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The Role of Stock Free Float in Investment Decisions in Iran (Tehran) Stock Exchange

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Abstract. Investors search for profitable investment opportunities with respect to the risk in financial markets. Since investors are willing to sell stocks whenever they want; they invest in liquid stocks with low liquidity risk. The free float is an important criterion that can show liquidity of a single stock. The higher the stock free float, the lower liquidity risk.

There is a common sense that suggest the higher the stock free float, the higher the transaction volume and so the higher the risk and also the higher the expected return.

In this paper, at first the relationship between risk, return is separately tested with free float in Tehran Stock Exchanges (TSE) listed companies. Free float is calculated quarterly in TSE. So, data gathered from 2005 to 2010 quarterly for 111 TSE listed companies. With Eviews 6 and in form of panel data, analysis is done.

Using OLS and GLS, significant relationship is confirmed between risk and return against free float. Then result of this test will be used in a model based on Goal Programming to find the best range of free float, regarding to two these important factors.

Keywords: Free Float, Liquidity, Risk, and Return, Pooled Least Square (OLS), Generalized Least Square (GLS), Inverse Regression.

JEL Classification: G12, G32, G19

1. Introduction

Investors usually try to find best ways and models to get the best decisions in the capital markets. Investors also usually like to know how they can encounter with relationship between risk and return. Because they know this relationship is positive and further return is gained only with undertaking further risk. People strictly prefer a certain outcome to an uncertain outcome with the same mean payoff, and so demand payoff premium to be indifferent. To the degree risk is not diversifiable as in market risk‘, someone must hold it, and because it is disliked those who do hold it must be compensated via a risk premium relative to risk-free securities. Consider that assets such as houses have characteristics that require compensation, such as crime, bad schools, or noise, and these factors and their effects are eminently measurable and consistent with intuition (Black 1999). Risk, meanwhile, has devolved into the financial equivalence of dark matter, evident solely by its effects. As asset pricing models have increased in complexity from the simple one-factor CAPM, to stochastic discount factor(s) … so general, they place almost no restrictions on financial data (Campbell 2002). Explaining asset returns via risk is often more calibration than prediction, as when the risk premiums are functions of a theoretically observed risk factors (see Dai and Singleton 2002; Fama and French 1992).

The idea of a free float has been noted by many investment banks in assessing the investablity and liquidity of stock markets during recent years. For example, on some of the popular international stock market indexes, such as the FTSE Indexes and Morgan Stanley Capital International’s indexes, the weights of constituent stocks have been free float adjusted since the start of 2001 to reflect government holdings and restricted ownership to ensure a more accurate representation of available stocks in the market. However, so far there has been no documentation on how the level of the free float is related to stock liquidity. This may be because the amount of free-floating shares is often difficult to define, as it is not always easy to determine the identities of the ultimate owners.

Goal programming approach uses some goals and constraints to create a model that we can use it for situations that we have two-edged or opposed goals. For example, while we want to increase our return without increasing the risk. But in financial markets it's nearly impossible, because we usually find higher returns with higher risks. Therefore, we use GP to solve this problem and in these cases, GP gives a optimum solution.

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2. Return and Risk

The annual return on an investment, expressed as a percentage of the total amount invested, also called rate of return. This can be calculated in different periods simply by dividing all gains from an asset to the money that have spent for it. For stocks, the price in first of a period is spending, dividend and last price in that period are the gains.

In finance, risk has no one definition, but some theorists, notably Ron Dembo, have defined quite general methods to assess risk as an expected after-the-fact level of regret. Such methods have been uniquely successful in limiting interest rate risk in financial markets. Financial markets are considered to be a proving ground for general methods of risk assessment. However, these methods are also hard to understand.

Different measurements are used for calculating the risk in financial markets. Standard deviation and beta are most useful measurements. Standard deviation calculates deviance of return from its average whereas beta presents the sensitivity of stock return relating to the market return.

An asset exhibits both systematic and unsystematic risk. The portion of its volatility which is considered systematic is measured by the degree to which its returns vary relative to those of the overall market. To quantify this relative volatility, a parameter called beta was conceived as a measure of the risk contribution of an individual security to a well diversified portfolio:

$$\beta_a = \frac{\mathrm{Cov}(r_a, r_p)}{\mathrm{Var}(r_p)}, \tag{1}$$

where:

r_a is the return of the asset

r_p is the rate of return of the portfolio

$\mathrm{Var}(r_p)$ is the variance of the return of the portfolio, and

$\mathrm{cov}(r_a , r_p)$ is covariance between the return of the portfolio and the return of the asset.

