

---

## The Impact of “Black Swan Events” on Beta and Returns: Evidence from Shanghai Composite Index and Pakistan Stock Exchange PSX (KSE-100). A Case Study of China and Pakistan

KISHWAR ALI<sup>1</sup>

PhD Scholar, School of Finance  
Zhongnan University of Economics & Law  
Wuhan, PR China

SHAH ABBAS

PhD Scholar, School of Economics  
Zhongnan University of Economics & Law  
Wuhan, PR China

SAMI ULLAH

PhD Scholar, School of Economics  
Zhongnan University of Economics & Law  
Wuhan, PR China

### Abstract:

*A Black Swan or improbable events is an unpredicted event that causes major market fluctuations, The main purpose of this paper is to exploiting the market’s reaction to unforeseen events, so called Black Swans, Seven years Monthly return data from January 01, 2011 to December, 31 2018 of Shanghai Stock Exchange (SSE Composite Index) and Pakistan Stock Exchange PSX (KSE-100) Index examined. A researcher randomly describe a black swan as a monthly return in the PSX and SSE market higher than or equal to  $\pm 5\%$  in absolute value. The Capital Asset Pricing Model (CAPM) methodology of Fama and French (*J Finance* 51:55–84, 1992) is adopted for an empirical perception. The CAPM state positive relationship between assets expected return and its beta. This paper focuses on analysis whether*

---

<sup>1</sup> Corresponding author: kishwar.mcb@yahoo.com

*beta is a valuable tool when evaluating portfolios consisting of stocks listed on the SSE Composite Index and PSX KSE-100 index and investigates that beta is a constructive and important determine of risk for our approach. All different variables Black Swan risk return, high beta portfolio, low beta portfolio are modified and changed according as per stock index's and financial environment.*

**Keywords:** Black Swans, Beta Portfolios, Returns, SSE, PSX, CAPM

## **1. INTRODUCTION:**

The importance of stock market and their contribution to economy can't be neglected. Stock market helps accumulating domestic resources and directing them to productive investment (Atiq et al., 2010; Aurangzeb, 2012; Vincent & Bamiro, 2013). Therefore, it is evidence that stock market play positive and significant role in the economy (Sherestha & Biggyan, 2014). Several studies show the performance of stock market is influence by the several factors, like political instability, external oil prices shocks, financial crisis etc. However, several events are not possible to predict in stock market, these events directly and indirectly influence the performance of stock market, such type of events are called black swan (Ibrahim & Aziz, 2003; Maria, 2013). Black Swans unpredictable events in the world stock market and it is very difficult to find and know their existence. This kind of events is hardly detected in the Stock markets, its improbable before when accident accrued in the stock market, because of black swan many stock markets which performing well goes down from heaven to the hell (LIU Lang, 2012).

Moreover, the black Swan events its low probability and extreme impact in the stock market either positive or negative but everybody could see when its coming after occurred in the stock market. Taleb (2007a) characterized black swan in more noteworthy detail. Accordingly, there are three criteria that require to be meet for an occasion to be regarded as a Black Swan 1) It is an outlier, lying external the realm of regular potential because nothing in the past can persuasively point to its happening; 2) it carry an excessive impact; and 3) regardless of being an outlier, conceivable explanations

for its event can be found after the fact, thus giving it the appearance that it can be understandable and predictable. In short, then, a black swan has three uniqueness: scarcity, excessive impact, and retrospective preventability. So, collectively he defines the event of an occurrence that is regard as unfeasible, or at slightest highly unlikely. Furthermore, Taleb (2007a) notes, a Black Swan is also the turn-around of this characterization: The non-occurrence of an event that is regarded as highly feasible.

Estrada (2008) argues that Black swans exist in financial markets which influence behavior of investors. As a result, black swans render market timing strategies a goose chase. Investors trapped between the widely-opposing views that advocate either a passive approach or an active approach, which put strong impact on the stock's performance in the short term period and these few days disturb the overall performance. During this time period, investors ultimately take quick decisions and face more challenges. This all happens because black swan disturbs the strategies of investors and affects the portfolio performance. However, the main objective of this study is to investigate impact of black swan events on beta and returns in the Shanghai Stock Exchange (SSE Composite Index) and Pakistan Stock Exchange (PSE) (KSE-100). We follow the method of Vargas (2012) and classify a Black Swan as a monthly change in return for the SSE Composite Index and KSE-100 Index of  $\pm 5\%$  or more. The main reasons to choose the Shanghai Stock exchange and Pakistan are: First, Shanghai stock exchange is the most important market for the world investors because of largest stock market in Asia pacific. Secondly, both Pakistan and Shanghai stock markets are emerging and growing fast market in the world. Thirdly, Pakistan stock market is oldest stock exchange in south Asia.

This study has following sections: the second section presents review of literature; third section describes data and methodology. The fourth section presents the empirical results and finally concludes overall study with major finding in section five.

## **2. REVIEW OF LITERATURE: THEORY AND EMPIRICS**

### **2.1 Theory:**

#### **Black Swans:**

Malm and Nihlen (2014) defined that a Black Swan is an improbable event that causes major market fluctuations. “The fundamental initiative of the Black Swan concerns the all-too-common coherent disorder of absence of substantiation with evidence of deficiency”.

