Short term momentum profits and their source: a business indicators' approach

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Abstract: The main objective of the paper is to seek the source that can explain the momentum profits because the source of momentum profits has been disputed. The secondary objective of the paper is to affirm the findings of the author about the presence of the short term momentum effect and to reaffirm the notion that CAPM cannot explain the momentum profits supported by a large number of authors. For the primary objective, a set of variables has been chosen, that fall under the category of "Business Indicators", to explain the momentum profits. It is found that a variable "Starting a Business" could explain the source of the momentum profits whereas other variables may have a negligible or no influence over the momentum profits. It is also reaffirmed that a short term momentum effect has been found in 14 stock markets and the CAPM could not explain the momentum profits. This study is not conclusive due to the limitation of data but it does give a source of the momentum profits and it sheds light on the future research about the sources that can explain momentum profits in a great detail.

Key words: business indicators, short term momentum effect, "doing business" report, CAPM, momentum profits

Short term momentum effects define that in the short term period, the recent past losers in the stock market will remain the losers and the recent past winners in the stock market will remain the winners. Winners will outperform the losers in a stock market. Under the momentum effect, stocks exhibit a price continuation. An investor exploits this "price continuation" behaviour of stocks and earns return by buying stocks that performed well in the past and short sells stocks that performed the worst in the past or by taking long positions in the winners' portfolios and going short in the losers' portfolios (Jegadeesh and Titman 1993; Chui et al. 2000; Griffin et al. 2003; Hong et al. 2003). It is also an empirically proven fact that the momentum lasts for 3 to 12 months (Hong et al. 2003; Emadzade et al. 2013) whereas, Griffin et al. (2003) argued that momentum profits can last over a horizon of 1 to 5 years. Good performing stocks are known as the "winners" whereas the worst performing stocks are known as the "losers".

Zoghlami (2013) also wrote that there is a huge disagreement over the sources of momentum profits. Hong et al. (2003) termed the explanation of momentum profits as a "mystery" and argued that the source of momentum profits is still an unresolved issue. Griffin et al. (2003) claimed the in the existing literature, many scholars have tried to explain the momentum from the risk based approach, behavioural approach or data mining, but they also claimed that,

based on the existing evidence, data mining is an unlikely explanation of the momentum effect. Risk based models have also not been helpful in explaining momentum profits. For instance, Jegadeesh and Titman (1993) showed that the market risk does not influence the momentum, Fama and French (1996) claimed that the Fama French three factor model was unable to explain the momentum, Grundy and Martin's (2001) conditional three factor risk model has only complicated the explanation of the puzzle. Chui et al. (2000) also claimed that based on the recent evidence, it is difficult to claim that the risk based models have explained profits of the momentum strategies.

Daniel et al. (1998) and Barberis et al. (1998) explained the momentum from the behavioural view point and the attributed momentum with the under-reaction and over-reaction of investors to the new information. But Hong et al. (2003) criticized them by arguing that behavioural biases have a universal application but still they cannot explain why the momentum existed in some countries and why it did not in other countries. Although these behavioural explanations have gained a great attention in this regard, they have been criticized heavily for their temporary nature and their disability to produce a reliable and testable hypothesis (Rubinstein 2000).

Therefore, Hong et al. (2003) tried to explain the momentum with a set of variables that falls under the

umbrella of the information dissemination network of a country. They choose 11 countries from across the globe and studied the relation of the momentum effect with the respective information dissemination networks of countries. The variables that were considered were the judicial system efficiency, the accounting standards quality, corporate disclosures, insider trading laws and the corruption perception index. They found that the economies, where the level of corruption is higher, experience the momentum effect which is weak in its nature. They also found that the variable that explained the momentum profits significantly was the corruption perception index and this variable was found to be strongly correlated with the momentum strategies. They also found that generally their results implied a link between the momentum and the information dissemination network of a country and the momentum returns are statistically insignificant when the insider trading laws are compromised, but they also found certain limitations to their study by writing that the power of their test is limited because of a small number of countries in the sample and they have limited data. In the end, they remarked that their study is not conclusive by any means.

The motivation of this paper mainly comes from the issue of the source of momentum profits. As mentioned above, that source of momentum profits is still a "mystery" and different studies are criticized and not conclusive by any means. So, the main objective of this paper is to seek the source of the momentum profits. The set of variables that has been chosen to explain the momentum profits falls under the category of "Business Indicators". These variables have been taken from the "Doing Business" report prepared by the World Bank. The variables are "Starting a Business" (SB), "Getting Credit" (GC), "Enforcing Contracts" (EC) and "Closing a business" (CB). The "Doing Business" report and variables have been discussed in the "Definitions" section. Their relationship will be examined with the "Momentum Profits" (MP) which is the dependent variable. Momentum profits are basically the average profits of winners-losers (W-L) portfolios of price momentum strategies. It will be examined whether the business indicators' variables contribute to the source of momentum profits or not, if yes, then up to what extent? Similarly, it will be also inspected whether the momentum profits have been explained by the variables or not. It will be of interest to see whether all variables or only some of them are statistically significant or not. It will also be seen which variable increases or decreases momentum profits. The primary objective of this paper is to seek the source of the momentum profits.

The secondary objective is to reaffirm the findings of the previous authors who have already found the existence of the momentum effect in the sample of countries and claimed that the risk based models cannot explain the momentum effect or momentum profits. The rest of the paper has a definitions section followed by the literature review, methodology, analysis and conclusion.

DEFINITIONS

The "Doing Business" report is prepared by the World Bank. The objective of this report is to provide the information to the investors about which country is friendlier in conducting a business. It also proposes reforms to the countries which can make their conditions more business friendly. It also provides information to the academics and journalists as well. They rank the countries after evaluating business indicators. Different business indicators have been used to assign ranking. Some of them are "Starting a Business", "Getting Credit", "Enforcing Contract", "Closing a Business" etc. They try to include as much economies as possible. The "Doing Business" project of the World Bank prepares a yearly report and publishes it. Since 2004, they have published 9 "Doing Business" reports that gave ranking to countries on the basis of different business indicators. For instance, for the years 2007, 2008, 2009, 2010, 2011 and 2012, the number of economies included was 175, 178, 181, 183, 183 and 183, respectively. Therefore, four business indicators have been chosen from the "Doing Business" report to seek the source of the momentum.