3. Free float

The free float of a company is the proportion of shares that are held by investors who are likely to be willing trade. It is a measure of how many shares are reasonably liquid. It therefore excludes those shares held by strategic shareholders. Strategic shareholdings typically include those of directors and those connected to them as well as shares held by parent companies and others who have links with the company that go beyond those of a portfolio investor.

4. Goal programming

The Goal Programming(GP) can be regarded as one of the most widely used multi criteria decision-making techniques. This model has been introduced by Charnes, Cooper and Ferguson (1955) and more explicitly defined by Charnes and Cooper (1961). Since then, a great number of works related to GP have

been appeared in the scientific literature. GP is simply a mathematical technique which investigates the relationships among a set of desired goals and the resources available to achieve them. Goals may be either economic or noneconomic. Goals are achieved according to priority; the higher priority goals being given precedence in the allocation of resources over those of lower priority. Within a particular priority level, sub goals may be specified by use of a weighting factor.

In its most basic form, GP consists of an objective function which minimizes deviations from specified goals:

$$\text{Minimize } Z=\sum_{j=1}^{n} wi\ Pi(d_i^{\ -} + d_i^{\ +}) \tag{2}$$

and a set of constraint equation:

$$\sum_{j=1}^{m} a_{ij}X_j + d_i^{\ -} - d_i^{\ +} = b_i$$

The constraint equations specify various goal or physical constraint levels(bi) , Assignment of activities(X_j),which may be in the form of hours of labor, dollars, trees, acres, etc., is dictated by the objective function, which minimizes both negative(d_i^-) and positive(di^+) deviations from specified goals according to their respective priority (P_i), and a weighting factor (w_i), if any. Production coefficients(a_{ij}) represent the relationship between the particular activity and the magnitude of its contribution to achieving the specified goal.

Steuer and Na (2003) found that the GP is the most used category of multi criteria decision-making in the finance area, including, portfolio analysis, capital budgeting, financial planning, commercial bank management. Azmi and Tamiz (2010) presented a review of the application of GP and its variants to portfolio analysis. Original portfolio selection problems, with risk and return optimization can be viewed as a GP with two objectives. For a more realistic approach to portfolio selection problem, additional objectives representing other factors can be introduced.

5. Methodology

Over 450 companies are listed in Tehran Stock exchange. In this market, transactions of stocks when they want to disclose new significant information or to carry on the stockholder's meetings are stopped. In some cases the stopping period is very long, so a stock may has no any transaction in a season or more.

The time horizon of this research is beginning of the spring season in 2005 to the end of the spring season in 2010. Because of long close periods, considering all stocks in all periods is not a good deal. So in this research a filter was noticed. This filter stands in a way that only stocks will be examine that haven't closed more or equal one season. Regarding to this filter, 107 companies were obtained from all.

Next step is finding free float, return and beta for this new group. These data have considered seasonally. In the case of free float, quarterly free floats reports from SEO were used. For achieving rate of return in every season, adjusted prices have been used. And finally beta was used as proxy of risk. For calculating beta, first data gathered in monthly base with opening of 36 months before, for every beta. In this research for measuring time variation of the betas, rolling windows procedure was used. So the sizes of windows have been 36 months.

After of gathering all needed data, they were entered in Eviews for further examinations. In this stage relations between free float and rates of returns in one side and between free float and beta in the other side were examined.

6. Results analysis

The Panel Data procedure in kind of Fixed Effect was used for analyzing data in Eviews and finding any relationship between free float and rates of return in one side, and between free float and beta in other side. Both of two relationships were significant and the regressive equations acquired as below:

$$\text{Beta} = 0.94724 + 0.17325 \times \text{free float} \tag{3}$$

$$\text{Return} = 0.66231 + 0.24961 \times \text{free float} \tag{4}$$

Now using this equations and the concept of Goal Programming, the optimum values of P/E ratios would be determined. So we can introduce GP as below:

Objective: determining optimum measure of P/E ratios.

Decision variables: there are three decision variables:

X_1: free float of every company

X_2: Beta of every company

X_3: Rate of return in every company

Goals: in the GP models, goals are determined regarding to the structure of the model and other existing conditions. Since investors usually entering the capital markets when they expect at least risk free rates of returns, one of goals in this research identifies the risk free rate of return. Risk free rate in Iran is about 15.5 percent that equals with rate of part payment securities of governmental organizations. Beta in fact is the risk's degree of a stock regarding to the risk of the overall market. So because of the risk aversion of investors, market's beta is assumed as maximum acceptable risk. In other words, another goal is supposed to be in a way that determines value of beta equals to 1 as desired, and divergence from it seen as undesired.

