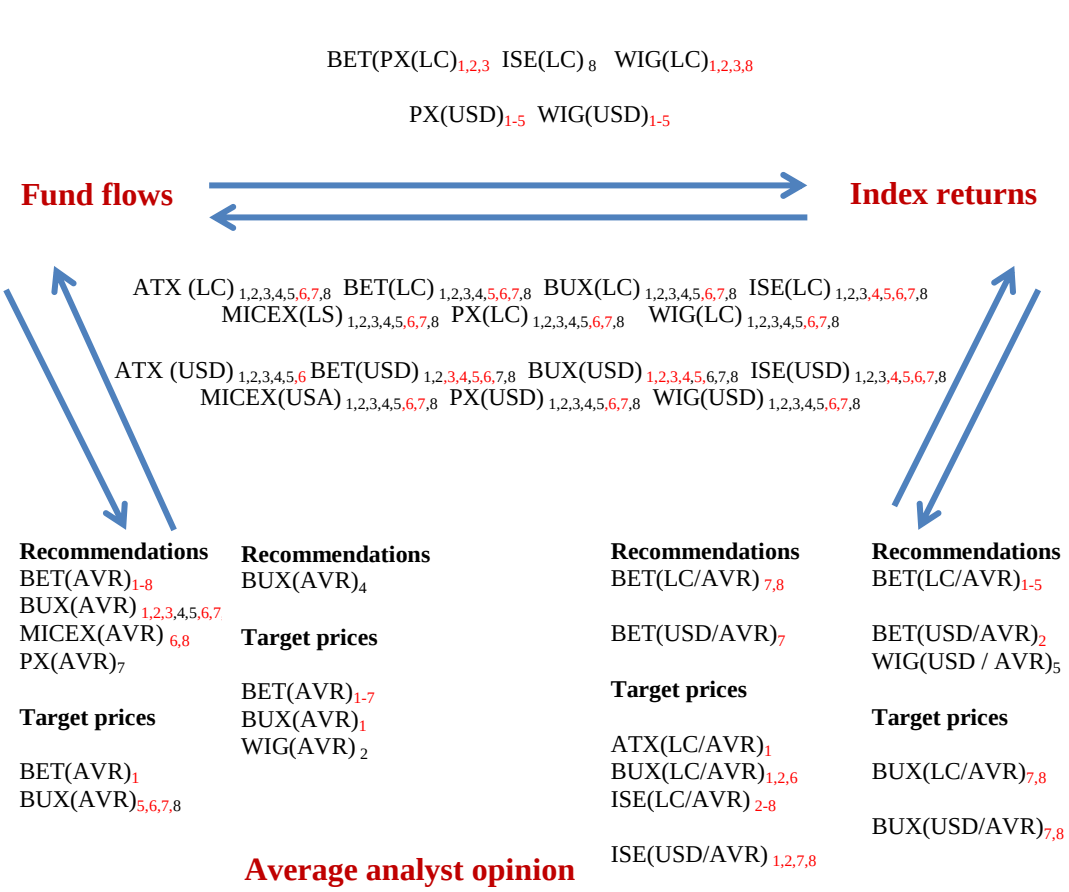

Figure 3: Pre-crisis period Granger-causality for given markets with specified lags. Numbers in red indicate a negative relationship; the others indicate a positive relationship.

