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LIQUIDITY AND STOCK RETURNS: EVIDENCE FROM KAZAKHSTAN STOCK MARKET

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Abstract:

A lot of well-known theorems and asset pricing models are derived from analysis of developed stock exchanges under conditions of absence of transaction costs. Thus, a lot of attention has been given to transaction cost effects on stock return, especially after the financial crisis of 2008. It is challenging to test the known theorems and models on the global scale due to global intraday data being expensive and growing exponentially over time. Some attention has been given to mid-stage emerging markets, however, smaller local stock exchanges have been left out. Therefore, this paper is an attempt to test how do the well-known theorems fit the "local" stock exchanges and find the effects of liquidity and currency on stock return. Unfortunately, due to the costs of the data the paper will be limited only to Kazakhstan stock market

Keywords:

Illiquidity, Emerging markets, CAPM, Exchange rate regime

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1. Introduction

Emerging markets exchanges massively expanded in recent years. From 2001 to 2016 the market capitalization has increased from $3 trillion to $7.5 trillion. Thus, attracting the eyes of many investors and researchers. It is common to distinguish the emerging market exchanges by their degree of maturity. Early-stage emerging markets typically focus on market enhancement and attracting local investors. Mid-stage emerging markets try attracting international investors and issuers. Maturing emerging markets tend to focus on the alignment of standards and regulatory principles with international practices.

A lot of well-known theorems and asset pricing models are derived from analysis of developed stock exchanges. These theorems are further tested on maturing stock exchanges. However, little research has been done on early- and mid-stage stock exchanges. “Local” stock exchanges have several common characteristics atypical to other stock exchanges. Namely illiquidity, low market capitalization, the small number of publicly traded firms, homogeneity of investors, low financial education and currency risk. These factors might lead to results that contradict the results of some worldwide accepted theorems and models.

After the recent financial crisis (2008) liquidity has earned the attention of many researchers. Liquidity is a characteristic of the stock that has high capacity traded at close price levels which could be acquired or sold in a small timeframe. Kyle (1985) notes that ‘‘liquidity is a slippery and elusive concept, in part because it encompasses a number of transactional properties of markets. These include tightness, depth, and resiliency,’’ (p. 1316) First is the cost of impatient investor who executes the order at the market price. This cost is measured by the bid-ask spread. Depth is the cost of purchasing a high stake and is measured by possible absorption of large size order. The third measure is the time delay for the prices to return to the initial level after liquidity shock. The last dimension has been defined after the work of Kyle and is called Immediacy. It is characterized by the speed at which the transaction is made at a given cost. Liquidity is a vital element of financial market development. Investors seek more liquid markets due to lower costs of trading. For issuers, liquidity is associated with lower costs of raising capital and more accurate share price valuations.

1.1 Research hypothesis

The first purpose of this paper is to test the effects of illiquidity on stock returns on local stock exchanges. Theoretically, the effects of the liquidity on the stock return should be more significant than in developed markets. The tested hypothesis was used by Amihud et al. (2002) and would claim that lagged daily illiquidity has a significant positive effect on daily stock return.

The second purpose of the study would analyze the effect of the shift in currency exchange policy on commonly used models. The models tested would include:

a) Capital Asset Pricing Model – using the global market as a factor

b) Asset Pricing Model – with the local market and SMB factors

c) Asset Pricing Model – with ILLIQ proxy for Illiquidity.

Each model would be analyzed in two periods with the fixed and flexible currency exchange rate and the results acquired under different samples would be later compared to each other. Maintaining the fixed peg requires sufficient foreign exchange reserves in order to back the stable exchange rate. Therefore, moving from the fixed to floating peg is associated with an immediate devaluation of the currency in one-time or cascade of adjustments. This shift in foreign exchange rate policy could have different effects on the targetted companies. The apparent effects are increased profit levels of companies that have exposure to foreign markets, an increase in the general debt payments and others. Overall this movement in the exchange rate regime is expected to cause an increase in average return. From the model standpoint, this rise could be described by the change in the values of model parameters such as an increase in the constant term or beta values.

1.2 Structure of the study

The first part of the literature review (Chapter 2) will mostly cover the problems associated with measuring the illiquidity and addressing the problems of each proxy. It will state the advantages and disadvantages of several illiquidity measures. The second part of the review will describe the effects the proxies mentioned above had on the stock returns.

Chapter 3 will cover the methodology of the hypothesis testing used in this paper. The data reliability and source would be covered in the early part of the Methodology chapter. It would be followed by the models and theoretical base of this thesis.

Chapter 4 will describe the results and differences of effects of liquidity on mid-stage emerging markets. The effects of the exchange rate policy shift on stock returns and factors will be covered in this chapter as well.

Chapter 5 will mostly contain an overview of the Kazakhstani stock market, possible explanations of the results, as well as address several issues the early and mid-stage emerging markets, might face.

Chapter 6 will contain the limitations of the study and possible improvements and perspectives for further studies.

2. Literature review

2.1 CAPM

The usual practice in the academic world is trying to prove the theory is either wrong or right every time a new theory is found. From that perspective, CAPM holds a vital role in the academic field. It is the theory that has the most comprehensive analysis on a global scale. Despite several papers having proved the CAPM wrong in some markets the theory still finds support and is not to be ignored. Džaja and Aljinović (2013) paper presents the test of the CAPM model on the emerging markets of central and southeastern Europe and finds CAPM not adequate for assessing the capital assets in these markets. Savor and Wilson's (2013) paper, in contrast, shows a strong relationship between market beta and average return on the dates of macroeconomic decision announcement. One of the recent papers testing the validity of CAPM on the developed markets was written by Jamil, Arfa (2018). He analyzes the data of the London Stock Exchange market during the period from 2004 to 2016 and presents findings that support CAPM. Empirical tests of the CAPM are based on three main implications of the relation between expected return and market beta implied by the model. Firstly, expected returns of assets are linearly related to asset's betas, and there is no other variable that has explanatory power. Second, the beta premium is greater than zero, which implies that the expected return on the market portfolio exceeds the expected return on assets whose returns are uncorrelated with the market return (or risk-free returns). Third, there is zero persistent correlation of assets with the market, and the beta premium is equal to the difference between the expected market return and the risk- free rate.

Damodaran (2011) conducted an empirical test of CAPM on a Global scope, considering different companies from different countries and proposed the Global CAPM model. This model will have a company's beta calculated using the Morgan Stanley Capital Index (MSCI) as a proxy. The main feature of the Damodaran study is that the Global CAPM assumes fully integrated markets, implying the assets on the same risk level should have the same return independent of the stock exchange where they are traded. The research paper findings showed that there is evidence of 'home bias' and integration barriers, showing that standard CAPM does not capture the effect of the country leading to the invalidity of the model.

Testing CAPM in emerging markets has been dependent on the definition of the market return. Bruner et al. (2008) state "the choice of the market portfolio used in the regression - the home country or global index - depends on the level of market integration." The model that uses global indexes as a market portfolio will be addressed as called Global CAPM. Mishra and O'Brien (2001) and Harris et al. (2003) suggest that the choice of the market portfolio is inconsequential in case the analyzed market is either developed or has a high level of global market integration.

Mishra and O'Brien (2005) conclude that the choice of the market portfolio makes a substantial difference in CAPM estimates for emerging market analysis. Using the local index as a market portfolio might prove to be challenging. In mid-stage emerging markets the local market is usually too small and has several market makers who have a high correlation with the overall market portfolio. This paper will contain both of the CAPM models, provide a comparison between them and try to add other possible factors in order to improve the explanatory power of the models.

Both of these models would be tested using two time periods. One containing the flexible exchange rate regime, while another will have a fixed exchange rate. There are many possible factors that might change after the shift the exchange rate regime and influence the results of the model. The performance of each individual company, their exposure to foreign markets, the currency of taken debt. Another notable reason is the loss of investor belief in currency and their willingness to diversify the currency risk. Due to the fear of devaluation of currency the population is expected to change their saving strategy and diversify their savings from the bank deposits to stocks and other instruments. All of these factors are expected to be incorporated into the model by adjusting the factors analyzed in this paper.

2.2 Estimation of liquidity and proxies

Liquidity is the term without direct mathematical form. It includes a lot of transactional properties in the market. Thus, there are multiple liquidity proxies used historically. The first type of illiquidity proxies measures direct trading costs. This type of measure was used by Amihud and Mendelson(1986). They tested the hypothesis of increasing and concave relationship between expected return and bid-ask spread. This empirical evidence implies the existence of a liquidity premium. However, Eleswarapu and Reinganum (1993) examined the effect of seasonality on bid-ask spreads and returns and concluded that this effect is limited to the month of January. The spread proxies have several disadvantages. Quotes information is not available for all of the markets and all of the stocks. Another fact which needs to be stated is that the closing prices could be outside the ranges of known quotes. Furthermore, collecting comprehensive data for quotes proves to be difficult and costly.

The second measure of liquidity is more direct and is volume-based. Intuitively high volumes indicate asset liquidity. Bailey and Jagtiani (1994) use raw trading volume as a proxy. This measure was adjusted by Amihud et al. (2002) and Berkman and Eleswarapu (1998) by using trading volume scaled by the security return (the Amivest measure) as a liquidity proxy for market depth to explain return differentials in studies on the Thai, Israeli, and Indian stock exchanges, respectively. The scaled return follows the price impact (Kyle 1985) definition of liquidity. The possibility to check this proxy in cases of no price change makes it an attractive measure for emerging markets. However, the day with zero trading volume could also be present which would make it undefined on this particular date.

Turnover rate is a ratio of volume traded to outstanding volume. Turnover based liquidity proxy was used by Datar, Naik and Radcliffe (1998) and Levine and Schmukler (2003), in investigating emerging market internationalization and domestic liquidity. Rouwenhorst (1999) uses turnover in examining emerging market return premiums. However, turnover ratio fails to account for the costs per trade which vary across assets. Furthermore, Lesmond (2005) argues that turnover is likely to have a non-linear relationship with the bid-ask spread. Thus, resulting in possible scaling problems.

Domowitz et al. (1998) use a variant of the Roll (1984) model to assess liquidity effects in their study of cross-listings and market segmentation for the Mexican stock market. Several studies have tried to analyze the institutional trades. However, due to institutions intentionally breaking up their trades in several batches to minimize the transaction costs, the data might not be reliable for analysis of the whole market. Overall, the problem of each proxy lies in the possibility of capturing the effects of variables unrelated to liquidity.

The model proposed by Lesmond et al. (1999) uses a limited dependent variable technique, which is generally appropriate for emerging markets. This estimate is considered to capture most of the costs the investor has to cover. However, this statement is accurate only for late-stage emerging markets, due to the lower levels of zero-return days. This model loses its credibility in the presence of extreme illiquidity. The accurate choice of proxy, therefore, is essential for asset pricing models.

2.3 Liquidity and return

There is no consensus on the effect of liquidity and stock return. The main reason behind it is the use of proxies. The fact that proxies capture some of the other variables effects causes different results which are the root of the controversy. Therefore, it is necessary to take a closer look at the relationship between liquidity and return. Intuitively, it seems clear that liquidity, being a risk factor, should have a premium. Rational investors are willing to hold more illiquid securities only when they are compensated for the additional risk of illiquidity (Amihud & Mendelson, 1986). Therefore, a lack of liquidity could be accessed as a riskier investment which should be rewarded with a return premium. Amihud and Mendelson studied the effect of the bid-ask spread on asset pricing for NYSE stocks. The primary hypothesis of Amihud and Mendelson that expected return is an increasing and concave function of the spread. The empirical tests were performed on the monthly based stock returns and the average of the beginning and the end-of-year relative spreads. Amihud and Mendelson controlled for market capitalization due to its possible effects on the relationship between volatility and liquidity. Small firms were found to have significantly larger risk-premiums than large firms (Banz, 1981). This paper will also try to control for market capitalization effect. Eleswarapu and Reinganum (1993) had extended the sample data period by ten years and examined the seasonal effects on bid-ask spreads and returns. The results showed that the effect of the bid-ask spread having a positive premium is limited to January. Thus, contradicting the fact of a liquidity premium.

Datar, Naik, and Radcliffe (1998) used a turnover rate as a proxy to illiquidity. Their findings were in line with Amihud and Mendelson's results. However, the January effect and seasonality had not been found to affect this relationship.