Yi, Kuo Hsing (2008) examined that the impact of Black Swan events in china stock market (Shenzhen and Shanghai Stock Exchange) are different from time to time and from stage to stage, while the initial stage of china reforming the critical impact of price differentiating on stock market in china is briefly rise which help promote security, but after the reforms in china and going towards to the internationalization the impact and influence of price differentiate are positive and increases on stock market in china. As is to this improbable and unrealized Black Swan Events it attributes to brief enhance of price differentials and is deviated off standard. According to (Taleb, 2007), there are three criteria that require to be meet for an occasion to be regarded as a Black Swan 1) It is an outlier, lying external the realm of regular potential because nothing in the past can persuasively point to its happening; 2) it carry an excessive impact; and 3) regardless of being an outlier, conceivable explanations for its event can be found after the fact, thus giving it the appearance that it can be understandable and predictable. In short, then, a black swan has three uniqueness: scarcity, excessive impact, and retrospective preventability”.

So there it is: scarcity; extremeness; and retrospective preventability. Collectively they define the event of an occurrence that is regard as unfeasible, or at slightest highly unlikely. What’s more, as (Taleb, 2007) notes, a Black Swan is also the turnaround of this characterization: The non-occurrence of an event that is regarded as highly feasible. (Liu Liang, 2012) explained Black swan events are those events which is found hardly and not easy to detect in the stock market and this kind of events more unexpected and unpredictable and impact of these kind of events is so effectiveness and high in the stock market ,the most important element is ignoring risk we ignoring this kind of risk that’s why many stock markets goes down form peak

to down ,according to author the main and basic cause of the such events accident had with the social and integrity relationship between listed companies.

(Aven, 2013) refers black swan “as a unforeseen intense event comparative to one’s knowledge”. This does not essential mean that all black swan events are attributed to severe consequences. There are situation in which black swan events do not result in extreme consequences and these situations are known as “near-black swans”, meaning surprises comparative to one’s knowledge/attitude. The black swan category of events according to (Aven and Krohn, 2014) can be broken down into three main categories:

- a) Unknown unknowns; These types are events completely unknown, improbable, unpredictable and unthinkable .The consequences is very high and extreme when this type of improbable events occurred in the stock market, we don’t know about that this type of events in the stock market but when occurred in the stock market the consequences and impact of these events is extremely high either positive or negative fluctuations. An example in scientific environment is new type of virus.
- b) Unknown known: These kind of events we can’t captured or measured when risk assessment is carrying out about these types of events we don’t know when accrued in the stock market but when occurred we know about that which kind of events or factors effects in the stock market fluctuations. Usually we can’t consider this types of events its occurred accidentally and there was no awareness and advance information about these type of events. For Example, 9/11 terrorist attack in the U.S, Tsunami in the Indonesia, and 8<sup>Th</sup> may Earthquake in Pakistan.
- c) Known known: we know about that events and can measure the risk assessment also but we ignore the events and when occurred the consequences the impact very high in the stock market, despite the negligible probability of occurrence. Brixet is the recent example 23,Jun,2016 the new events and information effected by stock market 24 Jun 2016,where the result of Brexit declare after the 24 hours the world wide stock market are crashed and lost about \$2 trillion in value. The

value of pound is decrease in 30 years almost 1.33 its lowest level according to (Isaac Quaye,2016).

Unforeseen events, or “Black Swans”, have caused stock markets all over the world to decrease, or increase, by numerous percent in a single day over the years. Based on (Estrada and Vargas’ article (2012), we will investigate whether we can make use of unpredicted events in the Stock Exchanges in order to achieve a higher return than the market index by relying on the mean reversion assumption.

When investigative the history of the stock market in the light of Black Swan events, it is predictable to see how much impact a few days of excessive activities has on the long-run performance. The impact of outliers has established to be enormous also on emerging markets. A long-term successful performance can be eliminating by just a few days of high negative activities. investigate 16 promising equity markets over a period of 28 years on average, “Estrada (2009) shows in the article “Black Swans in Emerging Markets” that if we were to exclude the ten best market days, the aggregated value of the stock market would be 69.3 percent less valuable than holding a passive portfolio, i.e. investing in the world market index, while excluding the 10 worst market days would yield a portfolio value of 337.1 percent higher than a passive investment. Taking these Black Swan events into account when investing in the stock market, an investor could obtain massive excessive returns. Unfortunately this is impossible to achieve, since such a rare event as a Black Swan is highly unpredictable, leaving investor’s success in the hands of the ugly bird (Estrada, 2009)”.

Look For Black Swan Businesses: (Investiv daily (The Black swan Investing Strategy you Need to Know, Jan 30, 2018).

Bank investment is the negative black swan business sector for investing when we invest our investment in the bank sectors’ ,for example Banks lends loans a to the peoples, Gov,t sectors ,companies and borrow interest and make profit against these loans ,if they not returned back on the time and not repaid the banks can easily can go bankrupt. Thus the upside is limited while the downside is total. The positive black swan business Venture capital, scientific research (biotechnology stocks). In Uber 9 years ago venture capitalist invested and exposed positive black swan but in pension fund when investor invest now is more exposed to a negative black swan. The key

according to Taleb is to get extremely aggressive, as speculative and as unreasonable as possible, when the downside is little and the upside unlimited. Therefore, when you find an opportunity, make sure to seize it.