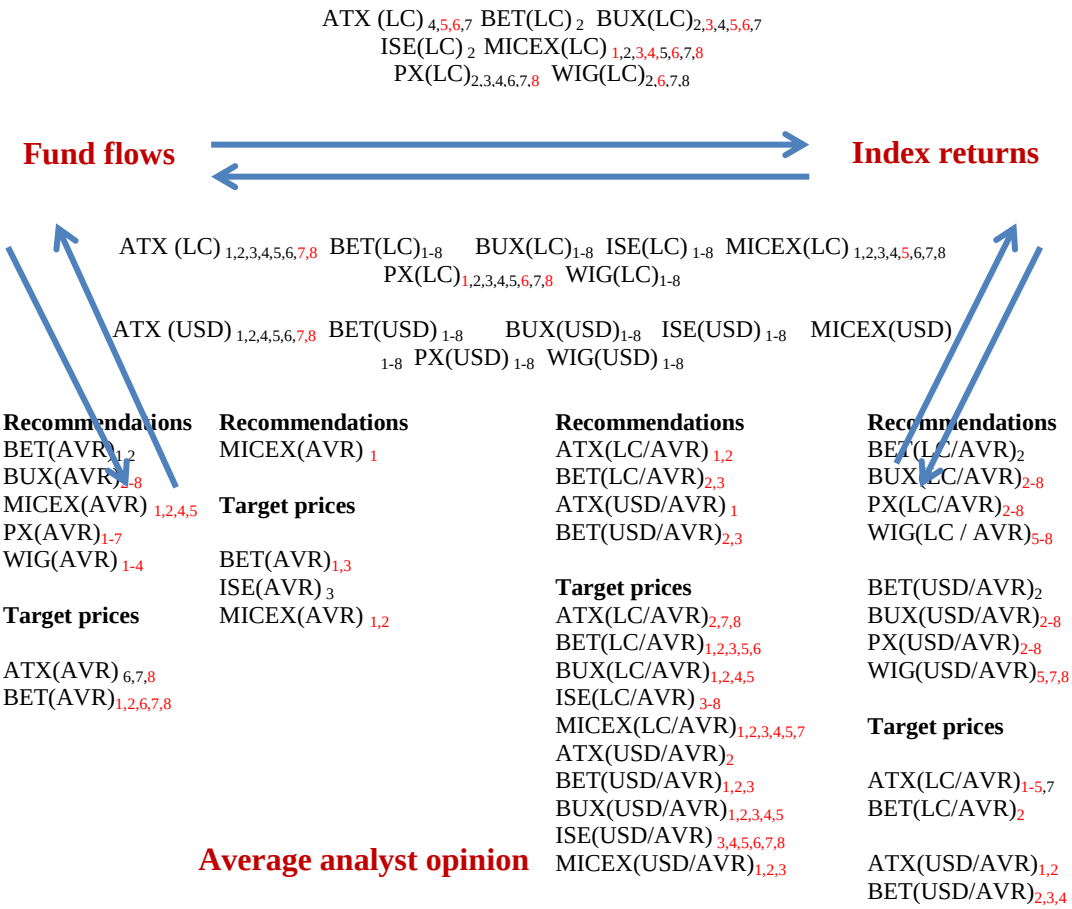

Figure 4: Post-crisis period Granger-causality for given markets with specified lags. Numbers in red indicate a negative relationship; the others indicate a positive relationship.

Results from splitting the time-series into bull (pre-crisis) and bear (post-crisis) markets supported the findings from the examination of the full period, namely, that average target prices cause weekly returns negatively.
The causal relationship in the opposite direction was also tested to get proof whether index returns caused analyst opinion. Examining the full period, average target prices for ATX (2,4,5,7 lags) and BET (2-6 lags) Granger-caused local currency returns negatively. Also, ATX (2,5 lags) and BET (2-8 lags) Grangers-caused USD-returns negatively.

For the same period, average recommendations showed mixed results. BET (1 lag), BUX (2-8 lags) and PX (5-8 lags) Granger-caused local currency returns negatively. Also, average recommendations for BET (2 lags) and BUX (2-8 lags) Granger-caused USD-based returns negatively. On the other hand, BET (2 lags) and WIG (5-8 lags) Granger-caused local currency returns positively. Also, average recommendations for PX (2 lags) Granger-caused USD-based returns positively.

Pre-crisis average target prices barely showed any effect, only BUX (7, 8 lags) Granger-caused both local currency and USD-based returns negatively.

Average recommendations in the bull market showed similarly rare instances of causality. Average recommendation for BET (1-5 lags) Granger-caused local currency returns negatively, and average recommendations for BET (2 lags) Granger-caused USD-based returns negatively. The WIG (5 lags) showed a positive relationship, on the other hand.
In the bear market, average target prices for ATX (1-5 lags) and BET (2 lags) Granger-caused local currency returns negatively, and ATX (1, 2 lags) and BET (2, 3, 4 lags) Granger-caused USD-based returns negatively.

Results from the causality tests between analyst opinion and index returns generally shows a negative relationship – especially in the post-crisis period – target prices appear to give the message to trade the opposite of what analyst recommend. A possible explanation could be that analysts appear to be late in publishing their opinion, or another explanation could be that the market does not react to their opinion in the first 8 weeks following publication; after all, analysts publish 12 month target prices and recommendations.

H2: A relationship exists between the dispersion of analyst opinion (target prices and recommendations) and market returns.

Dispersion is captured by **relative standard deviation** of all valid target prices and recommendations issued for a given stock during a given week. **Weekly market returns** are calculated for each stock individually in both **local currency and USD** as in the previous

examinations. To test whether a **causal relationship exists**, and to determine its direction, I will use the **Granger** causality test between the two time-series for each stock.

Dispersion of target prices for the full period for ISE (1,2 lags) and Micex (2,7 lags) negatively Granger-cause local currency return, and ISE (1-5,7 lags) and Micex (2, 4 lags) negatively Granger-cause USD-based returns. This is in line with evidence reported in the literature showing a negative relationship between dispersion and returns, indicating that higher dispersion is a proxy for risk, and therefore result in lower returns. Uncertainty is a different concept from risk. Bélyácz (2010) summarises and explains the literature that defines risk as having known or estimated probabilities, whereas uncertainty considers both the outcomes and their probabilities as unknown. Investors require compensation for holding stocks that entail high uncertainty, as measured by the high dispersion in analyst forecasts. The opinion of analysts that show in one direction, or have a low dispersion means that analysts are more certain regarding the future prospects of the stock.