Amihud (2002) expands upon the findings of Amihud and Mendelson (1986). The hypothesis on the relationship between stock return and liquidity is that return increases with illiquidity, Amihud (2002) developed a new illiquidity measure that is used as a foundation for the illiquidity measure in this paper, *ILLIQ*. It is defined as the sum of the daily ratio of the absolute stock return to its dollar trade volume, over some period.

$$ILLIQ_t^i = \frac{1}{Days_t^i} \sum_{d=1}^{Days_t^i} \frac{|R_{td}^i|}{V_{td}^i}$$

ILLIQ can be interpreted as the daily price response associated with one dollar of trading volume for that stock. This measure helps to compensate for the missing data and considers the days with zero volume traded as undefined. The data Amihud (2002) focuses on is NYSE stocks. The results of Amihud (2002) conclude that in cases of long-term holding, expected returns of stocks seem to increase with expected illiquidity, implying evidence for the existence of an illiquidity risk premium. *ILLIQ* has a positive and highly significant effect on expected returns. The initial requirement Amihud imposed on the reliability of the *ILLIQ* measure is to have at least half of the transactions for the time period. Ying Wu (2013), however, showed that in cases of extreme illiquidity the *ILLIQ* could still be used as a reliable measure of illiquidity. Therefore, in this paper, the *ILLIQ* would be used as a proxy for the illiquidity of stocks.

Amihud (2002) also provides useful insights into the relevance of firm market capitalization on illiquidity, concluding that illiquidity effects are stronger for small firms. Acharya and Pedersen (2005) continued on the framework developed by Amihud (2002). They stated that investors do not require a premium for the level of financial liquidity, but that they challenge the variability and uncertainty of the liquidity levels. The same measurement of illiquidity was used as a proxy for illiquidity. Acharya and Pedersen developed a liquidity-adjusted CAPM and concluded that this model performs better than the models without liquidity adjustments. The liquidity-adjusted CAPM shows that positive shocks in illiquidity are associated with low contemporaneous returns. Despite that Acharya and Pedersen find weak evidence that liquidity risk is necessary over and above the effects of market risk and the level of aggregated liquidity. Pastor and Stambaugh (2003) focused more on the aggregated level of liquidity and stock sensitivities towards changes in the aggregate level of liquidity. Aggregated liquidity is seen as a market variable describing the current market situation. They used the aggregate liquidity to test the effects of market liquidity on the market volatility. The empirical evidence suggests that stocks that are more sensitive to aggregated liquidity have higher expected returns and market capitalization.

Chan and Faff (2005) apply the time-series version of Fama and Macbeth (1973) to confirm the role of liquidity in asset pricing. The share turnover -was used as a proxy for liquidity in this study. The results of this paper support the association between liquidity and stock returns.

Liu (2006) proposes another way of defining illiquidity for individual stocks. Standardized turnover – an adjusted number of zero daily trading volumes over the prior 12 months. This new measure could encompass various features of liquidity trading speed, trading quantity, and trading cost. This method shows that illiquid stocks are mostly constituted by small firms and high book-to-market value stocks.

Emerging markets have some specific characteristics of liquidity which might affect the overall results. Bekaert, Harvey & Lundblad (2007) stated that emerging markets have unique characteristics and collected data on the Standard and Poor's Emerging Markets Database. After conducting a study on 19 emerging markets, they found that unexpected liquidity shocks are positively correlated with returns. Furthermore, they find that these liquidity shocks are negatively correlated with dividend yields, which support the previous views of Acharya and Pedersen (2005) and Pastor and Stambaugh (2003).

Lischewski and Voronkova (2012) investigate the influence of size, value, and liquidity on stock return in Poland. Results in this market are supportive of those in matured markets but could not fully explain the equity premium even with the liquidity factor present in the model. They found that liquidity factor plays a role in reducing the occurrence of the statistically significant risk-adjusted excess return; however, as a priced factor in this market is insignificant.

Wang et al. (2012) study the effects of liquidity on stock returns in the Taiwan market by forming 14 style portfolios based on terms of size and liquidity. Unlike the proposed theory of advanced markets, highly liquid stocks were found to outperform benchmark in both short- term and long-term significantly.

Tiebe and Andre (2014) checks for the association between liquidity and stock return in African countries during the period from 1995 to 2010 by the fixed effect model. Tiebe and Andre also analyze the effects of macroeconomic factors and use the turnover rate as a proxy for liquidity. A positive impact of liquidity on a stock return is recorded when South Africa is excluded from the sample.

Most of the studies of liquidity in emerging markets show unintuitive results of a negative premium for illiquidity. The possible explanation for this occurrence would be explained in the later parts of this paper.

2.4 Liquidity during shocks

One of the most noteworthy models of investor behavior during shocks is the FTQ and FTL models. Individual or aggregate stock liquidity could at some point face downward shocks. Financial theorems state that this will be corrected by higher returns. However, considering more recent literature, this does not always hold for all types of assets and markets. Flight-to-quality and flight-to-liquidity investor behavior models could increase the demand for low- volatile, liquid securities and reduce the demand for highly illiquid and volatile securities, demanding an additional premium for the latter type of securities. The first analysis of this behavior was in the bond market (Vayanos, 2004). It showed that liquidity premium varies over time and could significantly change during shocks or times of uncertainty. The reason the bond market became the first base of analysis is due to the fact that liquidity premiums could be easier defined in the bonds than in the stocks.

Beber, Brandt, and Kavajecz (2009) captured the different levels of effects of the FTL and FTQ during different types of shocks. They found that in the bond market, the substantial part of the spread can be explained by the differences in credit quality and thus the FTQ. However, in times of considerable cash in- or outflows, flight to liquidity explains a more significant portion of the yield spreads than the quality. It implies that in times of large shocks in cash flows the FTL is more important for the yield spread than the FTQ. This paper will consider the exchange rate policy shift which caused the devaluation of currency more than two times as a shock and will analyze its effects on the relationship between illiquidity and stock return.

3. Methodology

3.1 Data

The Kazakhstan Stock Exchange (KASE) market had an accelerated development in recent years mostly due to policies aimed at privatization of previously governmentally owned businesses. It has led to the formation of the International Financial Center in Astana, which will provide a platform for countries in middle Asia to have IPO's and get exposure to a bigger pool of investors. The formation of the International Financial Center brings up the need for analysis of the country in which it is being located and its historical stock market.

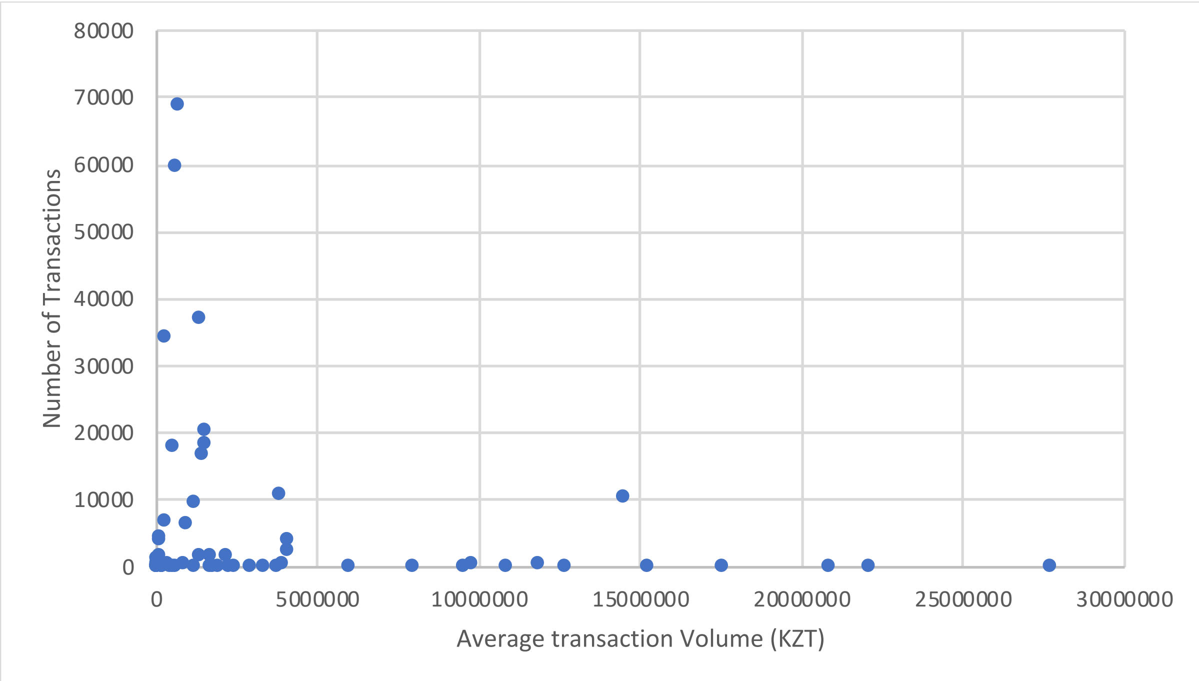
By the end of August 2018, KASE had 101 unique companies traded at the stock exchange. However, 12 of them were not based in Kazakhstan and are dual-listed. Fama-French model tests divide the companies based on their characteristic into different portfolios. If the test is made using the data acquired from the developed market the number of portfolios might reach as high as 27. Three portfolio types per each analyzed factor. This is possible due to high number of companies. In the case of emerging markets this detailed analysis might not always be possible. If we divide 101 unique companies into 8 groups each group will have on average 12 companies which might decrease the reliability of the test. Furthermore, a lot of the companies traded have only several dozens of transactions during the whole observation period of 5 years. Graph 1 shows that although some of the companies are publicly traded at the stock exchange, they do not fit the definition of "public." Due to the fact of having a low number of transactions with an extremely high average value of each operation. The lack of "marketability" in this type of stock could not be denied. Therefore, most of the data would be found to be unfit for the analysis.

First of all, it needs to be mentioned that the data of the Stock exchange referenced in this study would be from two different sources. The first is the informational agency "Irbis." It used to be a subsidiary of KASE and until recently was the provider of stock price information for an individual or corporate use. However, KASE has recently started to provide the information directly. Thus, consuming the "Irbis" agency. Although it is common practice to consider the first source as a reliable source of data, this might not necessarily hold for this case due to the transfer of data from acquisition and requires further analysis of data.

The data received from the "Irbis" agency could not be accessed directly. However, the results of the previous analysis are available in several Kazakhstanis university student theses. The most recent one covers the time frame: Jan 4, 2010, to Mar 15, 2016. Unfortunately, it contains only the daily closing stock prices and no information about bids and asks. This data will be used to test the CAPM on the Kazakhstani stock market. The second data which will be used in this paper covers a period from Aug 18, 2013, to Aug 18, 2018. It contains the data for each transaction, bid and ask performed on KASE during that period.

Figure 1 - Number of transactions and average volume of the transaction

This figure shows the number of transactions of a stock and its respective average transaction volume. The number of transactions is measure in the period of 5 years from 2013 to 2018. The distribution shows significant outliers which could influence the results and decrease the performance of the models. Spotting and addressing these outliers is the purpose of this graph.



One needs to be very careful in selecting and defining factors when analyzing the emerging markets stocks. Particular attention should be given to defining the market factor. One way of defining the market porfolio is to use a global index. One of the problems with using this index is that the regional events affect the local market more than global market index predicts. Another way of choosing the market portfolio is to consider the local market index as a factor. This method has several problems in emerging markets. The presence of several big market makers might strongly affect the market factor, thus, resulting in a high correlation between a specific company and a market factor. Another problem might arise from irregularly traded stocks which could cause deviation in the relationship. Therefore, it is reasonable to define the market portfolio as a sum of weighted stocks filtered for irregularity. Filtering the stocks is essential in order to avoid the spikes in market portfolio resulted from irregualr tradings. There would be two steps of filtering the data used for the analysis. Only 58 stock remained after the initial filtering which looked for the companies with at least 30 weeks of trades weeks. The second filtering would filter the number of total transactions during these 30 weeks leaving us with 35 stocks.

The Global CAPM test is required in order to determine whether the global index which has more exposure to different industry sectors and stock characteristics is viable and could pose as the market portfolio for the further analysis of the market. Furthermore, this test will check the validity of the CAPM and its results during different exchange policy regimes.