All variables have been defined in accordance with the "Doing Business" report of the World Bank.

"Starting a Business" calculates the cost of setting up a business. The scale of the business can be from a small scale business to a large scale limited company. It also estimates the time as well as the rules and procedure for setting up a new business in a country. The "Doing Business" report adopted a standardized procedure to include businesses from across the globe. Some important things that should be considered for inclusion of a business in the DB report are a 100% domestic ownership and the start-up capital should be 10 times the per capita income etc.

In the "Getting Credit", it measures to what extent the laws regarding collateral and bankruptcy facilitate the debtors. It also measures up to what extent the creditors have information on the potential debtors who want to obtain loans.

The variable "Enforcing Contract" measures the effectiveness of the judicial system regarding the

dispute of commercial nature. It measures the time, cost and legalities of a dispute. All such things are measured when a case is filed and these things are kept on being measured till the decision of the case.

"Closing a Business" measures the limitations of rules, regulations and procedures regarding bankruptcy. It also highlights the problems in the process that hinder the bankruptcy laws to be implemented for a long time.

LITERATURE REVIEW

This literature review discusses two papers. One is the Hong et al. (2003) paper and the other paper is by Chui et al. (2010). In the first paper, the authors explained the momentum effect with the information dissemination network of a country and the authors of the second paper explain the short term momentum effect from the cultural differences of countries i.e. individualistic societies vs. collective societies. Both papers are unique because the authors explained the momentum from sources other than the behavioural model or risk based models.

Hong et al. (2003) wrote a paper in which they tried to explain the source of momentum. They also developed a link between the short term momentum effect and the level of corruption of a country and another relationship between the momentum anomaly and the information dissemination network of a country. They took the stock exchanges of Australia, Canada, France, Germany, Hong Kong, Japan, Malaysia, Singapore, South Korea, Taiwan and the United Kingdom. The focus of this literature review will be on the momentum and its relation with the country's level of corruption and the information distribution network. Hong et al. (2003) have defined corruption in terms of how much the laws of the land give protection to the investor in the stock exchange and what the legislations on insider trading are. They also define the information dissemination network of country as the judicial system, accounting standards regarding corporate disclosures and the flexibility of laws regarding insider trading. The proxies they have used for the corruption and the information dissemination network are the efficiency of the judicial system, the scope of laws of the insider trading, the worth and class of accounting standards regarding the corporate disclosure information and the corruption perception index. They referred all the above terms as the "Institutional Features". They collected the data on the judicial efficiency and the accounting standard and adopted the methodology for the same two variables by following the paper of

La Porta et al. (1998). For the insider trading laws, they follow the work of Beny (1999), Mark Stamp and Carson Welsh, eds. 1996 and Emmanuel Gaillard, ed. 1992. The authors also believe that the corruption perception index can best explain the corruption level in a particular country. They develop a mechanism to define the corruption perception index in which they state that the countries are ranked according to the existing perceived level of corruption among politicians and civil servants. Hong et al. (2003) found that normally the countries found in a high level of corruption demonstrated weak momentum effects and a low investor protection. They also found that generally the momentum strategies are closely linked to the information distribution of a particular country. The authors concluded that the momentum effects are negatively correlated with the investor's level of protection and the investors do not follow the actions of others investors where the insider trading is free and the investors enjoy a low protection level. In these markets, stocks adjusted the price rapidly even when the information has not been made public and hence resulting in a weak short term momentum effect and the momentum profits became very low and almost economically insignificant when the insider traders and their associated parties have an unlimited access to private information.

Chui et al. (2010) took the momentum research further by examining cultural differences of countries and the momentum. They examine how cultural differences across countries influence the momentum profits within such countries. They measured cultural differences across countries through individualism. To measure individualism, they used the individualism index developed by Hofstede (2001). It meant that the individualism index can measure the cultural differences across different countries. The individualism index is connected to two biases, i.e. over-confidence and self-attribution. They were of the view that the risk based factor models or the risk based theories could not alone explain the momentum profits as the returns that were reported from the Stocks Market of the USA and Europe were approximately 12%, and a considerable amount of work had been done to explain the momentum phenomenon through the behavioural aspect. The authors argued that over-confidence and self-attribution are closely related to individualism and could play their role in generating the momentum profits. The authors' main focus is to examine whether the individualistic countries or collectivist countries generate momentum returns out of the overconfidence and self-attribution biases. They also examined whether it is an individualistic country that has produced the volatility and trading

volume of the collectivist's country. Hofstede from 1967 to 1973 prepared the Individualism Index. The index was created through a survey answered by the 88 000 employees of the IBM across the globe in 72 countries. They also took the market data. The USA stock market data was taken from the CRSP, whereas the data for 55 countries was taken from the DataStream. All domestic and foreign stocks were included from all the major stocks markets of the sampled countries. Since the momentum strategies work in portfolios, therefore, they have to take such stocks which had at least five years historical data and 30 stocks must be there every month. Therefore, in the end they are left with 41 countries and over 21 000 stocks and the sample period was from December 1996 to June 2003. In order to verify the authenticity of the individualism index as a proxy for the over-confidence bias and the self-attribution bias, they inspected to what extent the trading volume and variation could be explained by the individualism index across countries. They took other variables as well in their research work. Political risk is seen as the proxy for the liquidity costs by and Lesmond (2005), Eleswarapu and Venkataraman (2006) and Bekaert et al. (2007) therefore, a variable "Political" was introduced as a proxy to the political stability of a country and its source was the international country risk guide. Another variable was "Credit", which was the ratio of the cumulative private borrowings to GDP to measure the level of financial development as it was also done by Stulz and Williamson (2003). The "Insider" as a proxy of the insider trading was introduced to measure the insider trading and the measurement of this variable came from La Porta et al. (2006). Momentum portfolios were constructed by adopting the strategy of Jegadeesh and Titman (1993). They also tried to measure the honesty and the progress of financial stock markets and their relation to the institutional features of the same country. Their main idea was to see whether the information flow was improved and the trading cost was reduced if the market was honest and had integrity. In order to measure the progress and development of the financial market, a cumulative private credit to GDP ratio was used. An index was created under the name of the flow of capital restriction to measure the degree of investment in the markets by the foreign investment houses and institutions and that variable was given the name of the "Control". A dummy variable "Lang" was created which represented the average common language. This variable was also used by Chan et al. (2005), and Bekaert et al. (2007) respectively. They also measured to what extent the stock market is open.