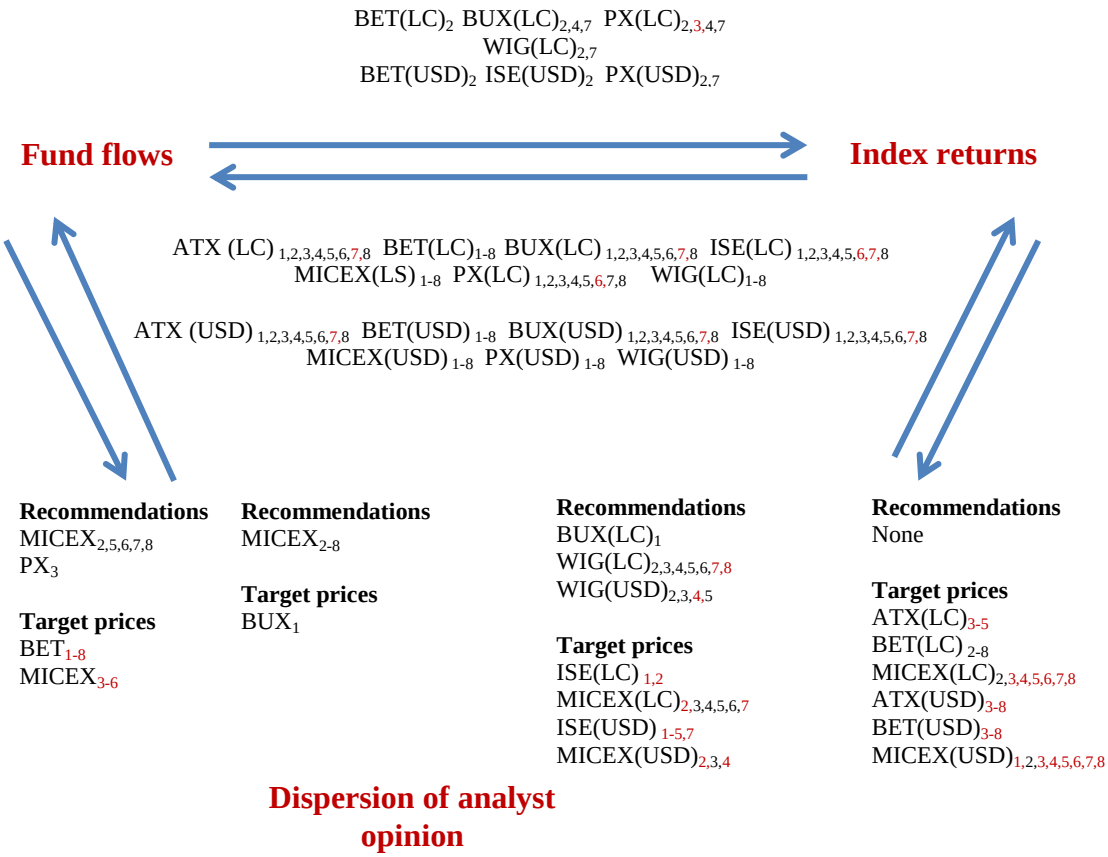

Figure 5: Full period Granger-causality for given markets with specified lags. Numbers in red indicate a negative relationship; the others indicate a positive relationship.

The results are only true in the case of two markets, the Turkish and the Russian, and the latter showed mixed results. The outlier result is the positive causal relationship from Micex (3-6 lags) for local currency returns.

Looking at the pre-crisis period, the dispersion of target prices for ATX (1-3 lags), ISE (1 lag) and Micex (3 lags) Granger-caused USD-based returns negatively; in line with the literature results. The post-crisis period showed that dispersion of target prices for ATX (7,8 lags) positively Granger-caused local currency and USD-based returns, whereas ISE (1-3 lags) negatively caused USD-based returns.

Dispersion of recommendations showed the opposite results. For the full period, BUX (1 lag) and WIG (2-6 lags) positively caused local currency returns, with the exception of WIG (7,8 lags) where the causal relationship was positive. The pre-crisis period confirmed the positive causal relationship for PX (1 lag) and WIG (2-5 lags) for local currency returns and for PX (1 lag) and WIG (1-5 lags) impacting USD-based returns. A minor outlier was WIG (1 lag) with a negative relationship with local currency returns. The post crisis period also gave proof of positive causation for BUX (1-4 lags) and WIG (3-5 lags) for local currency returns. Outlier considering the direction of the relationship was PX (2 lag) that showed a significant negative relationship with local currency returns.

These results, although mostly show positive direction of causality, are mixed and would be insufficient to draw conclusions, but the difference in the direction of the impact recommendation and target price dispersion has on returns is noteworthy. As if, one is a strong signal to investors, whereas the other is being published under pressure to please.