The local index of KASE has only eight companies. These companies will be used in order to test the validity of Global CAPM model. The return of the S&P 500 will be taken as a proxy for market return. 10-year US Treasury bill interest rate as a proxy for risk-free rate for the period. Adding any extra factors for this model is unreasonable due to the low number of companies. The results might be different for different data sources due to the time period. However, the general conclusion should remain the same. Furthermore, the effect of the exchange rate policy shift would also be analyzed.

3.2.1 Global CAPM test

CAPM is the result of works of Sharpe, Treynor and Lintner and is commonly represented with the following form:

$$E(R_i) = R_f + b_i\left(R_m - R_f\right) + \varepsilon_i$$

is a representation of mean-variance-frontier optimization problem as well as standard version of CAPM, where expected return on a given asset is equal to the risk-free rate plus beta (β) multiplied by the market risk premium, beta defined as a ratio of the covariance of an asset's return with market return and the variance of the market return.

In order to test the CAPM, we must test the claim that the market portfolio is positioned on the efficient frontier. Test on the validity of the capital asset pricing model involves a two-stage test:

First stage - test of intercept term. Under the null hypothesis – the intercept is statistically not different from zero.

$$((E(R_i) - R_f)_t = a_i + b_i\left(E(R_m) - R_f\right)_t + \varepsilon_{it}$$

Using ordinary least squares (OLS) we estimate b_i and a_i. The testing hypothesis of the first stage would be the following:

$$H_0: a_i = 0$$

$$H_a: a_i \neq 0$$

The second stage was firstly used by Fama and MacBeth (1973) and involved cross-sectional regression of assets returns on betas.

$$E({R_i}^{mean}) = \lambda_0 + \lambda_1 b_i^{estimated} + \varepsilon_i$$

It should be noted that ${R_i}^{mean}$ is the average value of excess return of company i and $b_i^{estimated}$ is the beta estimated in the first stage. The testing hypothesis of the second stage:

$$H_0: \lambda_0 = 0 \ \cap \lambda_1 = R_m - R_f$$
$$H_a: \lambda_0 \neq 0 \ \cap \lambda_1 \neq R_m - R_f$$

In the work of Vakhrushev (2016), there were two methods used in the estimation of CAPM betas, the betas derived from the first step regression and the method mentioned in Damodatan (2011). This paper, however, will only focus on first stage betas and compare the results.

3.2.2 Filtering data and Defining the portfolios

The local market factor has several disadvantages discussed before, namely: possibly high correlation with several market makers and outlier effect problems. Hence, before analyzing or limiting the outlier effect one needs to understand the reasons behind the outliers. Kazakhstan stock market does not have a Security and Exchange Commission analog. Therefore, most of the security laws and regulation comes from KASE itself. Due to the fact that the regulator is not independent of the stock exchange there might be some transactions which were not regulated properly. In this paper we will work with two types of data. This will allow us to see how important is the presence of independent regulator and how strong is the outlier effect on the results in early and mid-stage emerging market stock exchanges.

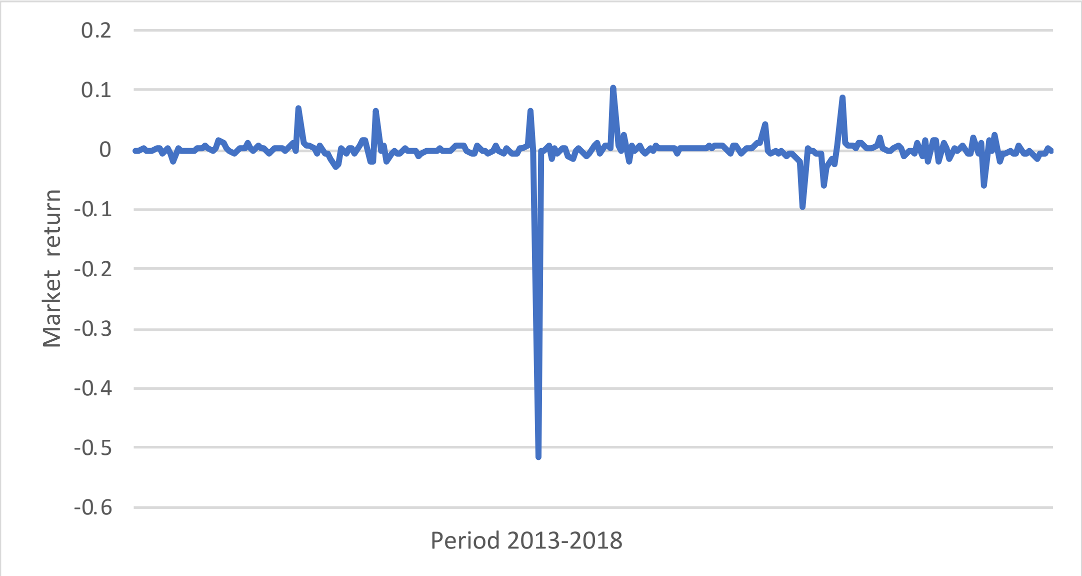
The local factor market model for consistency should have the local risk-free rate. The risk-free rate will be measured by the rate proposed by National Bank of Kazakhstan.

The first stage of filtering reduces the number of stocks to 58 unique tickers. This filtering covers both of the data sets. The main criteria for filtering are the presence of transactions on at least 30 weeks during the 5-year period. As it was seen from Figure 1 there are a lot of companies which had small number of transactions during this period, Therefore, more than 40 companies were excluded from the first filtering.

The second filtering is what brings the distinction between datasets. The first dataset will be only filtered once, while the second will have individual stock transaction filtering. This step includes deleting the specific types of data which causes massive deviations. The filtering would not decrease the number of companies. It would only target certain transaction which are found to be disturbing to the analysis and significantly deviate from the possible value of company. Some stocks have several big transactions for incredible amount of value massively overestimating the valuation of the company. These transactions' prices are believed to misrepresent the valid valuation and could cause significant misinterpretations of data. One method of checking data for such transactions includes dropping the data which led to abnormal returns with low volume. However, as described before there were precedents in which the traded volume could not be considered as small. Figure 2 demonstrates market return for the whole available period without transaction filtering.

Figure 2 – Weekly Market return for the period 2013-2018 one-stage filtering

This figure presents the weekly market return for the period 2013-2018 and includes 58 unique companies. The data used in the whole market return was subject to one filtering. Thus, limiting the effects of the outliers and companies with small number of transactions but with high average volume per trade.

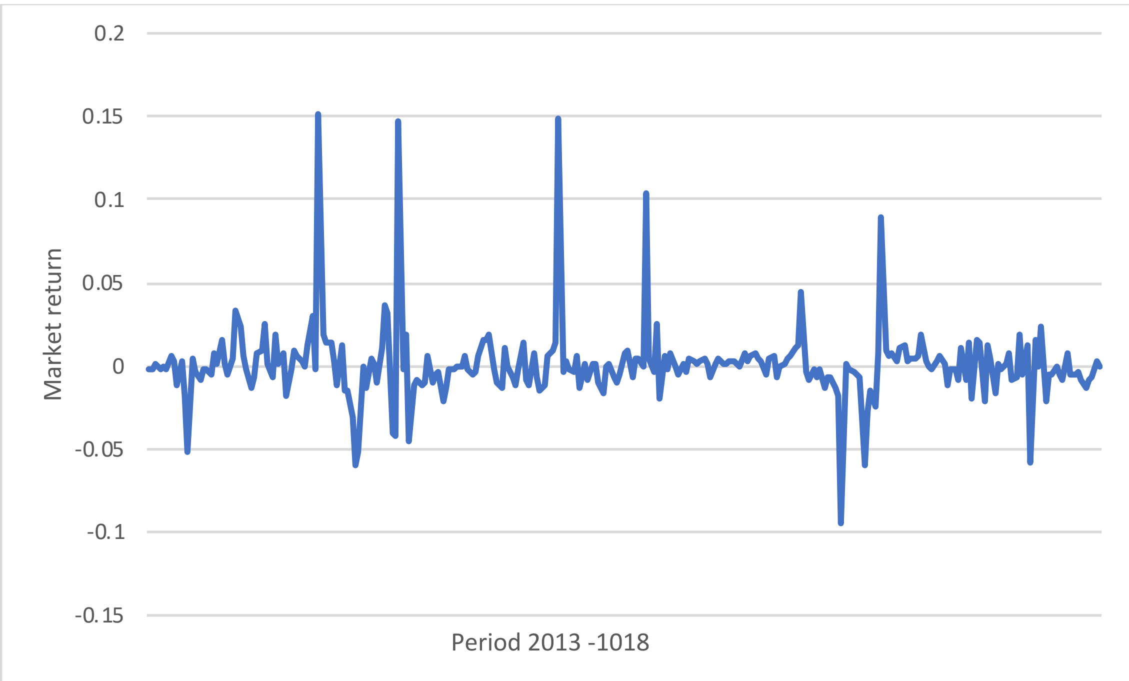


During the last 260 weeks one of disturbing transactions could be easily spotted during the shift in exchange policies. There was a 50% decrease in the whole market. The overall observation might lead us to bring bad conclusions about the market negatively reacting to the shift to the point of it losing half of its market value. However, the true problem lies in fact that the original valuation of some stocks was unjustified. The stock of ABBN had an IPO during the same period the number of listed purchasers was relatively low but with high stakes. This probably led to the fact that some of the big players in order to get to certain percentage level of ownership had purchased the stock for increadible price. Due to overall financial illiteracy of individual investors the stock continued to be traded at the same price for a week the price of the stock decreased by 94%. Thus, resulting in market capitalization of this company dropping 20 times in a week.

In Figure 3 we could see that after the transaction filtering the market return data did not have immense spikes and disturbing outliers. There were four weeks which resulted in a market growth of over 10% and 6 weeks with 5% or more drop.

Figure 3 – Weekly Market return for the period 2013-2018 two-stage filtering

This figure presents the weekly market return for the period 2013-2018 and includes 58 unique companies. The data used in the whole market return was subject to two filtering. Thus, this data limits both, the effects of the outliers and either intentional or nonintentional incorrectly valued transactions. The second filtering target specific transactions and not the particular firms.



It should be noted that the second filtering targeted only specific transactions not affecting the number of firms. Therefore, the portfolio construction in both datasets will be the same. The construction of portfolio from the given stocks is proved to be challenging. Usual CAPM models' extensions consist of several factors such as SMB, HML and IMV. The basic principle behind this division is to construct portfolios which fit one of 27 categories. In our case the total number of 58 companies is already small enough. Therefore, dividing it into even smaller number of groups with less than 3 assets per portfolio seems unreasonable. However, neglecting the effect of big players in the market might lead to nonreliable outcomes. Thus, the companies will be divided into three categories based on market capitalization. The factor would further be called as BIG. The companies which are included in the KASE index would constitute the big portfolio. Companies with relatively high market capitalization not belonging to the index would constitute the middle portfolio. Finally, the rest of the companies would be grouped into small portfolio. Interestingly enough biggest companies do have the highest turnover and volume traded per day (proxies of liquidity).

Hence in each month, the average returns portfolio containing firms sorted as "big" are subtracted from the average returns of portfolio containing stocks sorted as "small", thus, creating a factor of excess return of "Index" companies in comparison to low market capitalization firms. Thus, creating the first factor in CAPM extension used in this paper.

3.2.3 Descriptive statistics

Overall the mean market return of the two stage filtered dataset is positve, which could clearly be seen from the Fugire 4. The market return distribution has positive mean and median with high number of occurances in talis. There seems to be slight negative skewness but it is not significant.

Table 1 is the summary of basic statistics for portfolios. We see that the mean return of big portfolio is larger than that of other portfolios, while the standard deviation of the portfolio is lowest out of three. The middle portfolio in contrast is riskiest of portfolios. It has the lowest mean return of -0.3%, the standard deviation of 5.4%. The minimal return value is -0.78 despite erasing some of the outliers. The Kurtosis of all three portfolios is higher than 3 implying the tail return distribution being fatter than that of a normal one. Jarque-bera test was conducted on all of the portfolio residuals and have shown close to zero chi-squared value. Thus, rejecting the null hypothesis of having normally distributed portfolio returns at 1% level.

Figure 4 – Market return distribution

The histogram shows the distribution of the weekly market return (created with 58 selected companies) during the period from 2013 to 2018.

