

Valuation of Intangibles

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EXECUTIVE SUMMARY

The accounting regulations for financial reporting of intangible assets differ across countries. As a result there may be a difference in the manner in which the investors take the value of intangible assets in to consideration while valuing the stock prices. In my thesis, I shall test if there is a relationship between the Valuation of intangibles and Accounting of Intangibles across various countries, namely, US, UK, Germany and Japan.

Given that the regulations for the reporting of Intangibles vary across U.S., U.K, Germany and Japan, I would like to investigate the manner in which the investors from these respective countries take the intangibles on Balance Sheet and the Research & Development costs on the Income Statement in to consideration while valuing stock prices. *In a country where the costs on Intangibles are expensed, I expect to see the investors give more importance to the Research & Development costs on the Income Statement (when compared to the Intangibles on the Balance Sheet) while valuing the stocks. Conversely, for the companies in a country where the costs on Intangibles are capitalized on to the Balance Sheet, I expect to find the investors give more importance to the Intangibles on the Balance Sheet while valuing stock prices.*

I will find the significance of the Research & Development costs and the Intangibles on the Balance Sheet using regression techniques. If I am successful in finding a relationship between the Valuation of Intangibles and the Accounting of Intangibles then I shall discuss how Valuation methods should be logically used across various countries and industries. As a part of my thesis, I also tried to explain how the

investors across various countries value intangibles differently and as a result the investors should keep this in mind while investing across borders.

My Analysis can be divided in to four categories - summarizing accounting regulations, construction of hypotheses, collection & organization of data and regressing the data. Firstly, I made note of the accounting regulations with regard to Intangibles across US, UK, Germany and Japan. My primary sources for the accounting regulations included various accounting textbooks and some professors across the world. Given the accounting regulations across these countries, I came up with a set of hypothesis for each of the countries. Using the rules I mentioned above in italics, my set of hypotheses for each of the countries are as follows:

US:

Hypothesis 1: For most of the industries in the US, costs on Intangibles are expensed. As a result, the investors while valuing US stock prices will give more importance to the Research & Development expenses on the income statement when compared to the Intangibles on the balance sheet.

Hypothesis 2: In the US, the Research & Development costs in Software, Oil, Gas and Computer industries can be capitalized. Hence, the influence of the Intangibles on the Balance Sheet of the companies in these industries should be more significant than the influence of the Research & Development expense in the valuation of stock prices.

UK:

Hypothesis 3: In the UK, Research expenditures are generally written off immediately against current earnings, whereas the Development costs can be capitalized if they fulfill

a number of requirements. *As a result, the influence of both the Research & Development costs as well as the Intangibles should be significant in the valuation of British stocks.*

Germany:

Hypothesis 4: In Germany, Research & Development costs are expensed as incurred with few exceptions. In essence, the Balance sheets for the German companies consist of purchased intangibles and very few internally generated intangibles. Hence, the influence of Research & Development costs on the Income Statement should be more significant than the influence of the Intangibles on the Balance Sheet in the valuation of German stocks.

Japan:

Hypothesis 5: In Japan, the companies were allowed to capitalize the Research & Development costs prior to 1999. Hence, the influence of Intangibles on the valuation of Japanese stocks should be more significant than the influence of the Research & Development costs.

The next step involved collection of financial and market data for US, UK, Germany and Japan. I had collected data from 1991 to 2001. For the US, both the market as well as the financial data was available on Compustat in the SAS Dataset format. As for UK, Germany and Japan, I acquired the market data from Global Issue and the financial data from Global Industrial/Commercial Database in SAS Dataset format. In order to combine or merge the market and financial data in to one dataset, I performed SAS programming functions.

After the collection and organization of data, I had to observe the significance of Research & Development costs on Income Statement and the Intangibles on Balance

Sheet in the valuation of stocks. Hence, I ran a regression with the stock price as the dependent variable and various items on the financial statements as well as the Research & Development costs (on income statement) and Intangibles (on Balance Sheet) as the dependent variables. I repeated this process for each of the countries. I conducted the regressions using the Regression functions in SAS Programming. Based on the results that I had derived for each of the countries, I had validated the Hypotheses that I constructed. The validation of Hypotheses mainly involved the use of T-test and the Coefficient in order to see the influence of Research & Development and Intangibles on stock price.