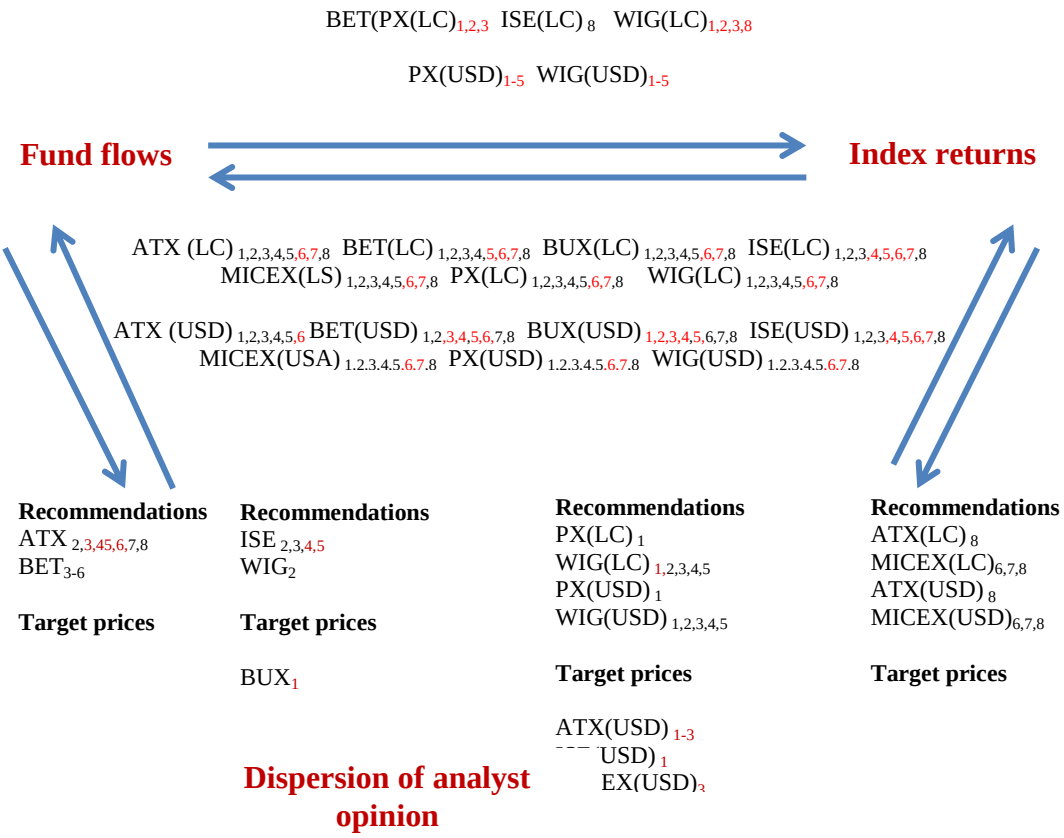

Figure 6: Pre-crisis period Granger-causality for given markets with specified lags. Numbers in red indicate a negative relationship; the others indicate a positive relationship.