### **Black Swan Investment Strategy:**

(John Maynard Keynes) applied the term investing to his won book, “The General theory of employment, interest and money “describe in the book about investment and speculations, rumors in the stock market. He considered the former to be a forecast of an enterprise’s profits, while the latter attempted to understand investor psychology and its effect on stock prices. The using of the black swan events is the main idea behind the investment strategy, that how can we avoid from these improbable events which is occurred in stock markets. That is, instead of creating a portfolio based on the non-occurrence of these events .Black swan events in our investment strategy, In our portfolio strategy we will not count them, but we will exploring and try to get some benefits from these such kind of events by exploiting the market reactions. (Talib, 2010). In emerging market the most investors agree that the investing is risky ,but there is no one agree and realized that how can we make a perfect strategy to handle this kind of risks, some investors realized that an investing in emerging market we make large and short term profit and actively trade . In the black swan approach in emerging market investors should follow passive approach and avoid engaging in futile market timing. This is not possible to achieve, since such a rare event as a Black Swan is highly unpredictable, leaving investor’s success in the hands of the ugly bird (Javier Estrada, 2008). Investor need to be informed about the improbable events which occurred in the market with extreme and high impact in the stock market, and we think we could predict short tail events which is occurred in the market with its probability and uncertainty, because of in our productive economy the black swan events can play an ever larger role in our financial economy. ( John C. Bogle).

We can use and show the beta is the relevant and valid tool for measurement the risk this investment strategy should be successful in the PSX (KSE100) index and SSE, when we build the portfolios in our strategy should be a valid and useful tool. Our

investment strategy will be compared to a passive portfolio following the KSE-100 index and SSE to where the first investment will be made at the same date as the occurrence of the first Black Swan.

The result show that that black swan is a surprising events which is not seen and occurred any time in the stock market, so the investors and for the portfolio managers is not able to invest in a straight forward manner, we can prepare by ours elf where we investing for exposed and highly impactful events which is occurred every time,.

### **Trial & Error Investing and the Barbell investing Strategy:**

In 2008 the global financial crises which is begin in 2007 market in USA, investors are deeply thinking and exploring ways to investigating risk how to minimize and downside risk in their portfolios, for this events the term black swan has been used for improbable events in the stock market, and many investors thinking that how we reduced in these unpredictable events to invest in their portfolios.

Trial and error investing is a strategy where we know about our investment, and invest a little part of portfolio and know the chance of investment is down with high probability and lose the big part of our investment even all of it. it doesn't hurt you but in the event of a black swan, your upside is unlimited. (Investiv daily, The Black swan Investing Strategy you Need to Know, Jan 30, 2018).

The Barbell Investing Strategy We can put money on the long term out of money options because if you are wiped out, there is nothing left to invest. According to Taleb and he suggests barbell investing strategy that is hyper aggressive and conservative at the real time and same time, its mean that your portfolio in highly safe investment which that we put about 85% to 90%, like mutual fund and treasuries. While remaining 10% to 15% spends on speculative bets. The key is not to be blinded by one potential black swan, but to ready black swan events from everywhere as we can't predicted and can't see black swan ahead. So by having 15 black swan bets, you will likely hit one or more per year and have a great return. Additionally, the barbell portfolio offers protection in bear markets which, again, a normal portfolio doesn't. The risk in the barbell portfolio is medium. (Investiv daily ,Jan 30, 2018).



## **2.2 Empirics:**

### **Beta and the Capital Asset Pricing Model (CAPM):**

The Capital Asset Pricing Model (CAPM) is one of the most extensively used, implement and discuss model for asset pricing since the before time of the 1960s. Pretentious risk-averse investors selecting mean-variance-efficient portfolios, the Capital Asset Pricing Model (CAPM) state that investors aim to (Markowitz, 1952):

Minimize the variance in their portfolios and maximize their anticipated portfolio returns.

The positive relationship of three variables Beta (Asset returns, market return and dividend by the variance of stock markets) CAPM model shows the realized returns is a positive about these three variables. The basic concept of CAPM test to use the check the returns are positively related to beta. The Risk divided into two subcategories in CAPM: “The systematic risk, or market risk, that cannot be eliminating by diversification, and the non-systematic risk, that can be condensed by holding a well-diversified portfolio. (Bodie et al., 2011)”. The stock beta can be anticipated as the covariance involving the market return and the return of some stock  $i$  divided by the variance of the market return. A beta of 1 indicate that the asset moves entirely with the market, a perfect correlation. If beta is higher than 1, the price movement of the asset is higher than the market. If beta is less than 1, the reverses hold. Higher beta value imply a higher estimated return, but at the cost of more risk. A zero beta value means there is no correlation with the market, and a beta value of minus 1 implies a perfect negative correlation, that is, the asset move in the complete contradictory trend compare to the market (Investopedia, n.d.). Beta is the good and useful measurement for risk and valid tool determined for stock market. Moreover for active portfolio strategy beta using active role and create a great impact on the final result of stock markets obtained has been consistently positive, which shows that when we building portfolio strategy beta is the valid tool for measurement the risk. Study by Ning and Liu (2004), there is no unconditional relationship find between beta and returns in the shanghai stock exchange.