Apart from running a regression for each of the countries, I also ran a common regression for all the countries. I used dummy variables in order to represent the Intangibles and Research & Development across the various countries. This common regression will help me to compare the influence of Research & Development costs on Income Statement and the Intangibles on Balance Sheet on stock prices across countries.

After I was successful in validating almost all of my hypotheses, I concluded that Accounting of intangibles has an influence on the Valuation of Intangibles. As a result, I mentioned that it would be a naïve approach to use similar valuation models while valuing stock prices across countries. I also recognized some of the flaws in using similar models across various countries. In particular, I examined the comparables valuation method using P/E ratio and Market Value / Book Value ratio to make my point.

I used the results of the common regression to prove that the investors across different borders value intangibles differently. Hence, the investors need to keep this in mind while carrying cross-border investments.

Valuation of Intangibles

ABSTRACT

The accounting regulations for financial reporting of intangible assets differ across countries. As a result there may be a difference in the manner in which the investors take the value of intangible assets in to consideration while valuing the stock prices. In my thesis, I shall test if there is a correlation between the Valuation of intangibles and Accounting of Intangibles across various countries, namely, US, UK, Germany and Japan. Given that the regulations for the reporting of Intangibles vary across U.S., U.K, Germany and Japan, I would like to investigate the manner in which the investors from these respective countries take the intangibles on Balance Sheet and the Research & Development costs on the Income Statement in to consideration while valuing stock prices. In a country where the costs on Intangibles are expensed, I expect to see the investors give more importance to the Research & Development costs on the Income Statement (when compared to the Intangibles on the Balance Sheet) while valuing the stocks. Conversely, for the companies in a country where the costs on Intangibles are capitalized on to the Balance Sheet, I expect to find the investors give more importance to the Intangibles on the Balance Sheet while valuing stock prices. If I am successful in finding the relationship between the Valuation of Intangibles and the Accounting of Intangibles then I shall discuss how Valuation should be sensibly done across various countries and industries.

1. Introduction

Given the different accounting regulations for financial reporting of intangible assets across countries, there may be a difference in the manner in which the investors take the value of intangible assets in to account while valuing the stock prices. In my thesis, I shall see if there is a correlation between the Valuation of intangibles and Accounting of Intangibles across various countries, namely, US, UK, Germany and Japan.

Investors usually take the items on the financial statements in to consideration while valuing stocks. Given that the regulations for the reporting of Intangibles vary across U.S., U.K, Germany and Japan, I would like to investigate the manner in which the investors from these respective countries take the intangibles on Balance Sheet and the Research & Development costs on the Income Statement in to consideration while valuing stock prices.

In a country where the costs on Intangibles are expensed, I expect to see the investors give more importance to the Research & Development costs on the Income Statement (when compared to the Intangibles on the Balance Sheet) while valuing the stocks and vice-versa for the countries that allow capitalization of Research & Development costs. For example: For most of the industries in the US, costs on Intangibles are expensed. If there is a correlation between the Valuation of Intangibles and the Accounting of Intangibles, the investors while valuing stock prices might give more importance to the Research & Development expense on the Income Statement when compared to the Intangibles on the Balance Sheet. In order to validate this, I will determine the influence of Research & Development expenditures and Intangibles by

running a regression with the Stock prices as the dependent variable and various accounting variables including Research & Development expense on Income Statement and Intangibles on Balance Sheet as the independent variables.

I choose to investigate US, UK, Germany and Japan because these four countries are Research & Development intensive. Check *Table 1* to see the Research & Development expenditure as a percentage of the GDP for the four countries. As you can observe in *Table 1*, Japanese companies spent 3.0% of the GDP on Research & Development in the year 1999. Similarly, US, Germany and UK spent 2.5%, 2.3% and 1.7% of GDP respectively.

2. Research Design

In this section, I have described the process of my Analysis. My Analysis can be divided in to four categories - summarizing accounting regulations, construction of hypotheses, collection & organization of data and regressing the data.

2.1 Summarizing Accounting Regulations:

Firstly, I made note of the accounting regulations with regard to Intangibles across US, UK, Germany and Japan. This process entailed going through the accounting regulations across various countries and making a summary of them. My primary sources for the accounting regulations included various accounting textbooks and some professors across the world.