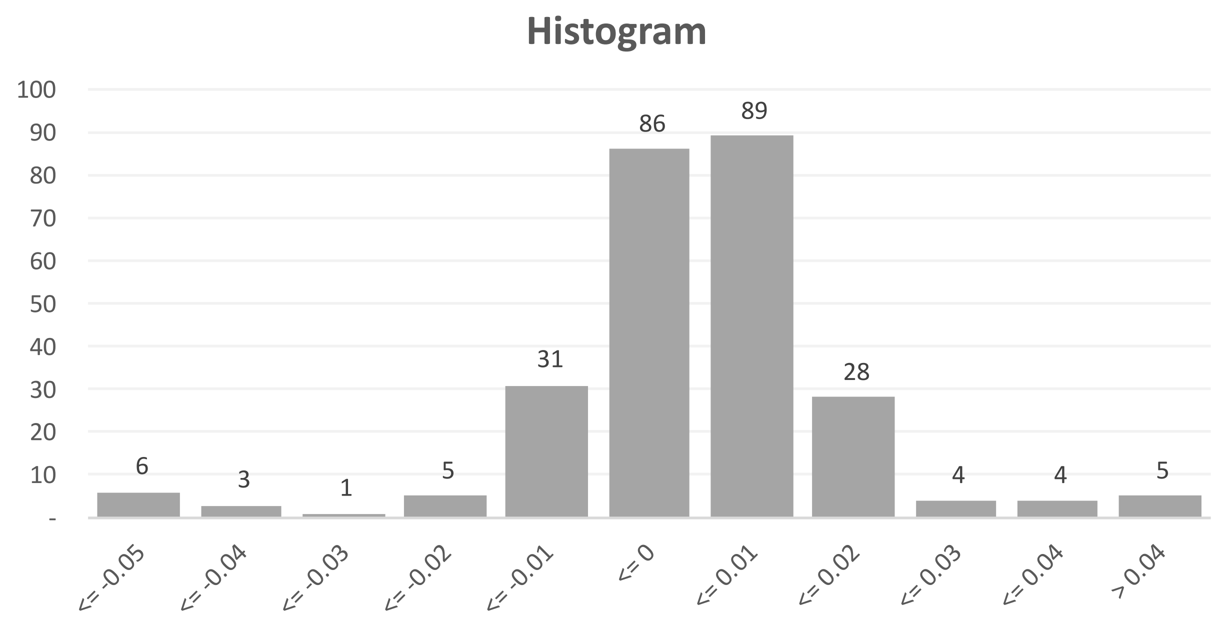


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Table 1 – Desctriptive statistic of portfolio return

Table presents the basic characteristics of 3 portfolios timeseries during the period of 13 Aug 2013 to 18 Aug 2018. The choice of the companies in portfolio are based on the market capitalization.

Variable	"Big" portfolio return	"Middle" portfolio return	"Small" portfolio return
Observations	263	263	263
Mean	0,004	-0,003	0,001
Std.Dev	0,028	0,055	0,033
Min	-0,085	-0,786	-0,178
Max	0,102	0,359	0,262
Skewness	0,056	7,876	3,201
Kurtosis	4,025	89,493	32,015
Jarque-Bera test	0.003	0	0

Table 2 presents us with basic statistics of variables during the period of 13 Aug 2013 - 18 Aug 2018. Market variable is the data of local market excess returns. Illiq is a weekly distributed variable constituting as a sum of daily ILLIQ. We could observe that the market return during "fixed" period was bigger than that of the "flexible" period. However, this difference is not statistically significant. The minimum and maximum values are also smaller for the "flexible period".

Table 2 – Descriptive statistic of Market data

This table provides the basic descriptive statistics for the market return data chosen in the analysis, ILLIQ proxy of illiquidity, "Big-small" factor of premium of companies with Big capitalization over small ones. The market return descriptive statistic is further divided into two time-periods.

	Mean	Std.Dev.	Min	Max
Market return	0.00088	0.02344	-0.0946	0.1513
ILLIQ measure	0.00509	0.02808	0	0.2309
"Big-small" return	0.00307	0.04076	-0.2746	0.2038
Market return (fixed)	0.00202	0.00255	-0.0593	0.1514
Market return (flexible)	-0.00016	0.00155	-0.0946	0.1037

Table 3,4 and 5 indicate relationships among factors in each portfolio. It should be noted that the correlation matrix for each of the portfolio have portfolio specific liquidity values.

There is no significant collinearity between factors market return and market capitalization (bigsmall). Thus, it would not trigger multicollinearity problem. The market capitalization factor is also negatively correlated to excess stock return. The developed market theory however states that the correlation should be positive. The correlation between liquidity factors of each portfolio is also insignificant. Interestingly enough the general direction of factor effects on big and small portfolios seems to coincide, whereas the effect of factors on middle portfolio is of the opposite sign.

Table 3 – Correlation matrix analysis in "Big" Portfolio

This table provides the correlation analysis of the "Big" portfolio with other factor like market return, ILLIQ and big-small factor with portfolio return.

	Market return	Big - small excess return	Big companies excess return	Big companies weekly Liquidity
Market return	1			
Big - small excess return	-0,1664	1		
Big companies excess return	0,1697	0,5865	1	
Big companies weekly Liquidity	-0,2375	0,0829	0,0611	1

Table 4 – Correlation matrix analysis in "Small" Portfolio

This table provides the correlation analysis of the "Small" portfolio with other factor like market return, ILLIQ and big-small factor with portfolio return.

	Market return	Big - small excess return	Small companies excess return	Small companies weekly Liquidity
Market return	1			
Big - small excess return	-0,1664	1		
Small companies excess return	0,3482	-0,7231	1	
Small companies weekly Liquidity	0,0196	-0,0732	0,0308	1

Table 5 – Correlation matrix analysis in "Middle" Portfolio

This table provides the correlation analysis of the "Middle" portfolio with other factor like market return, ILLIQ and big-small factor with portfolio return.

	Market return	Big - small excess return	Middle companies excess return	Middle companies weekly Liquidity
Market return	1			
Big - small excess return	-0,1664	1		
Middle companies excess return	0,9052	0,0288	1	
Middle companies weekly Liquidity	-0,0024	0,0759	-0,0023	1

3.2.4 Asset Pricing Model with local market factor and Capitalization factor.

The following two models would be tested on two datasets. The first dataset will not include the transaction filtering and would provide the analysis of original data with selective choice of companies. The second dataset would include the transaction filtering. We expect the second dataset provide results with more explanatory power, absolute value and significance of factors.

The following model would be used in order to test the effects of local market return and market capitalization on the returns of constructed portfolios

$$E(R_{i,t}) - R_f = a_{1,i} + b_{1,i}(R_m{}^{local} - R_f) + b_{2,i}(R_{big} - R_{not\,big}) + \varepsilon_i$$

$b_{1,i}$ is the measure of effect of the local market return on individual stock, $b_{2,i}$ is the measurement of the effect of excess returns of highly capitalized stocks on individual stock i. $a_{1,i}$ is the intercept term of the regression which in case of proper modeling should be insignificant.

The hypothesis would be tested 3 times: using all data, the data during the flexible exchange rate and the data during the fixed exchange rate period.

Using ordinary least squares (OLS) we estimate $b_{1,i}$, $b_{2,i}$ and a_i.

$$H_0: a_i = 0$$

$$H_a: a_i \neq 0$$

3.2.5 Asset Pricing Model with local market factor and Capitalization factor and Illiq factor.

The third model would include the *Illiq* liquidity proxy and would have the following view.

$$E(R_{i,t}) - R_f = a_{1,i} + b_{1,i}(R_m{}^{local} - R_f) + b_{2,i}(R_{big} - R_{not\,big}) + b_{3,i}Illiq_{i,t} + \varepsilon_i$$

The important factor is that the *Illiq* measure varies over time and we expect a positive effect of the illiquidity ratio on stock returns. It should be noted that the *Illiq* factor would be specific to the individual stock or portfolio.

Using ordinary least squares (OLS) we estimate $b_{1,i}$, $b_{2,i}$, $b_{3,i}$ and a_i.

The hypothesis would remain the same.

$$H_0: a_i = 0$$

$$H_a: a_i \neq 0$$

However, in order to check the performance of the model, we would also check whether $b_{2,i}, b_{3,i}$ are significantly different from zero.

3.3.1 Bid-ask spread

Another standard method of measuring illiquidity is the bid-ask spread. The higher spread usually signifies additional costs associated with the liquidation of a position in individual stocks. These costs are usually incurred in terms of additional expenses due to selling at lower prices or the extended period of time needed for position exit. Both of these costs theoretically result in investor aversion in case of similar stocks; thus, they are assumed to have spread risk premium. In developed markets, it has been proven that the theory holds only for long-term positions. However, the research on emerging markets was lacking. The underlying reason is the fact that the data required for this analysis is broad and needs the information of the average holding period. The data presented by the Kazakh Stock Exchange (KASE), unfortunately, does not provide this type of information. Furthermore, it also does not show whether the bid or ask was canceled and the length of the order selected by the investor. Therefore, deriving the necessary information for confirming the theory is proved to be hard.

This paper will use other methods of testing possible effects of the spread on the stock return. The first method would include the spread directly into the usual regression. Including the spread factor in the regression would cause several factors to change and, therefore, cause the market and SMB factors to change. The main reason for this change is the filtering of stocks. The stocks which will be included in this regression would deviate from the stocks which participated in the ILLIQ regression model.

The second method of testing the effects of the spread is dividing the existing portfolios into two groups based on the spread. This method helps to account for the market capitalization effect on the spread. In each of the three existing portfolios, the firms with higher than the portfolio average bid-ask spread would be selected in a group that would be counted as an illiquid group. Kazakhstan stock exchange market has a tiny sample of firms. Unfortunately, the initial division of the portfolios based on market capitalization led to the “BIG” portfolio having firms that are very similar. These firms have the highest turnover rates, market capitalization and the lowest bid-ask spreads among all of the companies. Therefore, in order to test the effects of the spread on the stock return the division between groups has to be made within the portfolios.

3.3.2 Bid-ask spread data

The first reason behind the change of the factors and the underlying firms lies in the insufficiency of data. Therefore, the model requires further filtering of data and implementation of several assumptions. Due to the inability to analyze whether the bid or ask had been canceled and the time length at which the order was placed each bid and ask is assumed to have a one-day duration. It is a powerful assumption and would lead to several consequences. The days where none of the transactions were made and only one type of order appears would be assigned with zero return and spread values.

This filtering method led to a decrease in the number of firms available for analysis. Mainly because some firms did not have a significant amount of days that fit the required criteria of having both bid and ask orders placed.

Another reason for having a lower number of suitable firms lies in the advantages of ILLIQ measurement. The ILLIQ proxy does not require a significant amount of available data. It was specifically designed for markets with a minimal number of transactions and is calculated using additive methods. Bid-ask spread as a proxy certainly lacks this ability and, therefore, requires significantly higher number of companies. Thus, resulting in the sample shrinking.

Unlike previous models, spread regression would use single day observations for five consecutive years, resulting in a total of 1236 observations. The number of firms due to additional requirements would decrease to 48 firms. Out of these 48 firms BTAS stock would be omitted in the analysis due to having much deviation in spread up to 250% of the stock price.

3.3.3 Bid-ask spread measurement.

he bid-ask spread measurement used in this paper is rather specific. Several methods were analyzed before concluding using this specific method. Before analyzing each method and stating its strong point and shortcoming several facts about data should be mentioned which obstruct us from finding the spread directly at each time.

The bid-ask spread data provided by KASE does not have the period for which the bid or ask limit order was placed. This implies that the bid could be placed for several days until completed, canceled manually or automatically upon reaching the deadline without notification. Although the completed transactions could be confirmed, thus, providing us with the ability to exclude it from the analysis the same could not be stated about bid cancellation. Assuming each bad having one-day duration could solve the problem, but it would result in the absence of orders on other days. Measuring the "depth" of the bids and asks also proves challenging. The main reason lies in the fact that no boundaries are set on the bid or ask price. Resulting in some occasional trades at extreme prices. The main issue lies in the lack of data on companies with a relatively low turnover which has a low amount of limit orders placed on their stocks.

Literature presents with many ways of measuring the bid-ask spread. With each measurement encompassing different aspects of illiquidity. Glosten (1987) in his model described bid-ask spread as an effect of asymmetrical information and other factors such as liquidity shocks.