(Jonas Nihlen & Jakob Malm,2014).in 1995 (Pettengill) describe the inverse relationship of beta and expected return and conditional relationship between beta and expected returns where

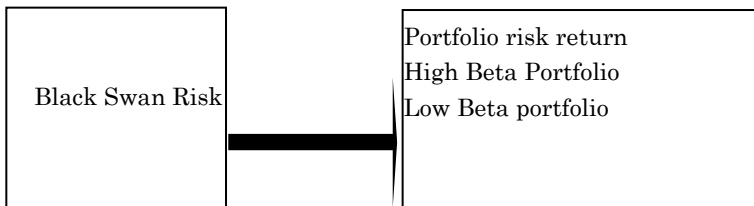
markets excess return are positive are negative. Using data Period of 1936 and 1990 in US stock market when market excess returns they found when market return is increasing the significant relationship between beta and realized return is positive when the market expected return decreasing and going to negative trend the expected return of the market is decreasing and the significant relationship of the beta return is negative. Isakov (1999) followed the concept of Pettengill (1995) that beta is the valid tool and good measurement of risk and statically significant related to expected returns and has the realized sign which is still exist and alive. Fletcher (2000) is also followed the approach of Pettengill (1995) and describe the conditional relationship of beta and returns between January 1970 and July 1998 in the international stock markets and he examined and found the consistent result of exists that there is also significant relationship of beta and expected returns. He found the result that the world stock market trend positive excess or increasing trend there are significantly positive relationship of expected return and beta and when the world stock market goes down towards negative or decreasing trend the realized return of beta is significantly negative. Fletcher (2000) also describe and found that in the yearly started month January the conditional relationship of realized return are significantly found positive while in this period the relationship of excess return are significantly negative. so the beta relationship is conditional upon the sign of excess market return either the risk premium is positive are negative.

The Standard Deviation according to (Fabian Brunaker & Andreas Nordqvist, 2013 Thesis report) examine as a risk of measure. According to Estrada and Vargas during large market fluctuations increasing or decreasing the importance of beta as a measure of risk, as do Chan and Lakonishok (1993) and Grundy and Malkiel (1996), due to previous scholars' rejection of its usefulness (Chan and Lakonishok, 1993). Since standard deviation, like beta, does not adjust for downside risk we find it relevant to evaluate standard deviation as a measure of risk to appraise if it is an accurate tool for describing the relationship between risk and return during extreme market movements. Estrada and Vargas find support in both Chan and Lakonishok (1993) and Grundy and Malkiel (1996) argue That we cannot ignore the importance and vital role of Capital Asset Price

Model (CAPM) for beta as a measure of risk and also find that CAPM is still useful tool and cannot reject for investigating beta as a measure of risk. (Pettengill, Sundaram, & Mathur, 1995 for the US market; and Isakov, 1999 for the Swiss market) suggested an alternative approach to assess the reliability of beta as a measure of risk and there is inverse relationship in beta and expected returns.

### 3. Empirical Framework, Data Description and Methodology

This section contains three parts, the first part presents the empirical framework and second part describes data and definition of variables. Third section is about the methodology, which will have used further for the empirical results.



#### 3.1 Empirical Framework

In previous section, we have discussed the theoretical and empirical literature and gain important insights into the impact of black swan on beta and returns. We summarize main insights by showing the main coefficients signs with relation to the empirical specification for the impact of Black swan on beta and returns in case of Pakistan stock exchange and Shanghai Stock exchange. Formally, the capital asset pricing model (CAPM) were used in the empirical studies on stock market. The CAPM model explain fluctuation behavior of the stock market returns. The CAPM state that positive relationship between assets expected return and its beta. This hypothesis is tested by different scholars in the domestic and international stock markets. In this study we formally estimate the modified version of CAPM model suggested by the (Lau et al. 1974; Michailidis et al. 2006).

$$R_i = R_f + \beta_i (R_m - R_f) + \epsilon_i \dots \dots \dots (1)$$

Where  $R_i, R_f, R_m$  and  $\beta_i$  represent return on stock i, risk free rate, return on market portfolio and beta of stock I respectively.  $\beta_i$  is systematic risk of asset I relatively to market and it can be calculated as

$$\beta_i = Cov(r_i, r_m) / \sigma_m^2$$

The returns are calculated using natural log of periods closing prices as

$$R_i = \ln\left(\frac{P_i}{P_{t-1}}\right)$$

The estimates of  $\beta_i$  is calculated by running following time series regression of market and stock excess returns.

$$R_{it} = \alpha_i + \beta_i \gamma_{it} + \epsilon_{it} \dots \dots \dots (2)$$

Where  $\gamma_{it} = R_{mt} - R_{ft}$ , which is known as market risk premium. The equation 2 is estimated by using the ordinary least square method. Furthermore, we add two more factors with the simple regression model for both Shanghai and Pakistan stock exchange markets by using the method proposed by Fama and Macbeth (1974).

$$R_t = \alpha_1 \beta_t + \alpha_2 \beta_t^2 + \alpha_3 Stdv_t + \alpha_4 H.Stdv_t + \epsilon_t \dots \dots \dots (4)$$

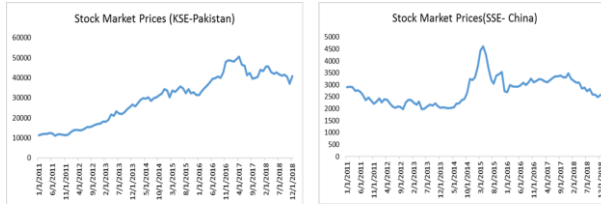
Where  $R_t$  is the rate of returns over the whole sample t,  $\beta_t$  is the estimate of the systematic risk contains in the particular stock.  $\beta_t^2$  is the square of  $\beta_t$ .  $Stdv_t$  is the standard deviation and  $H.Stdv_t$  is half of standard deviation in particular period.