2.2 Construction of Hypotheses:

Given the accounting regulations across these countries, I came up with a set of hypothesis for each of the countries. For countries that allow capitalization of Research &

Development costs, I expect to see the intangibles (on Balance Sheet) to be very significant in the valuation of stocks. On the other hand, for the countries that do not allow capitalization of Research & Development costs, I expect to see the Research & Development costs (on the income statement) to be very significant in the valuation of stocks.

2.3 Collection & Organization of Data:

The next step involved collection of financial and market data for US, UK, Germany and Japan. I had collected data from 1991 to 2001. For the US, both the market as well as the financial data was available on Compustat in the SAS Dataset format. As for UK, Germany and Japan, I acquired the market data from Global Issue and the financial data from Global Industrial/Commercial Database in SAS Dataset format. In order to combine or merge the market and financial data in to one dataset, I performed some SAS programming functions.

2.4 Regressing the Data:

After the collection and organization of data, I had to observe the significance of Research & Development costs and the Intangibles in the valuation of stocks. Hence, I ran a regression with the stock price as the dependent variable and various items on the financial statements as well as the Research & Development costs (on income statement) and Intangibles (on Balance Sheet) as the dependent variables. I repeated this process for each of the countries. I had performed this function using the Regression functions in SAS Programming. Based on the results that I had derived for each of the countries, I had validated the Hypotheses that I constructed. The validation of Hypotheses mainly involved the use of T-test and the Coefficient in order to see the influence of Research &

Development and Intangibles on stock price. A sample regression model for each of the country looks like the following:

$$\text{Stock Price} = \text{Intercept} + X_1 \text{ Asset} + X_2 \text{ Liabilities} + X_3 \text{ R\&D} + X_4 \text{ Intangibles} + X_5 \text{ Sales Growth Rate}$$

where X_i is the Coefficient

Apart from running a regression for each of the countries, I also ran a common regression for all the countries. I used dummy variables in order to represent the Intangibles and Research & Development across the various countries. This common regression will give a combined picture of the influence of Intangibles and Research & Development costs on the stock prices across the world. It will also help me to compare the influence of Research & Development costs on Income Statement and the Intangibles on Balance Sheet across various countries. The regression model looks like the following:

$$\text{Stock Price} = \text{Intercept} + X_1 \text{ Assets} + X_2 \text{ Liabilities} + X_3 \text{ Sales Growth Rate}$$

$$+ X_4 \text{ R\&D} + X_5 \text{ Intangibles} + X_6 \text{ UK R\&D} +$$

$$X_7 \text{ UK Intangibles} + X_8 \text{ Germany R\&D} + X_9 \text{ Germany Intangibles}$$

$$+ X_{10} \text{ Japan R\&D} + X_{11} \text{ Japan Intangibles}$$

where X_1 to X_5 are coefficients and X_6 to X_{11} are incremental coefficients.

3. Accounting Regulation across Various Countries

In this section, I shall look at the accounting regulations for intangibles across US, UK, Germany and Japan.

3.1 US:

In the US, Research & Development expenditures are expensed as incurred. However, there is an exception to this rule for the Software, Oil, Gas and Computer Industries. The companies in these industries can capitalize their expenditures on Research & Development as Intangibles on the Balance Sheets and they should be amortized over the years.

Hence, the intangibles on the Balance sheet for the US companies consist of purchased intangibles and in the case of Software, Oil, Gas and Computer Industries they also consist of capitalized Research & Development costs.

3.2 UK:

In the UK, Research expenditures are generally written off immediately against current earnings, whereas the Development costs can be capitalized if they fulfill a number of requirements concerning the technical and commercial feasibility of the project to which they are related. Capitalized development costs would be written off over their expected economic life or a maximum of 20 years, unless the capitalized asset's durability can be established, in which case no amortization may be required. ⁽¹⁾

Hence, the intangibles on the Balance Sheets of UK companies consist of capitalized development costs and externally purchased intangibles. The companies in UK can also write up the intangibles (except for goodwill) on the Balance Sheet. ⁽¹⁾

(1). Financial Reporting Practices and Contexts, Chapter 7, pp. 248

3.3 Germany:

In Germany, Research & Development expenditures are expensed as incurred. However, both the Research & Development expenditures can be capitalized if they are specific to a product, which is in the beginning stage of manufacturing process. ⁽²⁾