Thus, assuming that the bid price P_b could be represented by

$$P_b = p - \Delta P_b - C_b \text{ and } P_a = p + \Delta P_a + C_a$$

In this model, p represents the true price prior to the transaction based on known information. The ΔP_b and ΔP_a represent the variation in investor beliefs due to the adverse selection effect. C_a and C_b represent the addition to cover the transaction costs of the market maker.

Therefore, the bid-ask spread in the Glosten model

$$\text{Spread} = \Delta P_b + C_b + \Delta P_a + C_a$$

This estimate, however, might be biased and result in an underestimation of the spread.

Roll(1984) uses an unobservable fundamental value of the company in order to create an estimator of the spread. The shortcoming of this estimator lies in the fact that if the sample serial correlation is positive, the effective spread is undefined. Thus, making this estimator not suitable for the case of emerging markets with a low number of transactions and higher periods of undefined spreads.

Lesmond et al. (1999) based an estimator on the number of informed trading on nonzero return days and informed trading on zero return days. The Lesmond model is the difference between percent buying and selling costs. Hence, also requiring many transaction data.

The next method was presented by Corwin and Shultz (2012). It is based on daily low and high prices. The theory behind that is the fact that the high prices are always buyer-initiated while the lowest price is seller-initiated. "The variance component of the high-to-low ratio is proportional to the return interval while the spread internal stays relatively constant". Based on this characteristic the two-day spread would be relatively equal to the one-day spread but reflect the volatility of two days. From this characteristic, the final measurement of spread is derived. The bid-ask spread measurement used in this paper is rather specific. Several methods were analyzed before concluding using this specific method. Before analyzing each method and stating its strong point and shortcoming several facts about data should be mentioned which obstruct us from finding the spread directly at each time.

$$b_t = \left(ln\left(\frac{H_t}{L_t}\right) \right)^2 + \left(ln\left(\frac{H_{t+1}}{L_{t+1}}\right) \right)^2$$

Where H_t is observed high price at time t

And L_t is observed low price at time t

$$u_t = \left(ln\left(\frac{H_{t,t+1}}{L_{t,t+1}}\right) \right)^2$$

This u_t is the range of high-low ratio for the two-day period.

$$a_t = \frac{\sqrt{2b_t} - \sqrt{b_t}}{3 - 2\sqrt{2}} - \sqrt{\frac{u_t}{3 - 2\sqrt{2}}}$$

This alpha parameter could be negative and is the main limitation of the model. Thus, resulting in negative bid-ask spread values. The final estimate of the spread is

$$S = \frac{2(e^{a_t} - 1)}{1 + e^{a_t}}$$

The spread estimate *S* and *a* will be equal at small values of spread. This estimate is proven to be relatively reliable in the paper of Corwin and Shultz. However, it has another drawback of having a significant amount of transaction data on the stock.

Out of recent bid-ask spread estimators, Leirvik(2015) also uses the daily low and high prices and has the same underlying assumption as the Corwin and Shultz model.

Some of the presented methods help in determining the spread using only market transaction data; some require constant information about the fundamentals of the companies. However, none of them could be applied for KASE's stocks without significantly decreasing the number of firms in the sample. Therefore, the bid-ask spread used in this paper would be a custom method. This method would have several features of the method.

- The spread would be calculated only at days where both bids and ask orders were placed.
- Furthermore, the day at which the spread is calculated should have at least one market transaction.
- At some days the bid and ask spread is unusually minimal. However, it is mainly due to the fact that some of the bids and asks have 1— 2 shares ordered. Therefore, in order to capture "depth" characteristic of the spread, we would have to put weight to bids and asks through their value or number of shares.
- In order to capture the effect of spread and its change on stocks during a short time period we would use the spread percentages (to price).
- Some of the stocks have suspiciously variable spreads sometimes 2-3 times more than the stock price. These stocks would be excluded from our analysis.

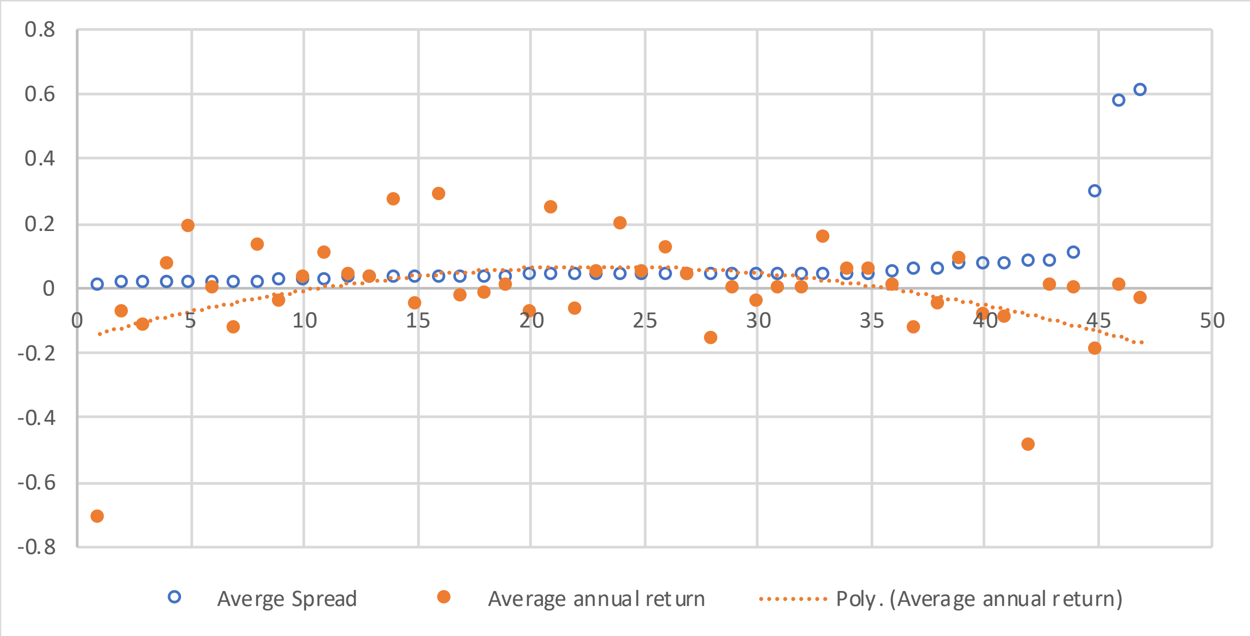
3.3.4 Bid-ask spread effect on stock return.

The best method for visualization of the bid-ask spread effects on the stock returns was proposed by Amihud(1989). The precise method partitioned the stocks into groups based on their spread. The resulting values of the stock return were expected to result in a concave function of stock return. Due to the lack of companies partitioning the stock for visualization purposes does not seem sensible. However, using all of the firms in the sample and sorting them based on their spread percentage we could get the visualization of the bid-ask spread effects (Figure 5).

The average spread was calculated as a percentage of the bid-ask spread to the price of the corresponding stock. The average of the stock spread was taken during the whole observation period. The annual return of each stock was calculated during the same period. The Kazakh Stocks seem to follow the Amihud's result at the low level of bid-ask spread. The higher levels of spread led to a higher level of returns.

Figure 5 – Average annual returns sorted on bid-ask spread

The figure presents the relationship between the annual returns and bid-ask spread. It should be noted however, that the relationship is not direct, and the values were sorted based on the average spread beforehand. This, graph is not the complete copy of the Amihud's graph, due to the fact of not depicting how the value of spread affects the annual return. (Only the order of the bid-ask spread in the portfolio is assessed and is used as the basis for this figure)



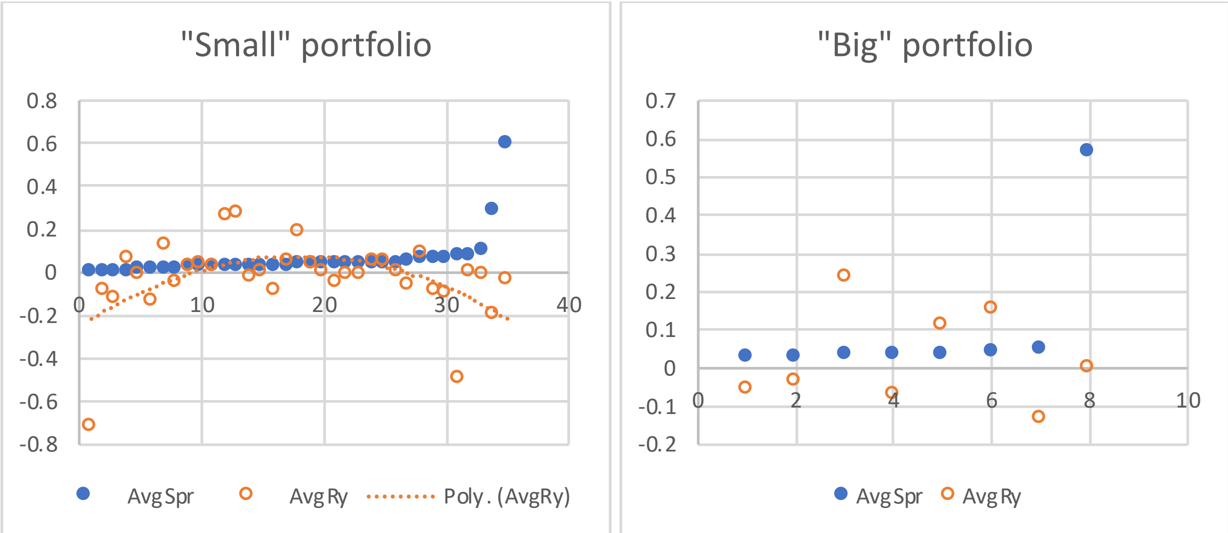
Furthermore, the concavity of the curve was also present. However, at the stocks with a high level of spread, the relationship between spread and return seemed to reverse. Interestingly, the concavity of the curve seems to remain. Overall this graph might be used as a proof of positive relationship between bid-ask spread and stock returns. However, this graph omitted the effects of multiple factors such as size and capitalization.

The amount of companies in the "Big" group is not significant enough to contradict the initial claim that the size does not have an effect on the relationship between bid-ask spread and stock return. Despite that, the non-linear relationship does not seem to hold in the "Big" portfolio which could be seen in Figure 6. The "Small" portfolio seems to have significantly lower returns at the edges of the bid-ask spread and higher returns at mid-levels of spread.

This graphical representation is not enough to conclude or contradict the existence of the non-linear relationship and could be attributed to the method of measuring the bid-ask spread. Furthermore, the apparent lack of firms in the "BIG" portfolio might lead to misleading conclusions about the effect of spread on stock returns.

Figure 6 – Average annual returns sorted on bid-ask spread in "Big" and "Small" portfolios

These two graphs present the relationship between the level of the bid ask spread in the portfolio and the annual return of the stock in each of the portfolio.



