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Preferences for lottery stocks at Borsa Istanbul ☆

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ABSTRACT

We investigate the existence of lottery-like preferences of investors at Borsa Istanbul. Proxying these preferences with demand for stocks with extreme positive returns (''*MAX*''), we establish that high-*MAX* stocks' significantly underperform low-*MAX* stocks, controlling for a series of potential explanatory return characteristics. We find that the negative relationship between *MAX* and expected returns is driven by stocks strongly preferred by individual investors and strengthens following periods of high investor sentiment. A natural experiment suggests that the *MAX* discount increased during the period of temporary short-sale restrictions at Borsa Istanbul. Our findings suggest a limits-to-arbitrage explanation for the *MAX* anomaly.

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1. Introduction

Considerable research has focused on stock return anomalies—cross-sectional dynamics, unexplained by standard asset pricing models. One such anomaly is the tendency of stocks with extreme positive returns to underperform next period, the so-called "*MAX* effect". Since high-*MAX* stocks have high total and systematic risk, they would be expected to reward with a risk premium, instead of a discount.

Investing in financial instruments with lottery-like characteristics (i.e., with small probability of a large payoff), such as high-*MAX* stocks, seems inconsistent with rational investor behavior, given empirical evidence that such instruments have poor long-run performance. Demand for them has been explained within the framework of behavioral characteristics of individual investors (Kumar, 2009). It has been suggested that retail investors tend to be influenced by past return performance, overweighing the favorable low-probability events they observe (Barberis and Huang, 2008; Barberis et al., 2016), and holding on to losing instruments (Barber and Odean, 2013). This empirically-observed preference for positive skewness has also been theoretically motivated with models such as Brunnermeier et al. (2007)'s portfolio choice with optimal expectations, in which investors maximize their ex-ante utility of investing in gambles.

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In this paper, we explore lottery preferences of investors in equities listed on Borsa Istanbul (the Turkish stock exchange) by analyzing the expected return behavior of high-*MAX* stocks. Similar to Bali et al. (2011) for the U.S. market, we employ portfolio sorts and cross-sectional regressions to establish that *MAX* effect exists and we analyze the characteristics of the *MAX*-sorted portfolios. We find that high-*MAX* stocks underperform low-*MAX* stocks for up to six months following the month in which the extreme positive returns were observed. High-*MAX* stocks tend to be small, high-beta, illiquid, and low-value.

The main contribution of the paper is to provide a comprehensive analysis of the *MAX* anomaly within the setting of an important emerging stock market, namely Borsa Istanbul, and explore demand- and supply-related explanations for the existence of that anomaly. Since there is lack of research on stock mispricing and investor behavior on Borsa Istanbul, our paper fills an important gap in the literature. On the demand side, we focus on analysis of whether the *MAX* effect is driven by the actions of individual investors. As suggested in many behavioral-finance studies, the actions of noise traders could significantly distort asset prices (e.g., Barberis and Thaler, 2003; Barber et al., 2006). We construct an individual investor index based on the methodology proposed by Lin and Liu (2017) and we find that the negative relationship between *MAX* and expected return is indeed strongest among the stocks that are most preferred by individual investors and not significant among the least-preferred stocks.

For a mispricing to cause persistent predictability of returns, arbitragers must be hindered in clearing it away. Our finding that high-*MAX* stocks are strongly preferred by individual investors speaks indirectly to this supply side of the *MAX* anomaly: a high-degree of retail investor preference and ownership makes shorting high-*MAX* stocks difficult, since stock lenders tend to be institutional investors. The finding of D'Avolio (2002) that stock loan supply from institutional investors is biased towards large and liquid stocks (which tend to be low-, rather than high-*MAX*), also provides support for such an interpretation.

Our analysis of the time-series dynamics of the *MAX* discount reinforces the conjectures of the interplay of the demand- and supply-side explanations for the *MAX* effect. Baker and Wurgler (2006) make the case that investor sentiment plays a significant role in driving prices away from their fundamental values for stocks that are subject to speculative demand, while at the same time being difficult to arbitrage. Consistent with this argument, we find that high investor sentiment in a given month strengthens the *MAX* effect in the following month. Stambaugh et al. (2012) argue that overpricing tends to be more prevalent than underpricing, after recent high-sentiment environments. In accordance, we observe that the short leg of the trade designed to clear the *MAX* anomaly has a significantly higher negative return following high-sentiment periods, while the impact on the long leg's return is not as strong.

We directly analyze impediments to short-selling and their role in the *MAX* effect, with the help of a natural experiment. Temporary restrictions on short selling at Borsa Istanbul were put in place between August 2011 and July 2012. During the period of short-sale restrictions, the *MAX* discount increased significantly, suggesting that even if informed traders could clear away the price distortion, they were prevented from doing so. This finding is reminiscent of Stambaugh et al. (2015)'s arguments and evidence regarding arbitrage risk and arbitrage asymmetry, in the context of another anomaly— the *IVOL* puzzle.

Finally, we find that the *MAX*-related return discount is negatively related to the aggregate institutional ownership ratio. Periods of decreased institutional ownership at Borsa Istanbul are associated with strengthening of the *MAX* anomaly, consistent with our earlier evidence and the limits-of-arbitrage hypothesis.

The remainder of the paper is organized as follows. Section 2 presents the data, descriptive return statistics, and predictor correlations. The evidence that *MAX* exists in Borsa Istanbul stock returns is discussed in Section 3. That section also explores the robustness of *MAX* to various return predictors, using double sorts and Fama-MacBeth regressions. Demand- and supply-side explanations for the *MAX* effect are analyzed in a cross-sectional setting in Section 4 and in a time-series setting—in Section 5. Section 6 provides robustness analysis. Section 7 concludes.

2. Data description

Our sample consists of all stocks listed on Borsa Istanbul, excluding REITs and stocks in the Emerging market and Watchlist market segments—a total of 359 stocks. We acquire daily stock price, market capitalization, and volume data, as well as quarterly book value data, from Thomson Reuters' Datastream, for the period from January 3, 2000 to June 30, 2016. Historical data is not available for the whole period for all stocks. Return data for the largest number of stocks is available for July 2014 (308 stocks) and the month with the least number of stocks is January 2000 (215 stocks). The source of data on institutional ownership is Turkey's Central Securities Depository (MKK), while data on stocks' industrial classifications are from Borsa Istanbul.[2]

Panel A of Table 1 reports descriptive statistics for the stocks in our sample, computed as the time-series means of cross-sectional characteristics. The average stock delivers 1.85% per month, with monthly volatility of 13.7%, and has a positively-skewed and slightly leptokurtic return. The stock characteristics used in the study, whose averages are reported in the table are defined, for stock i and end of month t, as follows: $MAX_{i,t}$ is the maximum daily return observed within month t (represented on a monthly basis in the table), $Size_{i,t}$ is the logarithm of market capitalization, $B/M_{i,t}$ is the logarithm of the book-to-

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[2] We are grateful to MKK and Borsa Istanbul for making the data available.