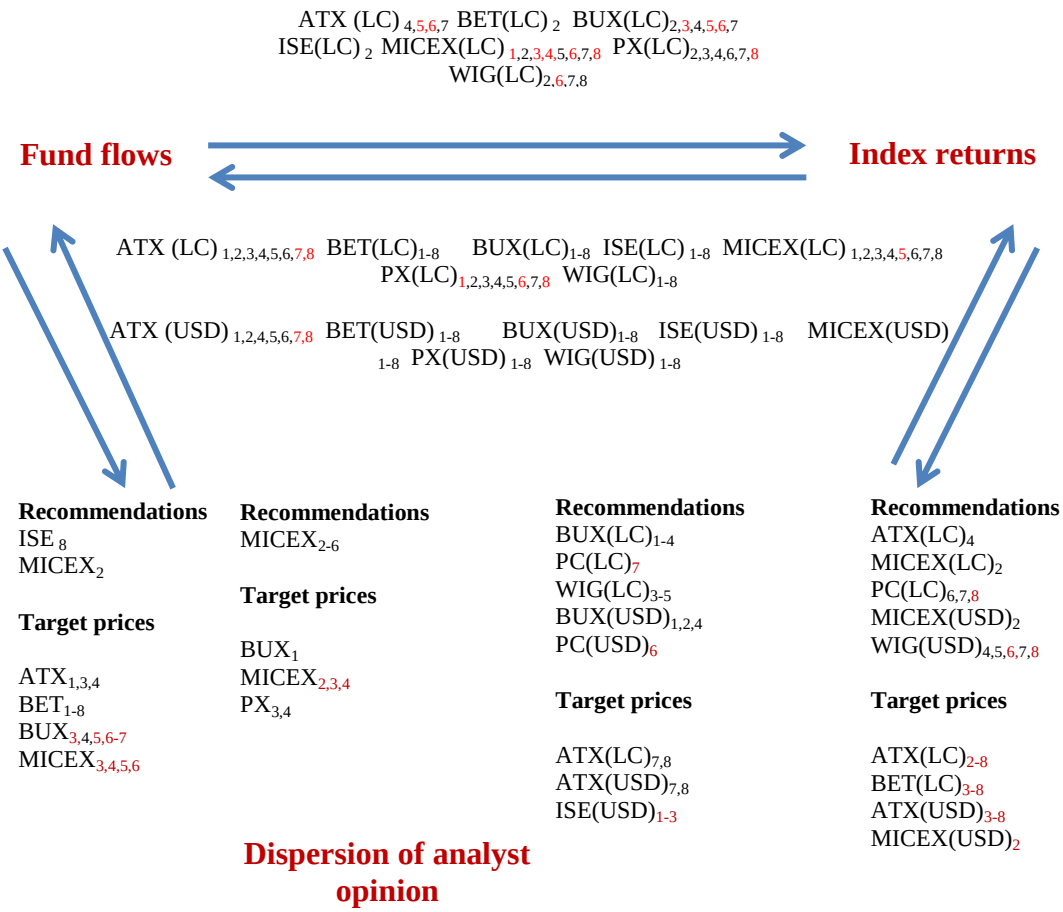

Figure 7: Post-crisis period Granger-causality for given markets with specified lags. Numbers in red indicate a negative relationship; the others indicate a positive relationship.

No effect was observed for the pre-crisis period. The post-crisis period showed that local currency returns Granger-caused ATX (2-8 lags) and BET (3-8 lags) negatively, as expected. Also, USD-based returns Granger-caused ATX (3-8 lags) and Micex (2 lags) negatively.

The other part of my research refers to investment fund flow data. The compilation, publication of the data, its reporting and monitoring by investors implies that investment fund flow data carry economic value that is not yet fully understood by the market. To unveil the effects of this data, I examined its relationship with market returns.

H3: A relationship exists between investment fund flows and market returns.

Flow data were arranged on a weekly basis, published to include data from every week's Thursday to the following week's Wednesday. The weekly stock returns were constructed accordingly to cover a Thursday-Wednesday period. The reason I had arranged analyst forecast data in the same weekly format in which fund flows are reported is to allow for testing the two datasets against one another. Fund flows (FF) are taken as a percentage of assets under management (AUM) of the funds covered and hereinafter referred to commonly as the funds, whereby I refer to (FF/AUM).

The hypothesis is that a positive relationship exists between index returns and FF/AUM, and the causal relationship can be in both directions. The results support the hypothesis.

For the full period tested, funds Granger-caused local currency and USD-based returns for BET (2 lags), BUX (2,4,7 lags), PX (2,4,7 lags) and WIG (2,7 lags) positively.

The surprising results comes from the pre-crisis period, funds negatively cause returns. In the case of PX (1,2,3 lags) and WIG (1,2,3,8 lags) a negative Granger-causality was recorded for local currency returns. Also, PX (1-5 lags) and WIG (1-5 lags) also negatively Granger-caused USD-based returns. The post-crisis period showed mixed results. ATX (4,7 lags), BET (2 lags), BUX (2,4,7 lags), ISE (2 lags), Micex (2,5,7 lags), PX (2-7 lags) and WIG (2,7,8 lags) showed positive relationships with local currency returns, whereas ATX (5,6 lags), BUX (3,5,6 lags, Micex (1,3,4,6,8 lags), PX (8 lags) and WIG (6 lags) showed negative relationships with local currency returns. A similarly mixed result was arrived at for USD-based returns.

These results could be interpreted that funds impacted returns during and after the crisis, and had inconsistent mixed effects in the earlier stage, perhaps owing to the fact that data collected from the funds did not cover a considerable proportion of the trading volume on CEE equities. However, post-crisis results show that fund data could be valuable for those who trade based on observing the positive causality of funds on index returns.

The second part of the question is how do index returns help understand funds. The assumption again is that the relationship is positive. For the full period, local currency and USD-based returns significantly Granger-cause funds positively for ATX (1-6,8 lags), BET (1-8 lags), BUX (1-6,8 lags), ISE (1-5,8 lags), Micex (1-8 lags), PX (1-5,7,8 lags) and WIG (1-8 lags). Results are fully in line with our expectation. Higher returns induce higher fund flows. Pre-crisis period shows this positive causal relationship for all indices for 1-3 lags. Some alternate relationship directions are shown for later lags, but this does not affect our conclusion, that positive (negative) returns for the past 1-3 weeks cause higher (lower) fund flows. The post-crisis period also corroborates this result and conclusion, and shows a strong causal relationship for all indices covering all lags. Slight outlying results (visible in the graph) do not impact the overall conclusion.

H4: A relationship exists between average analyst opinion (target prices and recommendations) and investment fund flows.

Average target prices for BET (1-7 lags), BUX (1 lag) and Micex (1 lag) Granger-cause funds negatively for the full period.

In the pre-crisis period, BET (1-7 lags) and BUX (1 lag) indices show a negative causal relationship (expect WIG (2 lags) shows a positive relationship). Post-crisis, BET (1,3 lags) and Micex (1,2 lags) support the negative relationships established for the previous periods.

Average recommendations have a less apparent impact. For the full period, only BUX (8 lags) shows any significant causal relationship with funds, and that is a negative relationship. During the pre-crisis period, BUX (4 lags) shows a positive relationship, and the post-crisis period brings Micex (1 lag) to cause funds in a negative directions. These results are weak and do not help in explaining how funds react to analyst opinion.