So the GP model defined as below:

$$\text{Min } Z = d_1^- + d_1^+ + d_2^- \quad (5)$$

S.t:

$X_2 - d_1^- + d_1^+ = 1$

$X_3 - d_2^- + d_2^+ = 0.155$

$X_2 + 0.17325\, X_1 - C_2 = 0$

$X_3 + 0.24961 - C_3 = 0$

In this model, first constraint confines beta around 1(market's beta), the second defines returns of stocks and confines returns to at least risk free rate, third has acquired from regressive equation of beta, and forth is related to regressive equation of return. C2 and C3 also represent fixed coefficients for regressive equations of beta and return respectively. In next step, data have been entered in WinQSB in the structure of acquired model and then the optimum stock free float for each company regarding to risk and return have achieved. The results have showed in the table1.

Table1. Optimum stock free float regarding to risk and return

Symbol	F.F	Symbol	F.F	Symbol	F.F	Symbol	F.F	Symbol	F.F	Symbol	F.F	Symbol	F.F	Symbol	F.F
FALOOM	0.33	KHEPARS	0.52	BEKAB	0.19	DEFARA	0.54	VATOSHE	0.29	VANAFT	0.40	SEFAROD	0.80	BEHRAN	0.36
KHAHEN	0.26	DEPARS	0.29	KECHAD	0.54	DELOGHM	0.18	VAPETRO	0.34	LESARMA	0.27	KAZAR	0.23	SHENAFT	0.19
CHAFSET	0.42	KESRAM	0.33	RANFOR	0.57	DEJABER	0.37	VATOOS	0.26	SAROOM	0.37	KHETOGA	0.16	FANAVARD	0.33
DALBER	0.48	SHEPAKSA	0.27	TAKSHA	0.64	VAPAKHS	0.59	VATOOSA	0.48	SEBHAN	0.70	GHESHRIN	0.22	SHEKOLOR	0.74
KHESHARGH	0.29	SHEPETRO	0.44	GHEDAM	0.17	DEROOZ	0.26	VARENA	0.54	SETRAN	0.26	KHEBAMAN	0.59	DAROO	0.69
KHODRO	0.37	SHARAK	0.59	MADARAN	0.86	KHETRAK	0.66	VASHAKHT	0.76	SEPAHA	0.56	GHEPAK	0.23	FASMIN	0.46
KHAVAR	0.73	SHEKHARK	0.23	DASVEH	0.27	KHERING	0.33	SAMAN	0.32	SEROOD	0.43	FELOOLE	0.46	TEKOMBA	0.36
NEMERINO	0.53	SHEFARA	0.78	DAMIN	0.38	KHEZAMI	0.67	VASEPAH	0.56	SESOOFI	0.39	KHEMOHRE	0.68	AKONTOR	0.21
PASA	0.17	KEMASE	0.25	DELOR	0.72	SASFA	0.20	VASANAT	0.27	DESINA	0.45	FABAHONA	0.84	DEKIMI	0.48
KAMA	0.39	TAYRA	0.37	DEDAM	0.66	KHESAPA	0.32	VABIME	0.18	GHESHAD	0.61	KEROOY	0.37		
VANOVIN	0.21	VABSHAR	0.46	DERAZAK	0.26	KHAZIN	0.68	VASENA	0.65	KEGHAZVI	0.17	MANGENEZ	0.47		
VAKAR	0.44	SHETOOLI	0.19	DEZAHRA	0.39	VALBER	0.54	SMASKAN	0.42	KEHAMDA	0.33	KHEMEHR	0.40		
GHEBEHNO	0.24	TEKNO	0.39	DESOBHA	0.56	VASANDO	0.25	VAMADEN	0.82	DESHIMI	0.37	KHEMOTOR	0.27		
SHEPAMCH	0.45	FEJAM	0.24	DEABID	0.80	VABOOALI	0.20	VANIKI	0.66	SADRA	0.61	BEMOTO	0.26		

7. Conclusion

There are two important aspects that people usually look when they want to start an investment. One of them is return and the other is risk. But usually determining the size of these aspects is not easy, so people try to find faster ways to embrace risk and return together. One of the useful ools in capital markets for this purpose is stock free float. In this research for 107 listed companies in Iran (Tehran) stock exchange, first seasonal return, risk and free float were calculated. Then regressive equations were fund between them and in the main step, these equations accompanied with by couple of constraints made a Goal Programming

model. This model was entered in WinQSB, and finally the optimum free float regarding to risk and return acquired. So these free floats show how people could undertake enough risk for obtaining suitable return.

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