They measured the openness by using a ratio and variable "Open". The ratio was the cumulative market capitalization of the S&P-IFC investable index to the market capitalization of the S&P-IFC global index of each country. They found through their results, that individualism was positively related to all such variables mentioned above, but the variable "Lang" was only statically significant and individualism did not reject the null hypothesis as the coefficients of all other variables were zero. They found that the short term momentum effect was consistent and powerful in the United States and the profits produced by the momentum strategies across the globe challenge the very existing literature of finance. They found that profits from the momentum portfolios were less risky in Japan and the South Asian countries, whereas they were risky in Europe. They also found that in few individualistic countries, the biases caused momentum profits. They found that different cultures have distinguished the impact on the momentum profits because in individualistic countries, the investors of their respective countries interpret the information according to their own thinking and culture. They also discovered that in collective culture countries the investors emphasized less on their own interpretation of the information and relayed heavily on the general opinion about the information which implied that the investors of such countries did not become the victims of the over-confidence or self-attribution, hence they did not make investment and earned less momentum profits. They found that the profits of momentum portfolios were related to the country focus variables and the relationship was significant. Individualism also has shared a significant relationship with the profits of momentum strategies. They concluded by writing that a future research can be done on the relationship between the earnings momentum and individualism which implied that a future research will be on the earnings momentum, style momentum or industry momentum strategies and their relationship with individualism.

## METHODOLOGY

Transformation of variables of countries' ranking into the scale of "Score"

In order to examine the relationship between the momentum profits (MP) and business indicators, the variables that have been chosen are Starting a Business (SB), Getting Credit (GC), Enforcing Contracts (EC) and Closing a Business (CB). Data on above variables are obtained from the "Doing Business" report

prepared and issued by the World Bank. The "Doing Business" report has been prepared by the World Bank since 2004. Data on the above variables are obtained from the "Doing Business" reports of 2007, 2008 2009, 2010, 2011 and 2012, because the earlier reports only provided the overall ranking of all variables for a particular country instead of providing the ranking of each variable for the same country. The following countries have been chosen for the purpose of the examination of the momentum profits relationship with the Business Indicators: Argentina, Austria, Brazil, China, Chile, Greece, India, Italy, Ireland, Mexico, New Zealand, Pakistan, Turkey and the USA. There are total 14 countries in sample. For example for Argentina, the separate ranking of all variables has been obtained for the year 2007, similarly, the separate ranking of all variables has been obtained for the year 2008–2012. It means that for Argentina, the variable "SB" has six different rankings for the year 2007–2012 and the same applies for other variables as well. Therefore, for all 14 countries, the respective rankings of all the variables shall be obtained for the year 2007–2012.

Countries with a higher ranking of variables among 183 countries are not regarded as good economies. For instance, for the variable "Getting Credit", a country with the ranking 144 indicates that obtaining a loan in that particular country is extremely difficult, but if the ranking for the same variable of a particular country is 44, it indicates that the advances can be obtained easily. A scale has been developed to transform the ranking of a country for a particular variable into some score for the ease so that the numbers can be used for the analysis. A scale of scores is constructed to give the rankings a score. For instance, the ranking from 1 to 9 shall be given a score of 0.5. It means that if a country's ranking is falling in the ranking of 1 to 9, it will be given the score of 0.5. "0.5" is a score which indicates that the economy of the country is good for the particular variable and vice versa. For instance, for the variable "Getting Credit", if a country has a ranking of 6, it will be given the score of 0.5; it indicates that the economy of country gives good conditions to obtain advances. If a country scores 9, it indicates that the economy of a country does not offer good conditions to obtain loans. The same scale is applicable for the other variables listed above.

Pictorial view of the "Scale" and "Score"
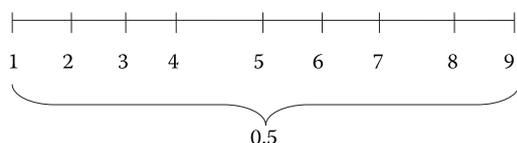
Numbers on the scale show the ranking of a country for a particular variable and "0.5" appearing below the parentheses is the score. Specimen for the rest of the scales and scores are as follows:

The above scales show the rankings of countries and the scores assigned for the each variable. Countries with the ranking of 180 and more shall be given 9.5 score. The lower is the ranking, the lower is the score, and the better are the conditions of the economy for the particular variable. The scores are ranging from 0.5 to 9.5. The "0.5" score shows a good performance and the 9.5 score shows the worst performance of a country for the particular variable.

Construction of the price momentum strategies

As the data of the variables above is yearly, so the price momentum strategy shall be used which gives the annual results. For instance, a j6k6 price momentum strategy can be constructed. A j6k6 momentum strategy is suitable to implement because the "scores" of the variables are yearly and a j6k6 strategy also gives annual returns because the portfolios are formed on the basis of six months ($j = 6$) and then they are held for another six months ($k = 6$) to get the returns. Moreover, the j6k6 strategy has been used by many scholars whenever they wanted to investigate the momentum effect for a large number of countries. For instance Chui et al. (2003) used the j6k6 momentum investment strategy when they analyzed eight Asian stock markets. Again Chui et al. (2010) adopted the j6k6 momentum investment strategy for 55 countries when they examined the relationship between the momentum and the individualism of societies. Hong et al. (2003) examined the momentum in the European markets and used the j6k6 strategy for the stock markets of 12 countries. Similarly, Griffin et al. (2005) examined 40 countries for the momentum effect and used the j6k6 price momentum investment strategy. From the review of the previous papers, it can be inferred that the j6k6 momentum strategy is useful when a sample has multiple countries.