The other direction of causality was tested with more apparent results. Funds Granger-caused average analyst opinion (target prices and recommendations). For the full period examined, ATX (7 lags), BET (2-8 lags), BUX (7,8 lags) and Micex (1 lag) proved to be significant causality contributors in a negative direction.

Pre-crisis BET (1 lag) and BUX (5,6,7 lags) and post crisis ATX (8 lags) and BET (1,2,6,7,8 lags) where examples of funds negatively causing analyst average target prices.

As for recommendations, funds for the full period showed that BUX (1-8 lags), Micex (4-7 lags) and PX (1-8 lags) negatively cause average recommendations. This was corroborated by results from BET (1-8 lags), BUX (1,2,3,6,7,8 lags) and Micex (6,8 lags) for the pre-crisis period. Also, funds significantly Granger-caused average analyst recommendations for BUX (2-8 lags), Micex (1,2,4,5 lags), PX (1-7 lags) and WIG (1-4 lags) for the post crisis period.

H5: A relationship exists between the dispersion in analyst opinion (target prices and recommendations) and investment fund flows.

The dispersion in analyst target prices for the fully period included only BUX (1 lag) to positively Granger-cause funds. In the pre-crisis period, BUX (1 lag) had a negative effect, and in the post-crisis period, BUX (1 lag) and PX (3,4 lags) Granger-caused funds positively, whereas Micex (2,3,4 lags) Granger-caused funds negatively. These mixed results shows that no causal effect could be spotted on the data examined.

The dispersion in analyst recommendations positively caused funds. For the full period, Micex (2-8 lags) showed significant Granger-causality, in the pre-crisis period ISE (2,3 lags) and WIG (2 lags) supported the same positive causal relationship. An odd results was ISE (4,5 lags) showing a negative relationship. In the post-crisis period, Micex (2-6 lags) also positively Granger-caused funds.

The results are somewhat contradictory (odds exist) and results apply only to one or two indices, none the less, it is interesting to look to the explanation of a positive relationship; why does higher dispersion in recommendations cause more fund inflow. Either investors are risk-lovers and buy on ambiguity; or do not interpret dispersion of opinion as a proxy of risk. Another possible explanation could be that high dispersion reflects contrarian opinion which is a strategy investors in the Russian, Turkish and Polish markets may have followed.

Examining whether funds impact the dispersion of analyst opinion, I find that the relationship is negative when looking at the full period. Funds negatively Granger-caused dispersion of target prices for BET (1-8 lags) and Micex (3-6 lags). No significant causality was uncovered in the bull market of the pre-crisis period, but the bear market in the post-crisis period showed mixed results. For BUX (3,5,6,7 lags) and Micex (3,4,5,6 lags) a negative causal relationship was shown, whereas ATX (1,3,4 lags), BET (1-8 lags) and BUX (4 lags) showed a positive causal relationship.

Funds negatively Granger-caused dispersion of analyst recommendations for Micex (2,5,6,7,8 lags) and PX (3 lags) for the full period; ATX (2,7,8 lags) and BET (3-6 lags) for the pre-crisis period; and ISE (8 lags) and Micex (2 lags) for the post-crisis period.

Summary

In this dissertation I investigated equity market efficiency in Emerging Europe through the relationship between sell-side equity analyst forecasts, fund flow data and market returns. The financial literature has examined the effect of both analyst forecasts and fund flows separately, in order to better understand what impacts market returns. No literature, to my knowledge, captured the equity market microstructure (analyst forecasts, market returns, and fund flows) in one framework. This enables me to examine whether the causal relationships between the two factors and returns could also be derived from the third relationship: namely, between analyst forecasts and fund flows. The argument in support of my approach is that the product of analysts' work serves clients at investment funds; therefore I assume that empirical tests would prove a causal relationship between what analysts say and what investment fund managers act upon. The counter argument could be the time mismatch in the investment horizons: analyst forecast offers a 12 month view, whereas investment funds make both shorter term (daily and weekly) investment decisions in addition to the mid-term and long-term ones (monthly and annual).

According to Fama (1970) markets are efficient to the extent that new information is reflected in asset prices. How does new information get priced-in? The equity market micro-structure reveals that analysts analyse new information and present their research to investors, who in

turn may act upon the new information. In an efficient market, where the efficient market hypothesis holds in its stronger form, analyst forecasts would have an immediate effect on fund flows, that in turn have an immediate effect on market returns; both effects taking place instantaneously, and no further impact should be observed.

The empirical results of my dissertation contradicts the efficient market hypothesis, since in many cases market returns significantly over- and under-reacted to analyst forecasts. This can be explained in different ways. Firstly, I am examining emerging markets, therefore temporary inefficiencies can be considered as normal. Secondly, as information is priced in slowly, I observed two-directional relationships which indicate that it is difficult to determine whether analyst forecasts or fund flows drive equity returns or vice versa.