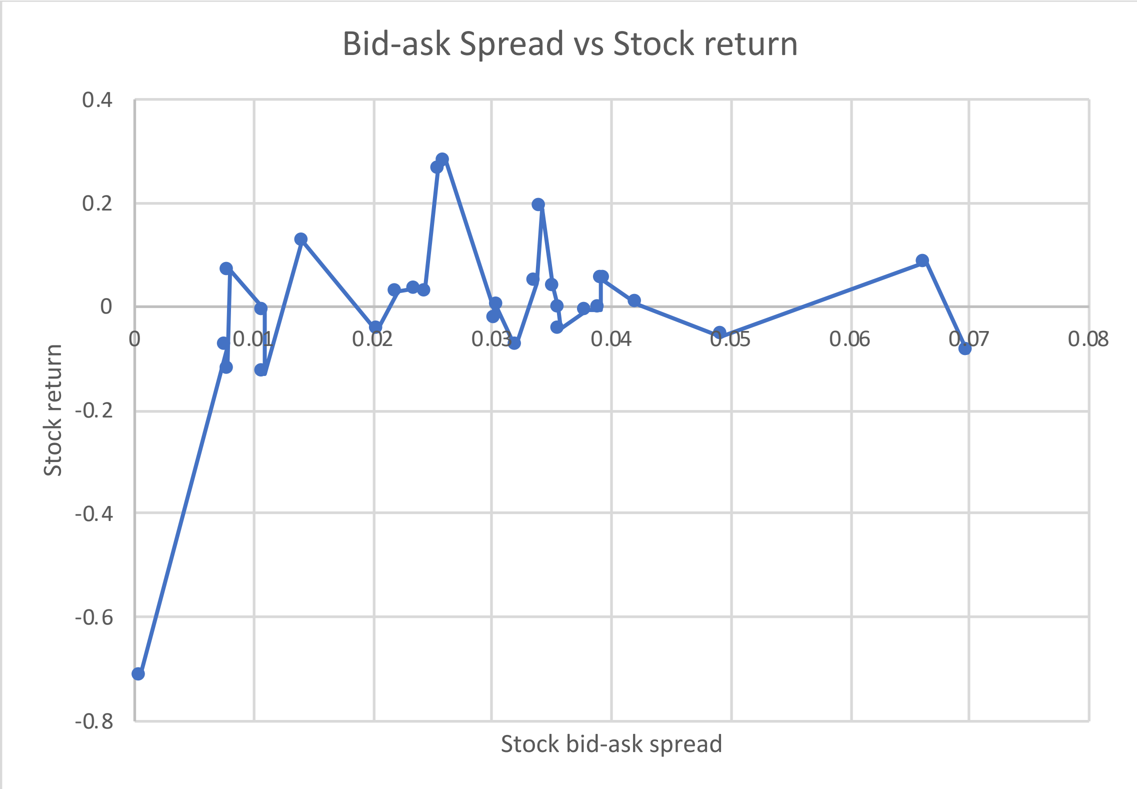
Furthermore, this graph does not show a direct relationship between spread and returns. It sorted out the companies based on spread and showed the respective returns. Constructing a graph with a direct relationship would be mathematically more appropriate.

Out of 47 companies, 3 had significantly higher spread leaving significant gaps between observations. If only 40 firms with the lowest levels of bid-ask spread are to be considered the Amihud's results could be observed more clearly in Figure 7. The higher spread is associated with a higher level of returns. The additional increase in the spread brings a lower increase in return level supporting the claim of the convexity of the Spread-Return curve.

It should also be noted that as the bid-ask spread increased to higher levels the annual return seems to even have a downward trend. Although, this trend could not be seen in Figure 7 as clearly as on the Figure 5.

Figure 7 – Average bid-ask spread effect on average annual returns for the 2013-2018 period

This graph is the closest to the original graph of Amihud. It represents the relationship between the stocks' nid-ask spreads and their annual return.



4 Empirical results and analysis

4.1 Global CAPM

It should be noted that the Global CAPM test is conducted for two reasons. Firstly, to test how the global market portfolio affects the stocks of Kazakhstan stock exchange. Secondly, to check and compare the results of the most recent available work of CAPM testing in Kazakhstan stock market due to difference in the data sources. The work of Vakhrushev O. (2016) analyzes these 8 companies and is motivated by the amount of data available for these particular companies.

Two stage test: First stage

Using the data of returns of the eight Kazakhstan companies, return of S&P 500 as a proxy for market return and 10 year US Treasure bill interest rate as a proxy for risk free rate for the period starting from Aug 13, 2013 to Aug 18, 2018 on the weekly bases eight time-series regressions of the following form are performed:

$$((E(R_i) - R_f)_t = a_i + b_i\left(E(R_m) - R_f\right)_t + \varepsilon_{it} \tag{1}$$

Using the results of OLS estimation, we need to check the hypothesis.

$$H_0: a_i = 0 \tag{2}$$

$$H_a: a_i \neq 0$$

Table 6 provides with regression results of "Big" portfolio companies. The estimated betas of all companies are small, thus implying a low effect of the global market. The average weekly return of companies for the whole period is positive, except Kcell's.

After checking the results from, we find that the only company to reject $H_0: a_i = 0$ at a 5% confidence level is KEGC. It should be worth mentioning that Kegoc was previously governmentally owned and had an IPO on 3rd December 2014. The peculiarity of this stock lies in the fact that during the IPO the percentage of a wage of several workers had been given in stocks. This resulted in a steep decline of stock price right after the IPO date. Therefore, this positive alpha could possibly be described by this fact.

The Table 6 also provides the standard errors of the beta coefficients. From these errors, we could see that none of the betas is significantly different from zero. Therefore, we might conclude that the Global market portfolio is unlikely to affect any of the chosen stocks.

Table 6 – Global CAPM regression results of "Big" portfolio companies

This table presents the results of the regression of 8 stocks on global market factor. This regression is a first-stage of the Fama-Macbeth empirical test methodology. Table presents estimated betas of the companies, average return, alphas and whether these alphas are significantly different from zero. It is important to mention that this result is for the whole available data period.

Companies	Estimated beta	Average return	Alpha	Test result
RAHT	0,029666	0,008403	0,008015	Fail to reject H_0
	(0,14489)		(0,0093)	
RDGZ	-0,010665	0,003729	0,003258	Fail to reject H_0
	(0,04524)		(0,0029)	
LCAP	0,002128	0,000772	0,000327	Fail to reject H_0
	(0,00992)		(0,0006)	
KEGC	-0,007975	0,004519	0.004053*	Reject H_0 at 5%
	(0,02795)		(0,0018)	
KZTK	0,006347	0,004131	0,003695	Fail to reject H_0
	(0,03870)		(0,0025)	
KZTO	0,005644	0,002857	0,002419	Fail to reject H_0
	(0,03880)		(0,0025)	
KCEL	-0,001651	-0,000675	-0,001128	Fail to reject H_0
	(0,03978)		(0,0025)	
KZMS	0,031313	0,006688	0,006304	Fail to reject H_0
	(0,06485)		(0,0041)	

Second stage. Using the values of estimated beta and average returns of each stock the following cross-sectional regression should be done: $E(R_i^{mean}) = \lambda_0 + \lambda_1 b_i^{estimated} + \varepsilon_i$

The testing hypothesis of the second stage is the following:

$$H_0: \lambda_0 = 0 \ \cap \lambda_1 = R_m - R_f \tag{3}$$

$$H_a: \lambda_0 \neq 0 \ \cap \lambda_1 \neq R_m - R_f$$

As it could be seen from the cross-sectional regression results presented in Table 7, we reject the $H_0: \lambda_0 = 0 \ \cap \lambda_1 = R_m - R_f$ due to $\lambda_0 = 0$ being significantly different from 0 at 5%.

Table 7 – Second stage: cross-sectional regression of assets returns on betas

This table presents the results of the second stage of Fama and MacBeth two-stage test of CAPM validity.

Parameters	Coefficient	Std.error	Hypothesis value	T-critical	Result
Beta	0,126	0,056	-0,0021	2,2952	Reject H_0at 5 %
Constant	0,003	0,001	0	3,24	Reject H_0at 5 %
R-squared	0,4594				
Prob>F	0,0647				

To sum up, we could confirm that after testing the standard version CAPM model, using two stages empirical test methodology firstly proposed by Fama and MacBeth (1973), there is statistical evidence that the model was inadequate for evaluating the data in Kazakhstan Stock Exchange (KASE) for the period starting from Aug 13, 2013 to Aug 18, 2018.

Fixed exchange rate period

The shift from the fixed exchange rate policy to flexible exchange rate was performed during mid-December. Thus, the fixed exchange rate data lasts from Aug 13, 2013 to Dec 12, 2015.

As presented in Table 8 during the fixed period the testing hypothesis is not rejected for any of the firms. Although the model presents us with low explanatory power and small R-squared all of the intercepts are found to be statistically insignificant. Although in some cases betas are not statistically significant, they represent a higher dependence on global market movements.

The Table 8 also provides the standard errors of the beta coefficients. From these errors, we could see that none of the betas is significantly different from zero. Therefore, we might conclude that the Global market portfolio is unlikely to affect any of the chosen stocks for the period of fixed exchange rate.

The testing hypothesis of the second stage remains the same as in equation (3)

The results presented in Table 9 show that the "fixed" period does not reject the H_0: $\lambda_0 = 0 \cap \lambda_1 = R_m - R_f$ at 5 % confidence level despite the fact that beta coefficient λ_1 is negative. Average $R_m - R_f = 0.0014$ for the "fixed" period.

Table 8 – Global CAPM regression results of "Big" portfolio companies during the fixed exchange rate period.

This table presents the results of the regression of 8 stocks on global market factor. This regression is a first-stage of the Fama-Macbeth empirical test methodology. Table presents estimated betas of the companies, average return, alphas and whether these alphas are significantly different from zero. It is important to mention that this result is for the fixed exchange rate time period starting from August 13 2013 to December 12 2015.

Companies	Estimated beta	Average return	Alpha	Test result
RAHT	0,696309	-0,003704	-0,005166	Fail to reject H_0
	(0,35494)		(0,0059)	
RDGZ	-0,242001	0,002092	0,001975	Fail to reject H_0
	(0,31335)		(0,0052)	
LCAP	-0,00005	0	-0.000464***	Reject H_0 at 5%
	(0,00031)		(0,0000)	
KEGC	0,019404	0,003287	0,002796	Fail to reject H_0
	(0,18035)		(0,0030)	
KZTK	-0,053709	-0,001916	-0,002303	Fail to reject H_0
	(0,26302)		(0,0044)	
KZTO	0,060404	0,000917	0,000367	Fail to reject H_0
	(0,26182)		(0,0044)	
KCEL	-0,177954	-0,004327	-0,004535	Fail to reject H_0
	(0,25942)		(0,0043)	
KZMS	0,702718	-0,001209	-0,00268	Fail to reject H_0
	(0,40100)		(0,0067)	

Table 9 – Second stage: cross-sectional regression of assets returns on betas during the fixed exchange rate period

This table presents the results of the second stage of Fama and MacBeth two-stage test of CAPM validity.

Parameters	Coefficient	Std.error	Hypothesis value	T-critical	Result
Beta	-0,002	0,003	0,0014	-1,3855	Do not reject H_0at 5 %
Constant	0,001	0,001	0	-0,74	Do not reject H_0at 5 %
R-squared	0,1132				
Prob>F	0,4152				

To sum up, we could confirm that after testing the standard version CAPM model, using two stages empirical test methodology, there is not enough statistical evidence that the model was inadequate for evaluating the data in Kazakhstan Stock Exchange (KASE) for the “fixed exchange rate” period starting from Aug 13, 2013 to Dec 12, 2015.

Flexible exchange rate period

The flexible exchange rate data lasts from Dec 12, 2015 to Aug 18, 2018. From Table 10 we could clearly observe that after the introduction of the flexible exchange rate CAPM turns out to be a bad model for explaining the returns of 3 stocks. Thus, implying that the exchange rate shift had caused the effects on the stock return which were not encompassed by original CAPM.

The Table 10 provides the standard errors of the beta coefficients. From these errors, we could see that none of the betas is significantly different from zero in this period either. Therefore, we might conclude that the effect of Global market portfolio on stocks is statistically insignificant.

The second stage is unnecessary in this case. However, just for the comparison purposes we will still conduct it. The testing hypothesis of the second stage will remain the same as shown in equation (3).

Table 10 – Global CAPM regression results of “Big” portfolio companies during the flexible exchange rate period.

This table presents the results of the regression of 8 stocks on global market factor. This regression is a first-stage of the Fama-Macbeth empirical test methodology. Table presents estimated betas of the companies, average return, alphas and whether these alphas are significantly different from zero. It is important to mention that this result is for the flexible exchange rate time period starting from December 12 2015 to August 18 2018.

Companies	Estimated beta	Average return	Alpha	Test result
RAHT	0,016605 (0,19093)	0,018687	0,018332 (0,0163)	Fail to reject H_0
RDGZ	-0,001964 (0,03478)	0,005741	0,005295 (0,0030)	Fail to reject H_0
LCAP	0,002767 (0,01372)	0,001425	0,001002 (0,0012)	Reject H_0 at 5%
KEGC	-0,008525 (0,02443)	0,005175	0.004697* (0,0021)	Fail to reject H_0
KZTK	0,012126 (0,02970)	0,009007	0.008630*** (0,0025)	Fail to reject H_0

KZTO	0,004507 (0,03119)	0,004062	0,003647 (0,0027)	Fail to reject H_0
KCEL	0,006757 (0,03349)	0,002318	0,001914 (0,0029)	Fail to reject H_0
KZMS	0,014801 (0,05786)	0,013384	0.013020** (0,0049)	Fail to reject H_0

From the data in Table 11 we could deduce that the "flexible" period does not reject the H_0: $\lambda_0 = 0 \cap \lambda_1 = R_m - R_f$ at 5 % confidence level despite the fact that beta coefficient λ_1 is negative. Average $R_m - R_f = 0.0048$ for the "flexible" period.