### 3.2 Data Description

This study analyzed the Shanghai and Pakistan stock market by using their stock prices, namely the Shanghai stock exchange composite index (SSE) and Karachi stock exchange index (KSE). The data was gathered from two main sources. The data on stock market prices were drawn from the Yahoo finance for both Shanghai stock exchange (SSE) and Pakistan Stock Exchange (KSE-100). The data on the monthly Treasury bill is taken from the international financial statistics (IFS). We consider monthly return on Shanghai stock exchange and Karachi stock exchange over the whole sample period 1/31/2011 to 12/31/2018. Monthly returns are calculated from the first

difference in the lag of stock prices.

**Figure 3.1: Stock Market Prices over the Period 2011-2018**



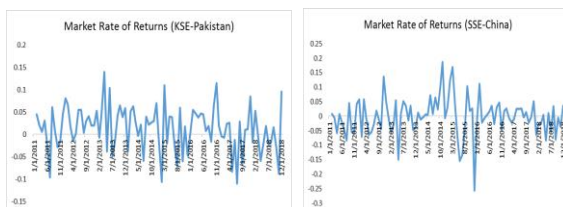
*Source: Author calculation based on the monthly data*

Figure 3.1 showing the price fluctuations of both PSX (KSE-100) and SSE-China (SSE) stock exchange from 01-01-2011 to 31-12-2018. It can be observe from the left panel of above figure that stock market price of Pakistan have increasing trend till and reached at the highest level in 2017 to approximately 50,000 and then there is a little downfall in Pakistan’s stock market price that decreases to almost 40000 in 2018.

However the stock market price situation is somehow different in SSE-China. Price of china stock market have a slightly decreasing trend from 2011 to fifth month of 2014 and then it jumps to the highest level in just less than a year in 2015 to just about 4500. Then again there is a fall in prices in august 2015. After that stock market prices are increases slightly until second month of 2018 but at the end of 2018 it decreases to 2500.

It is concluded from the above figure that stock market prices of Pakistan have almost an increasing trend during the time period taken into analysis while china stock market prices have more fluctuation and have sudden short fall and upward movement.

**Figure 3.2: Market Rate of Return over the Period 2011-2018.**



*Source: Author calculation based on the monthly data*

The initial Black Swan is observed when such is defined as a absolute  $\pm 5\%$  Monthly return on the PSX and SSE. The first Black Swan appear in PSX 07/31/2011, At the closing of this Month the index decline -6.3552 hence also the First black swan appeared in SSE 04/30/2011 and the index declined at the end of month -5.94476.

### 3.3 Methodology

The first step in our empirical studies is to identify the black swan in both stock exchange markets. Taleb (2007) define the black swan as an event with three attributes. First, it is outlier, second its carries extreme impact on stock market returns, third, it is predictable and plausible explanation after the fact. However, in short the black swan has three main characteristics a) rarity, b) extreme impact and c) retrospective predictability. Therefore, it is concluded that the higher volatility of stock prices in stock market are generally caused by the black swan. We therefore define black swan as the monthly returns in the stock market equal or higher than 5% in absolute term, because we need to calculate the beta for our study.

**Table 3.1: Monthly Rate of Returns at (equal or higher  $\pm 5\%$ )**

Shanghai Stock Exchange				Pakistan Stock Exchange			
Date	Returns	Date	Returns	Date	Returns	Date	Returns
4/30/2011	-5.94476	2/28/2015	12.41557	7/31/2011	-9.63552	2/28/2015	-10.6521
7/31/2011	-5.10216	3/31/2015	16.98316	8/31/2011	6.058028	3/31/2015	10.94237
8/31/2011	-8.45397	5/31/2015	-7.53024	1/31/2012	8.108504	8/31/2015	-7.2826
10/31/2011	-5.61769	6/30/2015	-15.4823	2/29/2012	6.638261	9/30/2015	5.934786
11/30/2011	-5.91401	7/31/2015	-13.3461	6/30/2012	5.467417	10/31/2015	-6.0346
1/31/2012	5.75775	9/30/2015	10.25801	7/31/2012	5.437567	2/29/2016	5.487444
2/29/2012	-7.06707	12/31/2015	-25.6814	1/31/2013	5.258264	10/31/2016	6.615734
3/31/2012	5.73348	2/29/2016	11.11268	3/31/2013	5.073827	11/30/2016	11.47922
5/31/2012	-6.3882	12/31/2017	5.117816	4/30/2013	13.94535	5/31/2017	-8.29296
6/30/2012	-5.62833	1/31/2018	-6.57261	6/30/2013	10.42079	7/31/2017	-11.0261
11/30/2012	13.62397	5/31/2018	-8.35285	7/31/2013	-5.06741	9/30/2017	-6.81038
2/28/2013	-5.60625	7/31/2018	-5.39797	10/31/2013	6.48657	12/31/2017	8.470626
4/30/2013	5.48011	9/30/2018	-8.06343	12/31/2013	5.855011	2/28/2018	5.228367
5/31/2013	-15.0472			2/28/2014	5.20158	4/30/2018	-5.98402
7/31/2013	5.112477			3/31/2014	6.254865	11/30/2018	-8.84857
6/30/2014	7.21438			7/31/2014	-5.93339	12/31/2018	9.595207
8/31/2014	6.405504			12/31/2014	6.950109		
10/31/2014	10.30643						
11/30/2014	18.70237						

Source: Author calculated based on collected data.