To see the short term momentum phenomenon and its relationship with business indicators, monthly data of stock prices of 14 countries for the period starting from 31st December, 2002 to 31st December, 2012 will be downloaded from the DataStream. The stock prices are converted into returns because prices

are not unit-free but the returns are. For the return conversion, the following formula has been used

$$\text{Returns} = \frac{\text{Price}_t - \text{Price}_{t-1}}{\text{Price}_{t-1}} \times 100$$

where:
Price$_t$ = closing price
Price$_{t-1}$ = opening price

The methodology will be adopted which was used by Jegadeesh and Titman (1993). The main thing in the methodology is to construct the winners' portfolios and the losers' portfolios. To construct the winners and losers portfolios, all stocks listed on the respective stock exchanges' indices will be positioned according to deciles based on their previous "*j*"-month return at the end of each month. "*j*" stands for the formation period and it will be equal to 6 months. So, each month will give separate portfolios according to the time period of the formation period. Top 10 performing stocks will be declared as the winners' portfolios and the bottom 10 will be declared as the losers' portfolios. Then these portfolios will be held for k succeeding months. "*k*" is a holding period and equals to 6 months. So a j6k6 portfolio on July 1st, 2007 will show the performance of a portfolio from 31st December, 2006 to 30th of June, 2007 and it will be held until 31st December, 2007. Each portfolio will be constructed like the above. There are 84 j6k6 price momentum strategies constructed to get the momentum profits "MP". Momentum profits "MP" are obtained for every country for years 2007–2012. It means that for each country, 6 momentum strategies are run in order to have 6 yearly profits. For instance, for the country Argentina, 1st momentum strategy is run for the year 2007, 2nd momentum strategy is run for the year 2008, 3rd momentum strategy is run for the year 2009, 4th momentum strategy is run for the year 2010, 5th momentum strategy is run for the year 2011 and 6th momentum strategy is run for the year 2012 to get yearly momentum profits (MP) for years 2007, 2008, 2009, 2010, 2011 and 2012 respectively. Same methodology is applied to other 13 countries

to get MP. Each momentum strategy is constructed on the basis of the previous 5 years stock market data. For instance, the 2007 j6k6 momentum strategy is constructed on the basis of the stock market data for the time period of 31st December, 2002 to 31st December, 2007; similarly, the 2008 momentum strategy is constructed on the basis of the stock market data for the time period of 31st December 2003 to 31st December, 2008 and so on. It is done because a long time series is necessary to establish some statistical significance of the pervasiveness of the momentum effect and also only if one has a long time series, then one can make sure that the effect is free from the sample selection bias. The following table has been produced after the methodology (Apendix).

The data turns out to be panel data, then the following model has been formed and run to test the relationship. However, this model did not come in the following form directly. Different tests have been run and all statistical conditions have been fulfilled to get the model into the following from, which is fit to be used. The estimation and formation of the model is discussed in the next section.

$$\log \text{MP}_{it} = \alpha + \beta_1 \log \text{SB}_{it} + \beta_2 \log \text{EC}_{it} + \beta_3 \log \text{GC}_{it} + \beta_4 \log \text{CB}_{it} + \varepsilon_{it}$$

where:
i = country
t = time period
MP = Momentum Profits
SB   = Starting a Business
EC   = Enforcing Contracts
GC   = Getting Credit
CB   = Closing a Business

Model estimation

First of all, it needs to be examined that whether the relationship between the variables is linear or non-linear. The linearity of the variables has been
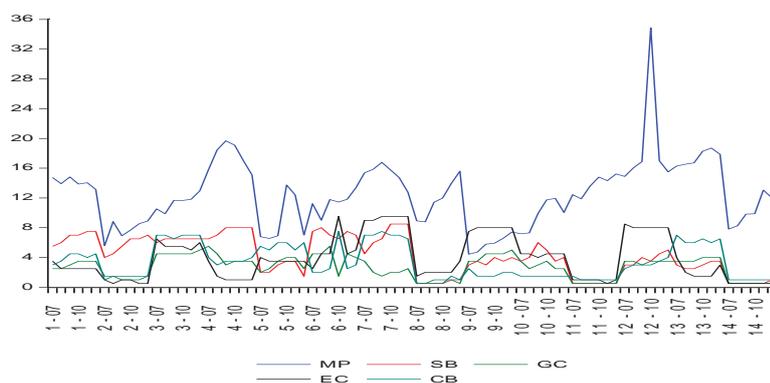

Figure 1. Non-linear relationship between the dependent and independent variables
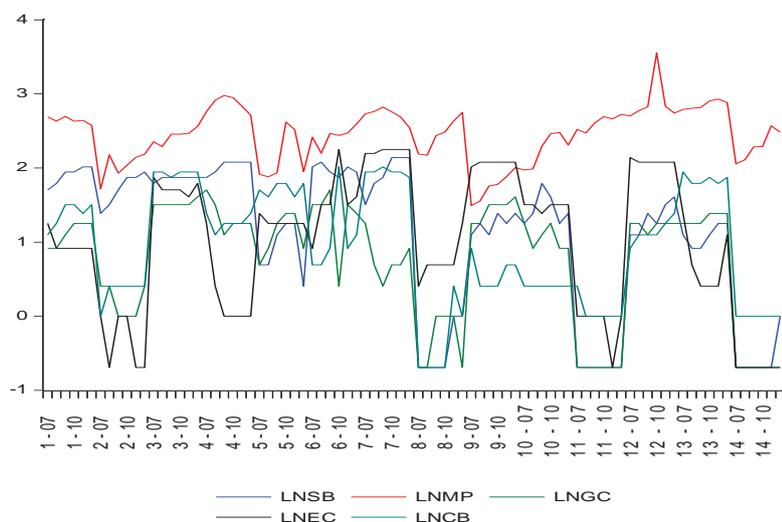
Source: Own calculations

Figure 2. Linear relationship between the dependent and independent variables

Source: Own calculations

checked through a graph and it was found that all variables share the non-linear relationship (Figure 1).