Table 11 – Second stage: cross-sectional regression of assets returns on betas during the flexible exchange rate period

This table presents the results of the second stage of Fama and MacBeth two-stage test of CAPM validity.

Parameters	Coefficient	Std.error	Hypothesis value	T-critical	Result
Beta	0,482	0,202	-0,0049	2,4073	Reject H_0 at 5 %
Constant	0,004	0,002	0	-0,74	Do not reject H_0 at 5 %
R-squared	0,4863				
Prob>F	0,0545				

Results have shown that the shift in the exchange rate had caused several changes.

Firstly, the estimated alphas of each stock have grown in comparison to alphas of the "fixed" period, furthermore, they have all become positive. This implies that the shift in currency has resulted in higher returns in comparison to Market return (S&P500). The betas have changed, however, statistically there is not enough evidence to contradict that they differ in "fixed" and "flexible" periods.

In conclusion, the results of the fixed exchange rate period are similar to the results of the work presented by Vakrushev (2016) which serves as indirect confirmation of the validity of the used data.

Furthermore, this test has shown that using the global market portfolio proxy as market portfolio in CAPM model brings statistical evidence of model being not adequate for evaluating data in Kazakhstan for the period Aug 13, 2013 to Aug 18, 2018.

4.2 Asset pricing model with local market factor and BIG factor and Illiq

The model and the data for this part of the thesis would be altered. Firstly, the selected stocks were the result of screening described in part 3 of this thesis. This screening resulted in 58 stocks. The reason the number of stocks was changed was due to the change of the purpose of the test. The main variable of interest became *ILLIQ* factor, which measure the illiquidity of the companies. The introduction of this factor levies some restrictions on the choice of stocks and helps in expanding the observation sample to 58 companies. Secondly, the market portfolio in further sections would consist of the weighted stocks participating in this analysis. Thirdly, due to relatively high number of firms the regression results of each individual firm will be discussed in text but will not be presented. Further analysis will be performed on the portfolio level.

The models which will be tested using full data in this section are extensions of CAPM

$$E(R_{i,t}) - R_f = a_{1,i} + b_{1,i}({R_m}^{local} - R_f) + b_{2,i}(R_{big} - R_{not\ big}) + \varepsilon_i$$

$$and$$

$$E(R_{i,t}) - R_f = a_{1,i} + b_{1,i}({R_m}^{local} - R_f) + b_{2,i}(R_{big} - R_{not\ big}) + b_{3,i} Illiq_{i,t} + \varepsilon_i$$

As we can see from Table 12 the models have average R-squared in 1-stage filtering data. The Middle portfolio presents us with good R-squared over 0.85. It could be observed that there are three statistically significant intercepts. The constant of the "index" portfolio in the model without liquidity factor, becomes statistically insignificant from the addition of the Illiquidity factor. Therefore, the inclusion of liquidity factor is very important for this portfolio. Despite having little effect on the R-squared, it helped to support initial hypothesis of insignificant constant, thus, improving the model. The beta of *ILLIQ* is unfortunately not statistically significant and does not provide evidence of the existence of liquidity premium. Thus, implying that relationship between stock return and liquidity proxy is not significant. The signs of illiquidity beta, however, do fit in initial assumption. The betas of local market effect and the "Big" factor effect are statistically significant for all portfolios and models. On the firm individual data, the null hypothesis $H_0: a_i = 0$ have been rejected only two times out of all 58 stocks. The results also show that after including the *ILLIQ* factor none of the betas have significantly changed. The difference of the market betas between the “Big” and “Middle” portfolios is significant. Surprisingly the “Small” portfolio had similar market return beta and the standard deviation

Table 12 – Risk factor estimation on Full data (1-stage filtering)

This table presents the result of regressions of 3 portfolios on 2 models which include the following factors: Market factor, SMB factor and ILLIQ factor specific only to 2nd model and calculated for each of the portfolio separately. The data used in this regression does include disturbing outliers.

	“Big” portfolio (model 1)	“Big” portfolio (model 2)	“Middle” portfolio (model 1)	“Middle” portfolio (model 2)	“Small” portfolio (model 1)	“Small” portfolio (model 2)
Market return	0.219*** (0.0383)	0.234*** (0.0392)	1.441*** (0.0372)	1.442*** (0.0372)	0.219*** (0.0383)	0.219*** (0.383)
Big-small factor	0.441*** (0.0335)	0.438*** (0.0334)	0.248*** (0.0325)	0.250*** (0.0327)	-0.559*** (0.0335)	-0.561*** (0.0336)
“Big” *ILLIQ*		52.73 (32.62)				
“Middle” *ILLIQ*				-1.854 (3.151)		
“Small” *ILLIQ*						-0.0285 (0.0481)
Constant	0.00333*(0.00135)	0.00261 (0.00142)	0.00225 (0.00132)	0.00231 (0.00132)	0.00333* (0.00135)	0.00348* (0.00138)
№ Obs	263	263	263	263	263	263
R-sq	0.417	0.423	0.853	0.853	0.576	0.577
adj.R-sq	0.413	0.417	0.851	0.851	0.573	0.572
RMSE	0.0218	0.0217	0.0212	0.0212	0.0218	0.0218

Standard errors in parentheses * p<0.05, **p<0.01, *** p<0.001

However, the results change significantly if the second stage filtering is performed. The second stage filtering was mentioned in section 3.2 of this thesis, and represents removal of harmful outlier data. Table 13 presents a higher R-square for big and small portfolios. None of the constant terms are significant which indicates that none of the null hypothesis is rejected and all of the intercepts are indistinguishable from zero. The absolute values of betas have increased and are close to 1. ILLIQ factor in this dataset also had not presented us with significant betas.

Furthermore, the inclusion of this factor has not provided any significant improvements in R-squared and has negatively affected adjusted R-squared. Therefore, we might conclude that the liquidity factor measured by ILLIQ proxy does not have any significant premium. One interesting observation is the close relationship between the behaviors of small and big portfolios. They present almost the same market return beta and close values of R-squared. This tendency could be observed in both of the datasets.

It should be noted that the transaction filtering stage mostly covered the middle stage portfolio. Thus, the relationship between the Big and small portfolio was not significantly affected. The similar values of beta could be due to a high correlation between companies in the portfolios.

Table 13 – Risk factor estimation on Full data (2-stage filtering)

This table presents the result of regressions of 3 portfolios on 2 models which include the following factors: Market factor, SMB factor and ILLIQ factor specific only to 2nd model and calculated for each of the portfolio separately. The data used in this regression has been filtered 2 times and does not include several disturbing transaction which deviated the factor significnalty.

	"Big" portfolio (model 1)	"Big" portfolio (model 2)	"Middle" portfolio (model 1)	"Middle" portfolio (model 2)	"Small" portfolio (model 1)	"Small" portfolio (model 2)
Market return	0.980*** (0.0345)	0.980*** (0.0346)	1.053*** (0.0810)	1.053*** (0.0809)	0.980*** (0.0345)	0.980*** (0.0346)
Big-small factor	0.686*** (0.0199)	0.686*** (0.0200)	0.304*** (0.0466)	0.308*** (0.0466)	-0.314*** (0.0199)	-0.315*** (0.0200)
"Big" *ILLIQ*		0.856 (16.73)				
"Middle" *ILLIQ*				-5.268 (3.977)		
"Small" *ILLIQ*						-0.00503 (0.0252)
Constant	0.000791 (0.000708)	0.000779 (0.000750)	-0.00135 (0.00166)	-0.00117 (0.00166)	0.000791 (0.000708)	0.000818 (0.00072)
№ Obs	263	263	263	263	263	263
R-sq	0.840	0.840	0.394	0.398	0.884	0.884
adj.R-sq	0.839	0.838	0.389	0.391	0.883	0.882
Standard errors in parentheses * p<0.05, **p<0.01, *** p<0.001						

4.3 Effects of exchange rate policies on models

Running the same two regressions

$$E(R_{i,t}) - R_f = a_{1,i} + b_{1,i}({R_m}^{local} - R_f) + b_{2,i}(R_{big} - R_{not\,big}) + \varepsilon_i$$

$$and$$

$$E(R_{i,t}) - R_f = a_{1,i} + b_{1,i}(R_m{}^{local} - R_f) + b_{2,i}(R_{big} - R_{not\ big}) + b_{3,i}Illiq_{i,t} + \varepsilon_i$$

on a dataset with a fixed and flexible exchange rate could help us analyze the effects the shift in exchange rate policy had on relationships between factors and portfolios.

The first thing to be noted is that the constant term during the flexible exchange rate period is significant for "big" and "small" portfolios. However, the intercept is indistinguishable from zero for the fixed exchange rate period. The beta of the market return has not significantly changed due to the addition of the ILLIQ factor in any of the time periods.

The "middle" portfolio, however, presents us with exciting results. It has directly opposite results compared to other portfolios. The constant term has shown significant values for the fixed period and insignificant for the flexible period. The liquidity factor beta has not shown any significant differences from zero and barely improves the model in terms of R-squared.

Overall the effect of adding Illiq factor mostly helped in describing the "Big" portfolio, increasing the significance of Market beta and decreasing the significance of the constant term. The only time the model showed the significance of Illiq beta, was conducted on a "Big" portfolio within a fixed exchange rate period.

Table 14 – Risk factor estimation of "Big" portfolio during different periods (1-stage filtering)

This table presents the result of regressions of "BIG"portfolio in 3 different time periods on 2 models which include the following factors: Market factor, SMB factor and ILLIQ factor specific only to 2nd model and calculated for each of the time frame separately. The data used in this regression has 3 time periods: Full data, "Fixed exchange rate" period and, "Flexible exchange rate" period. The data has been filtered only once with disturbing transactions being present.

	"Big" portfolio (model 1)	"Big" portfolio (model 2)	"Big" portfolio (model 1) "Fixed"	"Big" portfolio (model 2) "Fixed"	"Big" portfolio (model 1) "Flexible"	"Big" portfolio (model 2) "Flexible"
Market return	0.219*** (0.0383)	0.234*** (0.0392)				
Big-small factor	0.441*** (0.0335)	0.438 (0.0334)				
"Big" *ILLIQ*		52.73 (32.62)				
Market return "Fixed"			0.128* (0.0493)	0.184** (0.0546)		
Big-small factor "Fixed"			0.361*** (0.0535)	0.362*** (0.0526)		
"Big" *ILLIQ* "Fixed"				177.2* (79.85)		
Market return "Flexible"					0.857*** (0.0607)	0.856*** (0.0609)
Big-small factor "Flexible"					0.649*** (0.0309)	0.650*** (0.0311)
"Big" *ILLIQ* "Flexible"						-10.27 (21.50)
Constant	0.00333* (0.00135)	0.00261 (0.00142)	0.00177 (0.00239)	0.000521 (0.00242)	0.00384*** (0.00107)	0.00403*** (0.00114)
№ Obs	263	263	122	122	141	141
R-sq	0.417	0.423	0.291	0.320	0.778	0.779
adj.R-sq	0.413	0.417	0.279	0.302	0.775	0.774
RMSE	0.0218	0.0217	0.0261	0.0257	0.0123	0.0123

Table 15 – Risk factor estimation of "Middle" portfolio during different periods (1-stage filtering)

This table presents the result of regressions of "Middle" portfolio in 3 different time periods on 2. The data used in this regression has 3 time periods: Full data, "Fixed" period and, "Flexible" period. The data has been filtered only once with disturbing transactions being present.