This table shows all the black swans considered, ordered chronologically. A black swan is defined as a monthly return in the PSX (KSE-100) and Shanghai SSE Composite index higher than or equal to 5% in absolute value. A total number of 32 Black Swans are EUROPEAN ACADEMIC RESEARCH - Vol. VII, Issue 2 / May 2019

observed for the lowest definition of a Black Swan in our study in SSE Composite Index while 18 is negative and 14 is positive Black swan noted and observed the initial point of negative black swan in SSE on 04/30/2011 with negative -5.94476. Since in PSX (KSE-100) A total number of 33 Black swans are observed in which 11 is negative impact and observed the initial point of negative Black swan noted dated 07/21/2011 with -9.63552.

#### 4. EMPIRICAL RESULTS AND DISCUSSION

**Table 4.1: Regression Analysis -Pakistan Stock Exchange**

No	$\beta_t$	$\beta_t^2$	$Stdv_t$	$H.Stdv_t$	R-Square
1	-0.115042	0.113064	0.120509	8.428370	0.431067
	(-1.108373)	(1.105160)	(1.160262)	(9.880805)	
2	0.453650	-0.447488	-0.451440	13.21975	0.874998
	(11.66630)	(-11.40702)	(-11.50943)	(44.71891)	
3	0.515866	-0.506508	-0.510556	13.65729	0.906394
	(16.41375)	(-15.55022)	(-15.96786)	(55.15543)	
4	-0.062201	0.054120	0.083870	9.716898	0.132873
	(-0.276488)	(0.241726)	(0.367298)	(5.991669)	
5	0.674379	-0.672463	-0.666227	14.97968	0.793873
	(12.76885)	(-12.38366)	(-12.33730)	(36.71657)	
6	0.068383	-0.064557	-0.061177	10.80729	0.443642
	(3.809163)	(-3.559793)	(-3.525250)	(90.04016)	
7	0.407448	-0.398368	-0.396393	12.90551	0.706084
	(11.48345)	(-10.97777)	(-11.44355)	(49.26012)	
8	0.089361	-0.080110	-0.081823	10.95826	0.489710
	(2.948548)	(-2.598864)	(-2.478798)	(66.43557)	
9	0.313766	-0.305023	-0.312317	12.19365	0.747234
	(14.11334)	(-13.00352)	(-12.97197)	(77.81254)	
10	0.496092	-0.490625	-0.488039	12.93885	0.586572
	(5.173492)	(-5.125466)	(-5.222363)	(29.01337)	
11	0.300600	-0.291917	-0.296880	12.09490	0.800940
	(17.91928)	(-16.58764)	(-16.83240)	(107.6849)	
12	0.053121	-0.050210	-0.046190	10.94115	0.342272
	(2.409585)	(-2.462697)	(-2.011774)	(104.2364)	
13	0.298966	-0.287461	-0.297890	12.09336	0.798147
	(18.96505)	(-17.58179)	(-18.18127)	(117.6707)	

**Table 4.2: Regression Analysis -Shanghai Stock Exchange**

	$\beta_t$	$\beta_t^2$	$Stdv_t$	$H.Stdv_t$	R-Square
1	0.022464	-0.027166	-0.014058	7.875845	0.075638
	(0.212375)	(-0.255089)	(-0.130024)	(22.98369)	
2	-0.170011	0.175684	0.175408	7.159850	0.539018
	(-3.587364)	(3.723644)	(3.661085)	(48.82644)	
3	-0.098664	0.096710	0.106759	7.449892	0.280856
	(-1.226497)	(1.196072)	(1.311137)	(29.24082)	
4	1.323860	-1.317253	-1.318860	11.64865	0.784057
	(5.940069)	(-5.867468)	(-5.918623)	(17.44181)	
5	-0.039017	0.048126	0.043855	7.616816	0.115240
	(-0.471991)	(0.575884)	(0.521956)	(29.47121)	

Kishwar Ali, Shah Abbas, Sami Ullah- **The Impact of “Black Swan Events” on Beta and Returns: Evidence from Shanghai Composite Index and Pakistan Stock Exchange PSX (KSE-100). A Case Study of China and Pakistan.**

6	0.324182 (3.639473)	-0.309772 (-3.482922)	-0.317376 (-3.711439)	8.745215 (37.09623)	0.461424
7	0.251376 (5.626163)	-0.240495 (-5.275240)	-0.247822 (-5.664532)	8.549372 (62.72622)	0.424276
8	-0.228140 (-4.250795)	0.229965 (4.427715)	0.231120 (4.285801)	7.691491 (81.74030)	0.556349
9	0.182217 (6.679450)	-0.170660 (-6.194438)	-0.181047 (-6.566613)	8.330294 (109.3560)	0.433061
10	-0.139283 (-0.030702)	0.139537 (0.030769)	0.146670 (0.032350)	7.841375 (1.152745)	0.084543
11	0.190170 (8.840256)	-0.178887 (-8.315046)	-0.188588 (-8.511322)	8.356096 (149.0928)	0.514806
12	-5.953441 (-0.957504)	5.976214 (0.961472)	5.960394 (0.958759)	0.900901 (0.096637)	0.186375
13	0.170009 (8.817855)	-0.157922 (-8.253020)	-0.168050 (-8.503013)	8.292726 (172.7522)	0.475401