The horizontal axis has 14 countries for the time period of each country from 2007 to 2012, whereas the vertical axis has the values. It can be seen that the independent variable MP has started from 16, ended on 12 but achieved the highest peak at almost 34, whereas all other dependent variables ranges mostly from 4 to 8. In order to run the regression, the relationship should be linear. Therefore, log of all the variables have been taken and then the linearity of the all variables has been examined through a graph as evident from the Figure 2.

Similarly like in the previous graph, x axis has the 14 countries along with time period from 2007 to 2012 for each country. Y axis has the values. By looking at the graph, it is evident that the variables now share the linear relationship. The independent variable MP had the highest peak at 34 in the earlier graph but in this graph MP had started little below 3, ended also

Table 1. Pool data regression result

Dependent variable: LNMP

Method: Panel Least Squares

Date: 04/10/13 Time: 21:11

Sample: 2007−2012

Periods included: 6

Cross-sections included: 14

Total panel (balanced) observations: 84

Variable	coefficient	std. error	t-statistic	prob.
C	2.341052	0.065912	35.51786	0.0000
LNSB	−0.025585	0.068218	−0.375054	0.7086
LNGC	−0.057523	0.093147	−0.617558	0.5386
LNEC	−0.062339	0.053642	−1.162139	0.2487
LNCB	0.261959	0.069893	3.747985	0.0003
R-squared	0.166936	Mean dependent variable		2.454728
Adjusted R-squared	0.124756	S.D. dependent variable		0.372415
S.E. of regression	0.348411	Akaike info criterion		0.786812
Sum squared resid	9.589839	Schwarz criterion		0.931503
Log likelihood	−28.04610	Hannan-Quinn criter.		0.844977
F-statistic	3.957663	Durbin-Watson statistic		0.407210
Prob (F-statistic)	0.005588			

Source: Own calculations

Table 2. Chow test result

Redundant Fixed Effects Tests

Equation: Untitled

Test cross-section fixed effects

Effects test	statistic	d.f.	prob.
Cross-section F	19.653006	(13,66)	0.0000
Cross-section χ2	132.997943	13	0.0000

Source: Own calculations

below 3 and attained the highest peak in between 3 and 4, whereas all other dependent variables mostly fall between 1 and 2. No variables touched the negative values. This shows that after taking log, the variables share the linear relationship and now the regression can be run between the independent and dependant variables.

Panel data can be defined as the data which has more than one dimension and measured over time regularly and it includes manifold items and observations of similar individuals, so this data contains 14 countries, 5 variables including dependent and independent variables and time period of 6 years for each country. Therefore, this data can be termed as the panel data. It is evident that the time series regression will not work on panel data. Therefore, multiple linear regressions will be run either for pool testing or panel testing. To decide whether the regression should be run as pool data or panel data, the following regression is run to examine the chow test. On the basis of the Chow test, it will be decided whether to run data for pool testing

Table 3. Panel Data Random Effects Result

Dependent Variable: LNMP

Method: Panel EGLS (Cross-section random effects)

Date: 04/11/13 Time: 13:51

Sample: 2007−2012

Periods included: 6

Cross-sections included: 14

Total panel (balanced) observations: 84

Swamy and Arora estimator of component variances

Variable	coefficient	std. error	t-statistic	prob.
C	2.225549	0.138665	16.04988	0.0000
LNSB	0.149370	0.088524	1.687341	0.0955
LNGC	0.055998	0.082501	0.678757	0.4993
LNEC	−0.101144	0.069238	−1.460810	0.1480
LNCB	0.126651	0.093060	1.360958	0.1774
effects specification				
			S.D.	Rho
Cross-section random			0.352264	0.8062
Idiosyncratic random			0.172712	0.1938
weighted statistics				
R-squared	0.121621	Mean dependent variable		0.481784
Adjusted R-squared	0.077146	S.D. dependent variable		0.184271
S.E. of regression	0.177020	Sum squared residual		2.475556
F-statistic	2.734600	Durbin-Watson stat statistic		1.315671
Prob (F-statistic)	0.034607			
unweighted statistics				
R-squared	−0.057472	Mean dependent variable		2.454728
Sum squared resid	12.17312	Durbin-Watson statistic		0.267558

Source: Own calculations

Table 4. Haushman Test Result

Correlated Random Effects – Hausman Test

Equation: Untitled

Test cross-section random effects

Test summary	χ2 statistic	χ2 d.f.	Prob.
Cross-section random	7.990364	4	0.0919

Source: Own calculations

or panel testing. Therefore, the following regression model is run in *E* views.

$$\log \mathrm{MP}_{it} = \alpha + \beta_1 \log \mathrm{SB}_{it} + \beta_2 \log \mathrm{EC}_{it} + \beta_3 \log \mathrm{GC}_{it} + \beta_4 \log \mathrm{CB}_{it} + \varepsilon_{it}$$

After running, the above results are obtained and tested for the Chow test to decide whether to go for pool data testing or panel data testing (Table 2).

The results of the Chow test are interesting. The value of *F* is 19.65, which is statistically significant and the probability is very low, which means that the results are clearly denying the pool testing of data and suggesting that the panel testing of the data under the multiple linear regression should be carried out.

Under the panel testing, the model needs to be examined for random effects and fixed effects before achieving the main results. Once the random effects validate that the model is capable of running regression with fixed effects, only then the results will be obtained and interpreted through the multiple linear regression with fixed effects under the panel testing. The model has been run for random effects and the following output is obtained (Table 3).