	"Middle" portfolio (model 1)	"Middle" portfolio (model 2)	"Middle" portfolio (model 1) "Fixed"	"Middle" portfolio (model 2) "Fixed"	"Middle" portfolio (model 1) "Flexible"	"Middle" portfolio (model 2) "Flexible"
Market return	1.441*** (0.0372)	1.442*** (0.0372)				
Big-small factor	0.248*** (0.0325)	0.250*** (0.0327)				
"Middle" *ILLIQ*		-1.854 (3.151)				
Market return "Fixed"			1.459*** (0.0246)	1.459*** (0.247)		
Big-small factor "Fixed"			0.238*** (0.0267)	0.239*** (0.0270)		
"Middle" *ILLIQ* "Fixed"				-1.357 (5.682)		
Market return "Flexible"					1.340*** (0.130)	1.342*** (0.130)
Big-small factor "Flexible"					0.252*** (0.0661)	0.254*** (0.0665)
"Middle" *ILLIQ* "Flexible"						-1.770 (4.179)
Constant	0.00225 (0.00132)	0.00231 (0.00132)	0.00329** (0.00119)	0.00332** (0.00121)	0.00112 (0.00228)	0.00119 (0.00229)
№ Obs	263	263	122	122	141	141
R-sq	0.853	0.853	0.967	0.967	0.436	0.437
adj.R-sq	0.851	0.851	0.967	0.967	0.428	0.424
RMSE	0.0212	0.0212	0.0130	0.0131	0.0263	0.0264

Standard errors in parentheses * p<0.05, **p<0.01, *** p<0.001

Table 16 – Risk factor estimation of "Small" portfolio during different periods (1-stage filtering)

This table presents the result of regressions of "Small" portfolio in 3 different time periods on 2. The data used in this regression has 3 time periods: Full data, "Fixed" period and, "Flexible" period. The data has been filtered only once with disturbing transactions being present.

	"Small" portfolio (model 1)	"Small" portfolio (model 2)	"Small" portfolio (model 1) "Fixed"	"Small" portfolio (model 2) "Fixed"	"Small" portfolio (model 1) "Flexible"	"Small" portfolio (model 2) "Flexible"
Market return	0.219*** (0.0383)	0.219*** (0.0383)				
Big-small factor	-0.559*** (0.0335)	-0.561*** (0.0336)				
"Small" *ILLIQ*		-0.0285 (0.0481)				
Market return "Fixed"			0.128* (0.0493)	0.128* (0.0494)		
Big-small factor "Fixed"			-0.639*** (0.0535)	-0.640*** (0.0537)		
"Small" *ILLIQ* "Fixed"				-0.217 (0.478)		
Market return "Flexible"					0.857*** (0.0607)	0.856*** (0.0609)
Big-small factor "Flexible"					-0.351*** (0.0309)	-0.353*** (0.0313)
"Small" *ILLIQ* "Flexible"						-0.0118 (0.0279)
Constant	0.00333* (0.0013)	0.00348* (0.00138)	0.00177 (0.00239)	0.00189 (0.00241)	0.00384*** (0.00107)	0.00396*** (0.00111)
№ Obs	263	263	122	122	141	141
R-sq	0.853	0.853	0.967	0.967	0.436	0.437
adj.R-sq	0.851	0.851	0.967	0.967	0.428	0.424
RMSE	0.0212	0.0212	0.0130	0.0131	0.0263	0.0264

Standard errors in parentheses * p<0.05, **p<0.01, *** p<0.001

Results

4.4 Bid-ask spread effects on the stock return

The models which will be tested using full data in this section are extensions of CAPM

$$E(R_{i,t}) - R_f = a_{1,i} + b_{1,i}({R_m}^{local} - R_f) + b_{2,i}(R_{big} - R_{not\ big}) + \varepsilon_i$$

$$and$$

$$E(R_{i,t}) - R_f = a_{1,i} + b_{1,i}({R_m}^{local} - R_f) + b_{2,i}(R_{big} - R_{not\ big}) + b_{3,i}\ Spread_{i,t} + \varepsilon_i$$

It should be noted that including the IMV factor appears to be challenging due to the fact the companies with small spreads all belong to the "BIG" portfolio. Therefore, in this regression, we would try analyzing the direct effects of the spread on the stock return.

The market factor in this model was computed out of the different samples. Therefore, the betas do not precisely replicate the value we had in previous regressions. However, the values of betas are very similar. Unlike the results from previous regressions, all of the constant terms insignificantly differ from zero. The performance of the model could be measured by two ways R-squared and by testing the significance of the constant term.

$$H_0:\ a_{1,i} = 0$$
$$H_a:\ a_{1,i} \neq 0$$

Since the constant term is insignificant from zero for all of the models, we might conclude that the model performed relatively well. Models have average R-squared. The highest R-squared is shown by Middle portfolio of 0.604. Inclusion of the Spread factor does not seem to bring any positive effect on model performance. Spread factor beta of every model is statistically insignificant. Therefore, the inclusion of the spread factor is not essential for any of the portfolio. Despite that there seem to be a negative correlation between stock spread and stock return. The results also show that after including the Spread factor none of the betas have significantly changed.

Interestingly enough the spread factor beta to standard deviation ratio seem to increase from Big portfolio to small. This might be precisely due to the effects we have seen on the graph of "Small" portfolio. The difference of the market betas between the "Big" and "Middle" portfolios is significant. Surprisingly the "Small" portfolio and "Big" had similar market return beta and the standard deviation.

Table 17 – Risk factor estimation on Full data with spread as a factor.

This table presents the result of regressions of 3 portfolios on 2 models which include the following factors: Market factor, SMB factor and Spread factor specific only to 2nd model and calculated for each of the portfolio separately. The data used in this regression has been filtered 2 times and does not include several disturbing transactions which deviated the factor of market return and spread significantly.

	"Big" portfolio (model 1)	"Big" portfolio (model 2)	"Middle" portfolio (model 1)	"Middle" portfolio (model 2)	"Small" portfolio (model 1)	"Small" portfolio (model 2)
Market return	0.228*** (0.0165)	0.228*** (0.0165)	1.45*** (0.0335)	1.45*** (0.0335)	0.228*** (0.0165)	0.219*** (0.0165)
Big-small factor	0.489 *** (0.0155)	0.489 *** (0.0155)	0.288*** (0.0316)	0.290*** (0.0316)	-0.511*** (0.0155)	-0.511*** (0.0155)
"Big" *Spread*		0.01 (3.141)				
"Middle" *Spread*				42.353 (24.847)		
"Small" *Spread*						0.0003 (0.0004)
Constant	0.0779 (0.0779)	0.0779 (0.1298)	-0.221 (0.1328)	-0.0952 (0.1666)	0.086 (0.0782)	0.091 (0.0784)
№ Obs	1235	1235	1235	1235	1235	1235
R-sq	0.462	0.462	0.604	0.604	0.548	0.548
adj.R-sq	0.461	0.461	0.603	0.603	0.547	0.547

Standard errors in parentheses * p<0.05, **p<0.01, *** p<0.001

4.5 Kazakhstan market characteristics, which could help describing the results

Kazakhstan Stock Exchange does not have strict regulations. Therefore, sometimes the massive drops or rises could happen. One example of such a problem was mentioned in this thesis before. Therefore, the fact that the stocks are being quoted in the public stock exchange does not imply the free market system. In other words, it lacks marketability. This point could be observed in Figure 1.

Financial illiteracy of individual investors could be the driving factor of illiquidity among small stocks. Most of the brokers provide access to mutual funds which usually consist of stocks and bonds of companies included in KASE Index due to its safety. Therefore, the illiterate investor usually chooses to invest in these funds. Out of a survey conducted from the biggest broker of Kazakhstan more than 70% of people who chose to invest in Kazakhstan stocks or bonds get most of its exposure through mutual funds. This fact could explain several results of the regression. After the change of exchange rate policy and devaluation of the currency, investors tried to take out the money out of risky stocks. This change led to a significant decrease in the prices of small stocks. The big stocks, however, have experienced steady growth from that period. Because their field of operation partially lies beyond Kazakhstan. This arbitrage opportunity was not covered immediately due to the mass panic and insecurity about the currency.

One more problem lies in the choice of portfolio construction. The division of companies only by market capitalization might have led to some other issues. The companies with the highest market capitalization are the ones with a higher level of liquidity. It could result in insignificant values of the ILLIQ factor. In order to solve it, further division in portfolios is required. However, the further categorization of portfolios does not seem feasible due to the limitations on some companies.

Another characteristic of the Kazakhstan stock market is an overall unwillingness to engage in it. Relatively significant deposit percentages justify this unwillingness. Although the government recently put a limit onto deposit percentages, the banks could provide it still high. Old deposit contracts have an interest rate of as much as 14.7% in tenge and 4% in US dollars. Recently the limit on the US dollar deposits has been decreased to a maximum of 0.5%.

The government tries to engage people in the stock market which would result in positive future effects for the economy. However, not all of the attempts were successful. During the IPO of Kegoc, the government tried to get people to engage in stocks through providing the specific percentage of wages and bonuses of Kegoc through stocks, which resulted in a decrease of the stock price by 40% in the next month.

The Global CAPM model shows that the global integration of the Kazakhstan stock exchanges decreases with the implementation of the flexible exchange rate regime. Bruner et al (2008) come to the similar conclusion. They have found that emerging markets show downward trend in their level of integration. Therefore, the decrease in the integration level might not be fully explained by the shift in the exchange rate regime and the time might have an effect on this decrease as well.

The *ILLIQ* model and Bid-ask spread liquidity proxy do not provide statistically significant results on the portfolio level. One reason behind such result might lie in the choice of the portfolios. The problem of the KASE market lies in the fact that most of the liquid stocks and stocks with the lowest level of bid-ask spread are part of the "Big" portfolio. Hong Nhung Hoang (2017) analyzed Taiwan stock exchange and found that liquidity impact is highly significant with illiquid stocks, while insignificant in case of very liquid stocks. Geert Bekaert et al (2007) find that liquidity shocks in emerging markets are positively correlated with returns and negatively correlated with dividend yields. Finally the Tunis stocks market analysis have found significant effect of the liquidity on the stock return.

5. Conclusion

The first point of investigation of this thesis is the relationship between liquidity and expected stock return in the Kazakhstan stock market over the period from 2013 to 2018. The second point of the analysis was the effects of the currency exchange rate policy shifting on the stock market. The data is sourced from primary data provider Kazakhstan stock exchange (KASE). The main problem with getting the correct data was the fact that I happened to be their first client.

There have been many studies on the relationship between stock returns and liquidity. The studies based on developed markets have shown that liquidity is one of the critical factors affecting the stock return. The late-stage emerging markets have shown nonconclusive results on the relationship between liquidity and stock return. Kazakhstan is planning to open the International Financial Center in Astana. Despite that, it is still considered as one of the early or mid-stage emerging markets. Testing the effects of liquidity on this market proved to be challenging due to the low amount of data and transaction of the listed stocks.

The robust OLS method was employed to deal with heteroscedasticity problem. 3 Portfolios were formed based on market capitalization. Additionally, the portfolios were analyzed on two different datasets in which the currency was firstly tied to the dollar and was flexible during the second data period. Illiquidity ratio which was introduced in the paper of Amihud (2002) was utilized as a proxy for liquidity measure.

The first hypothesis was to test the Global CAPM performance on the Kazakhstani stock market in different time periods. Using the two-stage regression model proposed by Fama and MacBeth(1973) the Global CAPM has been statistically proven to be not adequate for evaluating the Kazakhstan Stock Market for the whole period and flexible exchange rate regime timeframe. Despite that, we could not reject the hypothesis that the model worked for the time period of the fixed exchange rate regime. The shift in the policy affected several factors. In the “fixed” time frame the data had insignificant constants. Shift to the “flexible” time frame has made constants significant and made the betas of the Global market insignificant. Therefore, we could say that the Global CAPM model has not covered the shock of the exchange rate policy shift.

Concerning the second hypothesis of the existence of a relationship between liquidity and excess stock returns, the broadened version of local CAPM has been tested. The model showed little significance to the ILLIQ factor. The change of the R-squared was minimal. However, the significance of constants has decreased.

Generally, the Kazakhstan market has not provided evidence which supports the relationships discovered in developed markets due to market specific characteristics. The shift of exchange rate has shown a significant positive effect for the big companies, while negatively affecting the smaller ones.

6 Limitations

Some parts of this thesis are not, entirely consistent. The data filtering problem could be solved firm-specific and could change the results of the analysis. The inclusion of other proxies of liquidity could help in determining the relationship between liquidity and market return. The effect of the exchange policy shift has not been studied broadly and has not yet covered any of the emerging markets. In further research inclusion of other emerging markets with a shift in exchange rate policy could be beneficial.

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