Note: Parenthesis shows t- statistic value

Table 4.1 and 4.2 shows the estimated coefficients of benchmark model 4. The risk free rate is constructed by assuming that Treasury bill rates stay constant within the month and suitably compounding them. Monthly excess rate is obtained by compounding monthly excess returns and refers to excess returns as returns. Three step procedures is adopted to estimate model. In the first step regress rate of returns on the excess rate of returns in the model, both variables are converted into the logarithm and first difference. In the second step obtained the Betas for both Pakistan and Shanghai Stock exchange. Furthermore, in the third step regress rate of returns on Beta, Beta Square, Standard deviation and half of standard deviation. The beta coefficients show linear risk returns relationship a cross sectional regression of an individual’s returns on its Beta. The positive sign of betas indicates risk and high returns and negative betas shows lower returns. Square of Beta as an additional variable to test the non-linearity of beta with rate of returns. The empirical results indicate that high risk is negatively related with rate of returns and its effect the portfolio decision of investors.

## 5. CONCLUSION:

To summarize, the outcome we obtain using Monthly data from the PSX (KSE-100) and Shanghai Composite Index SSE from 01/01/2011-31/12/2018 for a relative relation between Beta, size and returns. The Capital Asset Pricing Model (CAPM) methodology of Fama and French (J Finance 51:55–84, 1992) is adopted for an empirical point of view. This paper explain the significance of beta as a risk of



measurement in both stocks markets PSX (KSE-100) and Shanghai (SSE Composite Index).

The positive correlation establish between the beta value and return of a stock points to the fact that beta can be used as a determine of risk for the assets over the study period between 2011-2018 investigated. We have tested different levels of Black Swans, which all capitulate similar results in terms of a positive affiliation between the beta value and the return of a stock during a positive (negative) Black Swan. This suggests a secure and adequate conclusion for the first research query in our study. Before related evaluation of beta have been done on a number of large stock exchanges over numerous different markets, both developed and emerging, where beta has been concluded as a satisfying measure for risk. The conclusion, both from previous studies and ours, should however be interpreted with some caution, since the results are highly dependent on the market data used, which can be significantly variant between different markets. It should also be taken into consideration that even if the relationship shows to be significant in the study, it is based on historical information and does not guarantee a future positive relationship between beta and the return of a stock on the market” We conclude that beta is a valid tool when structure portfolios with stocks on the PSX and SSE, and that it is a valuable measure of risk for the data in our study. We note that the highest returns are obtained when implementing our strategy defining a Black Swan as a 5% Absolute monthly increase/decrease on the PSX (KSE-100) and Shanghai SSE composite index. All different variables Black Swan risk return, high beta portfolio, low beta portfolio are modified and changed accordingly as per stock index’s and financial atmosphere, the result is efficiently significant.

## REFERENCES

1. Adesanya O. Adeleke. (2014), Strengths and Weaknesses of Anticipatory Failure Determination in Identifying Black Swan Type of events, *Master Thesis University of Stavanger*.
2. Aven, T. 2013. On the meaning of a black swan in a risk context. *Safety Science*, 57, 44-51.

3. Aven, T. and Krohn, B.S. 2014. A New Perspective on how to Understand, Assess and Manage Risk and The Unforeseen. *Reliability Engineering and System Safety*, 121, 1-10.
4. Black Fischer, (1993), Beta and Return “Announcements of the ‘death’ of beta seem premature.”, *The Journal of Portfolio Management*, 20.1: 8-18.
5. Chivaura W. Samuel, Ojah K. Market Derived Capital Asset Pricing Model – Cost of Equity Capital in a South African Context, *University of the Witwatersrand*, Business School Thesis
6. Elton, EJ & Gruber, MJ (1995). *Modern Portfolio Theory and Investment Analysis*. 5th edition., Wiley, New York
7. Estrada Javier (2008), *Investing in Emerging Markets: A Black Swan Perspective*, IESE Business School, Av. Pearson 21, 08034 Barcelona, Spain.
8. Estrada Javier (2009), Black Swans, Marketing Timing and the Dow, *Applied Economics Letters*, 16, 1117-1121.
9. Estrada Javier & Vargas Maria. (2012), Black Swans, Beta, Risk, and Return, *Journal of Applied Finance*, No.2.
10. Fama. Eugene F., and Kenneth R. French. (1992) “The Cross-Section of Expected Stock Returns.” *Journal of Finance*, 47.
11. Kozeniauskas, N., Orlik, A. and Laura Veldkamp, L. (2016). The Common Origin of Uncertainty Shocks, *New York University and Federal Reserve Board*, pp:1-45.
12. Malm, J. and Nihlen, J. (2014). Excess Returns with Black Swan Investing on the Indian Stock Market. Department of Economics School of Economics and Management, Lund University, <http://www.lusem.lu.se/>
13. Markowitz, H.M. (1952). Portfolio Selection. *Journal of Finance*, 7(1), 77–91.
14. Marsh Terry & Pfleiderer Paul. (2012), “Black Swans” and Financial Crisis, *review of Pacific Basin Financial Markets and Policies*, Vol. 15, No. 2, 1250008 (12 Pages).
15. Shefrin, H. and Statman, M. (1995) Making sense of beta, size and book-to-market, *The Journal of Portfolio Management*, Winter, 26(1) 34.