The Table 4 will be tested for the Hausman test. Basically, the Hausman test will validate whether the model can be run with fixed effects or not.

By looking at the results, it is evident that this model can be run under multiple linear regressions with fixed effects. The χ2 value is 8 which is significant at 9%. Now the model is fit to be run after fulfilling all statistical conditions. Then the regression function has been run and the following final table has been produced for the analysis (Table 5).

Table 5. Panel Data Fixed Effects Result

Dependent Variable: LNMP

Method: Panel Least Squares

Date: 04/10/13 Time: 21:20

Sample: 2007−2012

Periods included: 6

Cross-sections included: 14

Total panel (balanced) observations: 84

Variable	coefficient	std. error	*t*-statistic	prob.
C	1.929968	0.167141	11.54695	0.0000
LNSB	0.304899	0.108171	2.818685	0.0064
LNGC	0.146688	0.097952	1.497548	0.1390
LNEC	−0.048002	0.084425	−0.568582	0.5716
LNCB	0.125559	0.111949	1.121570	0.2661
effects specification				
Cross-section fixed (dummy variables)				
R-squared	0.828976	Mean dependent variable		2.454728
Adjusted *R*-squared	0.784925	S.D. dependent variable		0.372415
S.E. of regression	0.172712	Akaike info criterion		-0.486973
Sum squared resid	1.968743	Schwarz criterion		0.033916
Log likelihood	38.45287	Hannan-Quinn criterion		-0.277580
F-statistic	18.81833	Durbin-Watson statistic		1.714178
Prob (*F*-statistic)	0.000000			

Source: Own calculations

CAPM estimation

It will also be examined whether the returns are explained by the CAPM model or not. For this purpose, the analysis of beta will be required. The CAPM model will be used to analyze the beta of j6k6 momentum portfolio. The CAPM model has been used by well-known researchers for this purpose. The following regression will be run for the CAPM regression in *E* views.

$$R_p - R_f = \alpha_p + \beta_p(R_m - R_f) + \varepsilon$$

where:
R_p = the monthly return of a portfolio
R_f = the risk free rate
R_m = the return on the stock market ndex
$R_p - R_f$ = excess return on the portfolio
$R_m - R_f$ = the risk premium
β_p = Portfolio Beta

Monthly data of market indices of all the sample countries have been downloaded from the DataStream for the period starting from 31st December, 2002 to 31st December, 2012. Risk free rates of all countries have also been downloaded from the DataStream for the same period. The risk free rates were downloaded annually, quarterly and bi-monthly. However, all rates have been converted to monthly returns to bring uniformity and for the ease of the analysis.

ANALYSIS

In this part, first of all the sources of the momentum will be discussed, and then the presence of the momentum and the CAPM explanation are argued (Table 5).

The results are the output of the regression model mentioned in the methodology section. It has been run as a regression of panel data testing under fixed effects. Through the results, it will be examined whether the source of the momentum profits has been found or not. In other words, from the results, it will be examined whether the independent variables have successfully explained the dependent variable or not. As mentioned in the paper above, the independent variables are the SB (starting a business), GC (getting credit), EC (enforcing contracts) and CB (closing a business), whereas the dependent variable is the MP (momentum profits). Through the output of model, it not only confirms whether these variables are behind the profits of the momentum, but it will also help in solving the riddle of the source of the momentum profits which stands still unresolved.

This model presents the overall view of the relationship. It sheds a general light on the relationship and tries to explain generally. It includes the data of 14 countries and contains all dependent and independent variables. However, this data is limited in the sense that it is for only 6 years. However, the overall model is significant. The value of *F*-stat is 18, which is significant even at 1% level of significance. The R^2 and adjusted R^2 have values of 82.89% and 78.49%, respectively. It is also known that R^2 shows to what extent the independent variables explain the dependent variable. It can be seen from the results that the only variable which is significant is the SB, which has a *t*-stat value of 2.81 and is significant at 1% level of significance, whereas other independent variables, for instance the GC, EC and CB, are not significant. The results show that the independent variable SB has been able to explain the momentum profits and it shares a positive relationship with the dependent variable MP. It means that the countries that have easy conditions for setting up a business or the countries that promote economic activity through starting a new business result in statistically significant momentum profits. This finding leads to an explanation that any country which is encouraging to set up new businesses or which has relaxed the conditions for starting new businesses is favourable for the implementation of momentum strategies in the stock market of that country. It also implies that the independent variable SB can explain the profits of momentum and it also contributes to the source of the momentum profits. The other independent variables GC, EC and CB have not been able to explain the momentum profits successfully or partially because they are not statistically significant. It leads to an interpretation that factors like getting credit, enforcing contracts and closing a business do not directly influence the momentum profits to a larger extent. They might have influence over momentum profits but it can be very minimal. For instance, momentum profits are not influenced by the country's conditions in obtaining loans or the advances to conduct businesses. It also implies that in a country where the conditions for obtaining credit are easy or hard, it does not affect the profits of the momentum in the stock market of that country. Similarly, the same expressions go for the other two variables according to the results. For instance, the conditions of enforcement of business contracts and closing of businesses do not affect the momentum profits of momentum strategies, if pursued in the stock market of the sample countries. In other words, if countries set up tougher conditions or lighter conditions, when it comes to enforcing businesses contracts and closing of businesses, it does not really impact

the profits of momentum in either way. Similarly, all three variables have not been able to explain the profits of momentum and do not contribute to the sources of the momentum as they are not significant or they might have a little influence in the contribution, but this influence is negligible.