In essence, the Balance sheets for the German companies consist of purchased intangibles and few internally generated intangibles. ⁽²⁾

3.4 Japan:

In Japan, the companies are required to expense the Research & Development expenditures since April 1999. Prior to April 1999, some of the Research & Development costs were allowed to be capitalized. The capitalized Research & Development costs were required to be amortized over a period of 5 years. ⁽³⁾

3.5 Summary of Accounting Regulations:

Country	Research & Development Costs	Intangibles
US	Expensed as incurred except for Software, Oil, Gas & Computer Industries	Purchased Intangibles and in-house generated intangibles for Software, Oil, Gas & Computer Industries
UK	Research costs are expensed, Development costs capitalized if they fulfill some requirements	Purchased Intangibles and capitalized Development costs. Intangibles can be written up except for good will
Germany	Expensed as incurred; unless they are specific to product which is in the beginning stage of manufacturing process	Purchased Intangibles and capitalized product-specific & beginning of stage R&D expenses.
Japan	Expensed as incurred (after 1999); Capitalization of R&D costs with some requirements (prior to 1999)	Purchased Intangibles and Capitalized R&D costs prior to 1999

(2) Financial Reporting Practices and Contexts, Chapter 8, pp.300

(3) Professor. Yoshiro Ito, Takushoku University, Japan

4. Hypotheses

As mentioned earlier, for countries that allow capitalization of Research & Development costs, I expect to see the influence of Intangibles (on Balance Sheet) to be more significant than the influence of Research & Development costs (on Income Statement) in the valuation of stocks. Conversely, for the countries that do not allow capitalization of Research & Development costs, I expect to see the influence of Research & Development costs (on the income statement) to be more significant than the influence of Intangibles (on Balance Sheet) in the valuation of stocks.

As mentioned earlier, I shall determine the influence of Intangibles on Balance Sheet and the Research & Development costs on the Income Statement by running a regression with the stock price as the dependent variable and various accounting variables including Research & Development and Intangibles as the independent variables.

Given the accounting regulations, the following are the hypotheses for each of the countries:

4.1 US:

Hypothesis 1: For most of the industries in the US, costs on Intangibles are expensed. As a result, the investors while valuing US stock prices will give more importance to the Research & Development expenses on the income statement when compared to the Intangibles on the balance sheet.

Hypothesis 2: In the US, the Research & Development costs in Software, Oil, Gas and Computer industries can be capitalized. Hence, the influence of the Intangibles on the Balance Sheet of the companies in these industries should be more significant than the influence of the Research & Development expense in the valuation of stock prices.

4.2 UK:

Hypothesis 3: In the UK, research expenditures are generally written off immediately against current earnings, whereas the Development costs can be capitalized if they fulfill a number of requirements. *As a result, the influence of both the Research & Development costs as well as the Intangibles should be significant in the valuation of British stocks.*

4.3 Germany:

Hypothesis 4: In Germany, Research & Development costs are expensed as incurred with few exceptions. In essence, the Balance sheets for the German companies consist of purchased intangibles and very few internally generated intangibles. *Hence, the influence of Research & Development costs on the Income Statement should be more significant than the influence of the Intangibles on the Balance Sheet in the valuation of German stocks.*

4.4 Japan:

Hypothesis 5: In Japan, the companies are required to expense the Research & Development expenditures since 1999. Prior to 1999, the Research & Development costs were allowed to be capitalized. *Hence, the influence of Intangibles on the valuation of Japanese stocks should be more significant than the influence of the Research & Development costs.*

4.5 Common Regression:

Hypothesis 6: Given the accounting regulations across the four countries and the stock prices & financial data of the companies in all four countries, *the Research & Development costs on the Income Statements should be significant in the valuation of stock prices in the case of the US, UK and German companies. On the other hand, the*

Intangibles on the Balance sheets should have a significant influence on the valuation of stock prices in the case of the UK and Japanese companies. A common regression for all the four countries will also help me to compare the influence of Research & Development costs on Income Statement and the Intangibles on Balance Sheet across various countries.