The database used in my empirical research covers the equity market of 7 emerging European countries (Austria, Czech Republic, Hungary, Poland, Romania, Russia, and Turkey) from 1st January 2000 – 25th March 2012. This period spans the economic crisis of 2008; therefore I refer to the period before Lehman Brothers' collapse on 15th September 2008 as the pre-crisis period, and consequently the latter period is called as post-crisis period.

The fund flow data is the proprietary data of EPFR that publishes weekly data on each Friday covering the previous week's net amount of money flows into a country's equity market, covering both country dedicated funds as well as all funds allocated to that country. EPFR data are quite expensive, and it is only available to paying clients.

The data on analyst forecast are unique and original since I compiled all items one by one from Bloomberg's database covering 437 stocks, and 55 sell-side equity analyst target prices and recommendations (jointly referred to as analyst forecast), a total of 22,568 entries. Weekly average and dispersion of target prices and recommendations were set up for each country, with 631 weeks examined.

The datasets on fund flows, analyst forecast and market returns are all aligned in weekly format to enable time-series analysis.

My findings can be summarised in three points:

1. Fund flows

In general, fund flows and market returns have a positive two-directional relationship. This is in line with my initial expectations, which is also supported by empirical literature including Fortune (1998), Goetzmann and Massa (1999), Ippolito (1992) and Alexakis et al. (2004).

Positive fund flow means liquidity influx to the market that will hike asset prices, and hence returns. Conversely, higher returns attract money into funds, through cross-asset reallocations.

My findings show that fund flows Granger cause market returns for the subsequent 2 weeks. However, this was evident only in 4 countries and the results vary during the pre- and post-crisis period. Before the crisis, the relationship is rather negative, and post-crisis I record rather positive relationships. Therefore, the direction of the relationship is uncertain and fairly unstable in time. Hence, during some periods, fund flows may help in forecasting market returns, nevertheless, a profitable trading strategy can hardly be based solely upon this dataset.

At the same time, the reverse effect of market returns on fund flows is much stronger, covers longer lags and was proved in the example of most countries. The positive relationship is more apparent in the post-crisis period. One possible explanation could be that before the crisis, the database comprised much less funds than in the later periods and EPFR's database coverage of funds expanded continuously.

2. Average analyst forecasts

I observed a negative relationship between average analyst target prices and subsequent returns. High average target prices Granger-caused lower returns after 1-3 weeks. The same results were seen when the Granger-causality test was repeated for the pre- and the post-crisis periods separately, with the most apparent results for the post-crisis period. This surprising result signals that during this period, analysts were not successful in forecasting equity returns. A possible explanation could be that higher target prices attract sellers to the market who see an opportunity to realise gains. Or high target prices in the Emerging European equity research arena could have been a signal for a contrarian trading strategy.

For recommendations, the relationship is also negative, but results are less robust than in the case of target prices.

When examining the relationship between average analyst forecasts and fund flows, I also arrive at surprising results. Namely, average analyst forecasts negatively Granger caused subsequent fund flows. There is no literature on this relationship, but my initial assumption was that analyst forecasts Granger cause fund flows in a positive direction. A possible explanation to the negative relationship can be an immediate over-reaction to analyst forecasts and slow corrections in the following 1-2 weeks. The reverse relationship, whether fund flows affect analyst forecasts were not significant on this sample.

3. Dispersion of analyst forecasts

The dispersion of analyst target prices and market returns show a negative relationship in both directions. My results contradict Malkiel (1982), and Barry and Brown (1985) and therefore, I cannot consider dispersion as a possible proxy for risk, as they have suggested. On the other hand, my results were inline and support the findings of the mainstream literature such as Diether, Malloy, and Scherbina (2002) and Johnson (2004). However, the results are unstable across countries and through time, especially following the crisis. The explanation provided by literature (see McNichols and O'Brien (1997) Denis and Dimitri (2002), and (Chen et al., 2001)), could also be considered for my data. First reason is the costly short selling in Emerging Markets, and later on, complete short selling ban during the post-crisis period. Another reason is that prices suffered upward bias more, as negative information was withheld from the market, coupled with low market breadth.

The empirical tests confirmed the negative direction causal relationship for target prices, but found a positive causality for recommendations. The same results were confirmed for the pre-crisis period. However, the crisis period failed to show any meaningful direction for causality as results were mixed, which means that dispersion of forecasts was misleading during the crisis.

The relationship between the dispersion of analyst target prices and fund flows is less pronounced, but shows a negative relationship in the subsequent 1-2 weeks. My presumptions were not reflected in my results. I assume that the information transmission mechanism between analyst forecast and fund flow data is subtle, and therefore the tests failed to capture it.

I summarise the results of the empirical tests in figure 8. In the first column, the hypotheses state a causal relationship and its direction between any two variables. The second column indicates whether analyst forecast is captured by target price (TP) or recommendation (Rec.). The last three columns show whether the relationship was positive or negative, and for how many subsequent weeks (lags) was the relationship significant. Results are shown when the relationship is not mixed and holds for at least 2 countries.