It can be interpreted safely that the SB is relevant in explaining the profits of momentum and the SB and MP share a direct relationship with each other which means that if setting a business is easy in a country, than it is favourable to implement a momentum strategy in the stock market of that country. So it can be inferred from results that the SB has explained the source of the momentum profits to some extent. Whereas other independent variables EC, GC and CB do not share any relationship with the dependent variable i.e. the MP, in other words, the short term momentum effect, the momentum investment strategy and profits from the momentum investment strategies are not influenced by the country's conditions related to obtaining advances, implementation of business contracts and closing of business after bankruptcy. As the value of R^2 is 82.80%, it means that the dependent variables have been able to explain the independent variable up to 82.80% which is encouraging, but it must be remembered that this regression is run under fixed effects which shows that there must be some other phenomena that could have explained the momentum effect which are still hidden and may explain the momentum effect fully. For instance, the set of variable that fall under the category of "Governance Indicators" like the voice and accountability or rule of law, the control of corruption etc. can be the proxies to find the source of profits of the momentum.

Country by country analysis of momentum profits

In this part of the analysis, all momentum profits will be discussed individually. It will be examined whether the short term momentum effect exists in the stock market of sample countries in each year. Profits of the j6k6 momentum investment strategy have been examined, whether they are significant or not and to what extent they can result in good profits. It must be remembered that there are total 14 countries included in the sample and it is a mixture of emerging stock markets and developed countries (Apendix – General Table).

It is clear from the results that the short term momentum effect existed in all the stock markets of the countries included in the sample and all MPs were significant. So it reaffirms the findings of Jegadeesh and Titman (1993), Rouwenhorst (1998), Kang et al. (2002), Chui et al. (2003) and Griffin et al. (2005) who found the existence of the short term momentum effect in the stock markets of countries included in the sample.

Momentum profits and CAPM

It is believed that the short term momentum strategy potentially bears a risk which implies that it will earn higher returns (Hong et al. 2003). Therefore, Conrad and Kaul (1998), Moskowitz and Grinblatt (1999) and Naranjo and Porter (2006) explained the momentum from the standard risk based models. Different authors have used different risk models to explain the momentum returns. For instance the CAPM and the Fama French Three factors model have been used quite often to seek the explanation of momentum profits through the risk based approach (Fama and French 1996; Zoghlami 2011). The Capital Asset Pricing Model has been used extensively by many researchers to explain the source of the momentum. For instance the CAPM has been used by Jegadeesh and Titman (1993), Grundy and Martin (2001), Griffin et al. (2003) and Zoghlami (2011).

In this section of the analysis, it will be examined briefly whether the momentum profits are explained by the risk based approach i.e. the CAPM. The CAPM regression, which is mentioned in methodology section, has been run to examine the relationship of explanation between the momentum profits and the risk factor defined by Beta, because beta is defined as the responsiveness of the market or the risk attached to the momentum portfolio. A CAPM regression has been run for all the countries in the sample for six years separately to obtain the results. It must be remembered that the j6k6 momentum strategy has been implemented for all sample countries (Table 6).

There are 84 j6k6 price momentum investment strategies, which have been run for 14 countries, and as it is evident from the results, the CAPM has only been able to explain the momentum profits of for 18 momentum strategies, partially because the value of R^2 is very low which shows a weak strength of relationship between the dependent and independent variable. But the CAPM has been unable to explain the momentum profits of 66 price momentum strategies. Therefore, it reaffirms the findings of Jegadeesh and Titman (1993), Grundy and Martin (2001), Griffin et al. (2003) and Naranjo and Porter (2004), who found that the risk based models were unable to explain the momentum profits.

CONCLUSION

The primary aim is to find the source of the momentum through business indicators. The secondary objective is to reaffirm the findings of the previous authors who have already found the existence of the momentum effect in the sample of countries and claimed that the risk based models cannot explain the momentum effect or the momentum profits. There is an ample amount of evidence in the existing literature which claims that there are huge disagreements over the source of the momentum profits and it is termed as the "mystery". Jegadeesh and Titman (1993), Fama and French (1996) and Grundy and Martin's (2001) have tried to seek the explanation of the momentum through the risk based approach but the standard risk models have failed to explain the profits of momentum. Similarly Daniel et al. (1998) and Barberis et al. (1998) tried to associate the short term momentum effect with the over-reaction and under-reaction of investors, but Hong et al. (2003) criticized it by arguing that behavioural biases have universal application but still they cannot explain why the momentum existed in some countries and why not in some other ones and Rubinstein (2000) criticized them for their the temporary nature and their disability to produce a reliable and testable hypothesis.

From the analysis, it was found that it can be interpreted safely that the SB is relevant in explaining profits of the momentum and the SB and MP share a direct relationship with each other which means that if setting up a business is easy in a country, than it is favourable to implement a momentum strategy in the stock market of that country. So it can be inferred from the results that the SB has explained the source of the momentum profits to some extent. Whereas other independent variables EC, GC and CB do not share any relationship with the dependent variable i.e. MP, in other words, the short term momentum effect, momentum investment strategy and the profits from the momentum investment strategies are not influenced by the country's conditions related to obtaining advances, the implementation of business contracts and closing of business after bankruptcy. However, the power of the test is limited because the number of countries included in the sample is only 14 and the variables are only 4. Similarly, there is only the data for 6 years available for each country. Therefore, it is not a conclusive study and other factors, for instance the set of variable that fall under the category of "Governance Indicators", like voice and accountability or the rule of law, the control of corruption etc. can be the proxies to find the source of the profits of momentum.