16. Stambaugh, R. (1982) On the exclusion of assets from tests of the two parameter model: a sensitivity analysis, *Journal of Financial Economics*, 10, 237-68.
17. Shanken, J. (1985) N Multivariate tests of the zero-beta CAPM, *Journal of Financial Economics*, September, 327-48.
18. Sharpe, W. F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *The Journal of Finance*, 19(3), 425-442.
19. Taleb, Nassim (2007). *Fooled by Randomness: The hidden role of chance in the markets and life*. New York, N.Y. Random House.
20. Taleb, Nassim (2007). *The Black Swan: The Impact of the Highly Improbable* 2007. New
21. Yu Yang (2011), A Comparative Empirical Analysis on the Effectiveness of CAPM in Chinese Stock Market, *Master Thesis Business Economics Track Finance*.
22. Yeh YH, Lee TS, Pen JF (2002) Stock returns and volatility under market segmentation: the case of Chinese A and B shares. *Rev Quant Finance Acc* 18:239–257
23. Wang Y, Di Iorio A (2007b) The cross section of expected stock returns in the Chinese A-share market. *Global Finance J* 17:335–349
24. Wong KA, Tan RSK, Liu W (2006) The cross-section of stock returns on the shanghai stock exchange. *Rev Quant Finance Acc* 26:23–39
25. Zhang T, Zhao R (2003) Risk under one country and two systems: evidence from class A, B, and H shares of Chinese listed companies. *Rev Pac Basin Finance Markets Policies* 6:179–197.

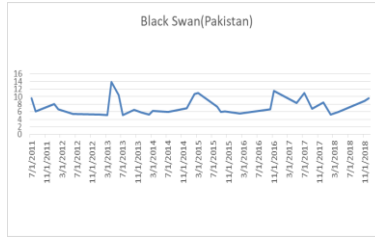


# Kishwar Ali, Shah Abbas, Sami Ullah- The Impact of “Black Swan Events” on Beta and Returns: Evidence from Shanghai Composite Index and Pakistan Stock Exchange PSX (KSE-100). A Case Study of China and Pakistan.

4/30/2018	-5.984020359	0.42870953	5.98402	0.42871	5.984020359	0
5/31/2018	-2.208134446	-8.352847589	2.208134	8.352848	0	8.352847589
6/30/2018	1.894407225	1.012720999	1.894407	1.012721	0	0
7/31/2018	-2.297644669	-5.397965081	2.297645	5.397965	0	5.397965081
8/31/2018	-1.797585251	3.465536151	1.797585	3.465536	0	0
9/30/2018	1.574831528	-8.06342871	1.574832	8.063429	0	8.06342871
10/31/2018	-2.808201186	-0.562322911	2.808201	0.562323	0	0
11/30/2018	-8.848574182	-3.71186763	8.848574	3.71187	8.848574182	0
12/31/2018	9.595207148	3.571378707	9.595207	3.571379	9.595207148	0

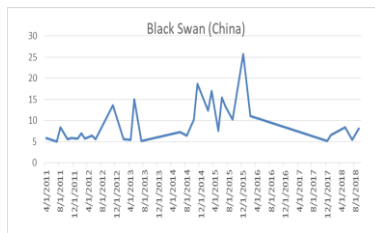
## Black Swan. PSX (KSE-100)

Date	Black Swan(Pakistan)
7/31/2011	9.635516
8/31/2011	6.058028
1/31/2012	8.108504
2/29/2012	6.638261
6/30/2012	5.467417
7/31/2012	5.437567
1/31/2013	5.258264
3/31/2013	5.073827
4/30/2013	13.94535
6/30/2013	10.42079
7/31/2013	5.067406
10/31/2013	6.48657
12/31/2013	5.855011
2/28/2014	5.20158
3/31/2014	6.254865
7/31/2014	5.933385
12/31/2014	6.950109
2/28/2015	10.65209
3/31/2015	10.94237
8/31/2015	7.282605
9/30/2015	5.934786
10/31/2015	6.034599
2/29/2016	5.487444
10/31/2016	6.615734
11/30/2016	11.47922
5/31/2017	8.292957
7/31/2017	11.02607
9/30/2017	6.810381
12/31/2017	8.470626
2/28/2018	5.228367
4/30/2018	5.98402
11/30/2018	8.848574
12/31/2018	9.595207



## Black Swan SSE Composite Index.

Date	Black Swan (China)
4/30/2011	5.944760656
7/31/2011	5.102156219
8/31/2011	8.453974821
10/31/2011	5.617693929
11/30/2011	5.914013661
1/31/2012	5.757750159
2/29/2012	7.067073549
3/31/2012	5.73348045
5/31/2012	6.388195475
6/30/2012	5.628331932
11/30/2012	13.62396808
2/28/2013	5.606245123
4/30/2013	5.480110282
5/31/2013	15.04719906
7/31/2013	5.112477072
6/30/2014	7.214379835
8/31/2014	6.405503952
10/31/2014	10.30642779
11/30/2014	18.70237177
2/28/2015	12.41556769
3/31/2015	16.98316098
5/31/2015	7.530235135
6/30/2015	15.48230902
7/31/2015	13.3460969
9/30/2015	10.25801448
12/31/2015	25.68139346
2/29/2016	11.11268393



**Kishwar Ali, Shah Abbas, Sami Ullah- The Impact of “Black Swan Events” on Beta and Returns: Evidence from Shanghai Composite Index and Pakistan Stock Exchange PSX (KSE-100). A Case Study of China and Pakistan.**

---

12/31/2017	5.117815574
1/31/2018	6.572606404
5/31/2018	8.352847589
7/31/2018	5.397965081
9/30/2018	8.06342871