		Full period	Pre-crisis (bull)	Post-crisis (bear)
H1 Average forecasts → Market returns	Rec.	pos (1-2 lags)	0	neg (1-3 lags)
	TP	neg (1-3 lags)	neg (1-2 lags)	neg (1-3 lags)
H1 Market returns → Average forecasts	Rec.	neg (1,2 lags)	0	neg (2-8 lags)
	TP	neg (2-5 lags)	0	neg (1-2 lags)
H2 Dispersion of forecasts → Market returns	Rec.	pos (1-2 lags)	pos (1 lag)	0
	TP	neg (1-2 lags)	neg (1-3 lags)	0
H2 Market returns → Dispersion of forecasts	Rec.	0	pos (6-8 lags)	pos (4,5 lags)
	TP	neg (3-8 lags)	0	neg (2-8 lags)
H3 Fund flows →Market returns	n.a.	pos (2 lags)	neg (1-3 lags)	pos (2 lags)
H3 Market returns → Fund flows	n.a.	pos (1-4 lags)	pos (1-3 lags)	pos (1-3 lags)
H4 Average forecasts → Fund flows	Rec.	0	0	0
	TP	neg (1 lag)	neg (1 lag)	0
H4 Fund flows → Average forecasts	Rec.	neg (1-8 lag)	neg (1-8 lag)	neg (1-5 lag)
	TP	neg (7,8 lag)	neg (1,5 lag)	0
H5 Dispersion of forecasts → Fund flows	Rec.	0	pos (2-3 lags)	0
	TP	0	0	0
H5 Fund flows → Dispersion of forecasts	Rec.	pos (2,3 lag)	0	pos (2,8 lags)
	TP	neg (1-8 lags)	0	0

Figure 8: Summary of empirical tests for Granger-causality in the market microstructure.

In summary, the tendency I observed was that increases in market returns were caused by fund flow increases, average forecast decreases, and lower dispersion of analyst forecast, albeit, the last one is a very weak relationship. From this I conclude that there are some signs of temporary inefficiencies, but the efficient market hypothesis cannot be falsified, even in these emerging markets.

Further research areas which were beyond the scope of my dissertation include the impact of market liquidity and also examining the impact of analysts based on their past performance and their experience. Also, optimising trading algorithms and strategies with accounting for transaction costs, and investigating whether contrarian trading strategies yield better results can be topics to further explore.

I presented my results in this dissertation and showed the value of analyst forecast and fund flow data in understanding returns through the example of Emerging European equity markets. With wider-spread availability of the analyst forecast and fund flow data, I hope more academic research would cover the microstructure of the cash equity business, that would ultimately benefit investors and capital markets.

Glossary

Consensus	It is the average forecast of equity analysts covering a stock. Consensus may refer to target prices and earnings estimates.
Coverage	The act of providing analysis for a stock by issuing research reports including target prices and recommendations on a regular basis.
Developed markets	Includes stock markets of USA, Canada, Western Europe, Asia, Japan
Downgrade (of a recommendation)	When a new recommendation is on a lower grade than the previous one. Going from strong buy to buy, buy to neutral and so on.
Downside	The negative difference (in %) between the target price and the current closing price of the stock.
Earnings estimate	Estimation of earnings per share (EPS) for a stock by an analyst for a given date. May also be referred to as earnings forecast.
EMEA	Europe, Middle East, Africa
Emerging markets	Includes EMEA, LatAm (Latin America)
Equity Analyst	Is the person authorised to cover stocks on behalf of a brokerage firm. Their qualification is usually supported by professional exams (e.g. CFA) and regulatory approvals (e.g. FSA exam).
Fair value	Theoretical economic value based on present value of future cash flows.
Forecast	In my dissertation, I will collectively refer to target prices and the recommendations as analyst forecasts or simply forecasts.
Maintenance or reiteration (of a recommendation)	When a new recommendation is not changed from the previous one.
Market value	Valuation based on stock price, as priced in by the market.
Opinion	Used interchangeably with Analyst forecast. *See* Forecast.
Pricing date	The date on which pricing is carried out for a research note. It is usually 1-2 days prior to the publication date, allowing time for final editing and production.
Publication date	The date on which research notes are published, i.e. dispersed to clients and data source providers.
Recommendation	Qualitative rating of a stock given on an ordinal scale referring to the analysts' advice to purchase, to hold on to or to dispose of the stock.
Research note or equity research	The written product of an equity analyst or a team of analysts that includes the target price and recommendation on the covered stock, and quantitative and qualitative assessment of the investment case.
Stock universe	The whole set of stocks covered by a brokerage firm.
Target price	The fair value of the stock 12 months from now.
Upside	The positive difference (in %) between the target price and the current closing price of the stock.
Earnings forecast	See earnings estimate
Upgrade (of a recommendation)	When a new recommendation is on a higher grade than the previous one. Going from strong sell to sell, sell to neutral and so on.

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