Appendix

General table: Variables' score and momentum profits

	Year	SB	GC	PI	PT	EC	CB	MP	*t*-stat of MP
Argentina	2007	5.5	2.5	5	8.5	3.5	3	14.74	28.78
	2008	6	2.5	5	7.5	2.5	3.5	13.92	38.97
	2009	7	3	5.5	7	2.5	4.5	14.83	50.91
	2010	7	3.5	5.5	7.5	2.5	4.5	13.87	61.14
	2011	7.5	3.5	5.5	7.5	2.5	4	14.04	48.53
	2012	7.5	3.5	6	7.5	2.5	4.5	13.15	38.37
Austria	2007	4	1.5	7.5	5.5	1	1	5.57	51.53
	2008	4.5	1.5	6.5	4.5	0.5	1.5	8.82	14.02
	2009	5.5	1	6.5	5	1	1.5	6.90	23.25
	2010	6.5	1	7	5.5	1	1.5	7.66	23.39
	2011	6.5	1	7	5.5	0.5	1.5	8.54	24.38
	2012	7	1.5	7	4.5	0.5	1.5	8.90	23.95
Brazil	2007	6	4.5	3.5	8	6.5	7	10.53	43.67
	2008	6.5	4.5	3.5	7	5.5	7	9.87	45.74
	2009	6.5	4.5	4	7.5	5.5	6.5	11.67	41.82
	2010	6.5	4.5	4	8	5.5	7	11.66	42.63
	2011	6.5	4.5	4	8	5	7	11.82	30.90
	2012	6.5	5	4	8	6	7	12.96	24.07
China	2007	6.5	5.5	4.5	8.5	3.5	4	15.81	13.21
	2008	7	4.5	4.5	8.5	1.5	3	18.44	23.43
	2009	8	3	4.5	7	1	3.5	19.67	30.87
	2010	8	3.5	5	7	1	3.5	19.09	28.24
	2011	8	3.5	5	6	1	3.5	17.07	35.71
	2012	8	3.5	5	6.5	1	4	15.09	42.71

	Year	SB	GC	PI	PT	EC	CB	MP	*t*-stat of MP
Chile	2007	2	2	1	2	4	5.5	6.78	35.45
	2008	2	2.5	2	2	3.5	5	6.55	41.58
	2009	3	3.5	2	2.5	3.5	6	6.92	41.00
	2010	3.5	4	2.5	2.5	3.5	6	13.75	21.34
	2011	3.5	4	1.5	2.5	3.5	5	12.41	19.22
	2012	1.5	2.5	1.5	2.5	3.5	6	7.01	31.25
Greece	2007	7.5	4.5	8	5.5	2.5	2	11.21	55.08
	2008	8	4.5	8	4.5	4.5	2	9.01	14.51
	2009	7	5.5	8	3.5	4.5	2.5	11.78	50.50
	2010	6.5	1.5	2	8.5	9.5	7.5	11.46	47.78
	2011	7.5	4.5	8	4	4.5	2.5	11.82	45.75
	2012	7	4	8	4.5	5	3	13.37	34.67
India	2007	4.5	3.5	2	8	9	7	15.36	35.87
	2008	6	2	2	8.5	9	7	15.86	30.96
	2009	6.5	1.5	2	8.5	9.5	7.5	16.79	34.50
	2010	8.5	2	2.5	8.5	9.5	7	15.75	28.04
	2011	8.5	2	2.5	8.5	9.5	7	14.73	21.15
	2012	8.5	2.5	2.5	7.5	9.5	6.5	12.76	24.27
Ireland	2007	0.5	0.5	0.5	0.5	1.5	0.5	8.93	34.52
	2008	0.5	0.5	0.5	0.5	2	0.5	8.78	39.23
	2009	0.5	1	0.5	0.5	2	0.5	11.44	18.97
	2010	0.5	1	0.5	0.5	2	0.5	11.98	20.22
	2011	1	1	0.5	0.5	2	1.5	13.95	25.37
	2012	1	0.5	0.5	0.5	3.5	1	15.61	28.94
Italy	2007	3	3.5	4.5	6	7.5	2.5	4.45	41.99
	2008	3.5	3.5	3	6.5	8	1.5	4.73	44.46
	2009	3	4.5	3	6.5	8	1.5	5.79	28.30
	2010	4	4.5	3	7	8	1.5	5.93	28.72
	2011	3.5	4.5	3	6.5	8	2	6.59	36.12
	2012	4	5	3.5	7	8	2	7.43	38.44
Mexico	2007	3.5	3.5	2	6.5	4.5	1.5	7.19	29.67
	2008	4	2.5	2	7	4.5	1.5	7.29	29.91
	2009	6	3	2	7.5	4	1.5	9.92	22.79
	2010	5	3.5	2.5	5.5	4.5	1.5	11.72	25.69
	2011	3.5	2.5	2.5	5.5	4.5	1.5	11.95	22.38
	2012	4	2.5	2.5	5.5	4.5	1.5	10.05	23.51
New Zealand	2007	0.5	0.5	0.5	1	1	1.5	12.44	54.65
	2008	0.5	0.5	0.5	0.5	1	1	11.87	52.18
	2009	0.5	0.5	0.5	1	1	1	13.58	26.13
	2010	0.5	0.5	0.5	0.5	1	1	14.81	22.80
	2011	0.5	0.5	0.5	1.5	0.5	1	14.34	23.08
	2012	0.5	0.5	0.5	2	1	1	15.23	30.94
Pakistan	2007	3	3.5	1	7.5	8.5	2.5	14.90	39.48
	2008	3	3.5	1	7.5	8	3	16.05	27.54
	2009	4	3	1.5	6.5	8	3	16.90	28.82
	2010	3.5	3.5	1.5	7.5	8	3	34.86	9.69
	2011	4.5	3.5	1.5	7.5	8	3.5	17.00	25.07
	2012	5	3.5	1.5	8	8	4	15.51	34.98
Turkey	2007	3	3.5	3.5	3.5	4	7	16.28	42.62
	2008	2.5	3.5	3.5	3	2	6	16.54	46.87
	2009	2.5	3.5	3	3.5	1.5	6	16.71	53.45
	2010	3	4	3	4	1.5	6.5	18.29	28.05
	2011	3.5	4	3	4	1.5	6	18.70	30.62
	2012	3.5	4	3.5	4	3	6.5	17.86	25.47
USA	2007	0.5	0.5	0.5	3.5	0.5	1	7.82	52.52
	2008	0.5	0.5	0.5	4	0.5	1	8.26	47.86
	2009	0.5	0.5	0.5	2.5	0.5	1	9.83	22.79
	2010	0.5	0.5	0.5	3.5	0.5	1	9.88	21.89
	2011	0.5	0.5	0.5	3.5	0.5	1	13.05	17.57
	2012	1	0.5	0.5	4	0.5	1	11.99	14.92

Source: Own calculations

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