5. Validation of Hypotheses

5.1 US:

Hypothesis 1: *The investors while valuing US stock prices will give more importance to the Research & Development expenses on the income statement when compared to the Intangibles on the balance sheet.*

In order to confirm this hypothesis, I ran a regression with the Price as the dependent variable and Assets, Liabilities, Research & Development, Intangibles and Sales Growth Rate as the independent variables. In order to make the dependent and the independent variables consistent, I divided the independent variables by the common shares outstanding. *Table 2* presents the descriptive statistics of the variables used in the regression. The mean of the stock prices is 18.79 and the mean of the Research & Development and Intangibles is 0.26 and 1.57 respectively. The results of the regression can be found in *Table 6* as model 1.

As it can be observed in the results for model 1 in *Table 6*, the coefficient for R&D is 5.57 with a t-statistics of 56.3. On the other hand, the coefficient for intangibles is 1.42. Hence the considerably great coefficient proves that the Research & Development costs on the income statements have a big influence on the US stock prices.

Hypothesis 2: *The influence of the Intangibles (on the Balance Sheet of the companies in the Oil, Gas, Computer and Software industries) should be more significant than the influence of the Research & Development expense in the valuation of stock prices.*

Computer & Software

In order to study the influence of Intangibles and Research & Development costs on the stock prices of Computer & Software industries, I created the dummy variables Sic35 and Sic73. Sic35 is equal to 1 if a company is in the Computer and Sic73 is equal to 1 if a company is in the Software industry. $R\&D \cdot sic35$ is the incremental coefficient for the Research & Development costs if a firm is in the Computer industry. $R\&D \cdot sic73$ is the incremental coefficient for the Research & Development cost if a firm is in the Software industry. Similarly, $Intangibles \cdot sic35$ is the incremental coefficient for Intangibles if a firm is in the Computer industry. $Intangibles \cdot sic73$ is the incremental coefficient for the Intangibles if a firm is in the Software industry.

Hence, I ran a regression with the Price as the dependent variable and Assets, Liabilities, Research & Development in general, Intangibles in general, Sales Growth Rate and the above mentioned dummy variables as the independent variables. In order to make the dependent and the independent variables consistent, I divided the independent variables, namely assets, liabilities, Research & Development and Intangibles by the common shares outstanding. *Table 2* presents the descriptive statistics of the variables used in the regression. And the results of the regression can be found in *Table 7* as model 1.

The results for the regression show that the variable Research & Development has a considerably high coefficient and significance. However, the incremental coefficients

for $R\&D*sic35$ is negative while the coefficient for $Intangibles*sic35$ is faintly negative and significant. This validates the hypothesis that Research & Development costs on the Income Statement do not have a significant influence in the valuations of stocks in the Computer industry. For the companies in the Software industry, both the $R\&D*sic73$ and $Intangibles*sic73$ were insignificant. The Intangibles might be insignificant because of the presence of goodwill. Investors do not take good will in to consideration and as a result the Intangibles may not be significant in the valuation of stocks in the Software industry.

Oil & Gas

In order to study the influence of Intangibles and Research & Development costs on the stock prices of Oil & Gas industries, I created the dummy variables $Sic13$. $Sic13$ is equal to 1 if a company is in the Oil or Gas industry. $R\&D*sic13$ is the incremental coefficient for the Research & Development costs if a firm is in the Oil or Gas industry. Similarly, $Intangibles*sic13$ is the incremental coefficient for Intangibles if a firm is in the Oil or Gas industry.

Hence, I ran a regression with the Price as the dependent variable and Assets, Liabilities, Research & Development in general, Intangibles in general, Sales Growth Rate and the above mentioned dummy variables as the independent variables. In order to make the dependent and the independent variables consistent, I divided the independent variables, namely assets, liabilities, Research & Development and Intangibles by the common shares outstanding. *Table 2* presents the descriptive statistics of the variables used in the regression. And the results of the regression can be found in *Table 7* as model 2.

As it can be observed in the results, the incremental coefficient for the Intangibles*Sic13 is 0.7 with a t-statistics of 2.68. The positive incremental coefficient validates the hypothesis that Intangibles on the Balance Sheet do have a significant influence in the valuations of stocks in the Computer industry.

5.2 UK:

Hypothesis 3: *The influence of both the Research & Development costs as well as the Intangibles should be significant in the valuation of British stocks.*

In order to validate this hypothesis, I conducted a regression with the Stock Price of the UK Companies as the dependent variable and Assets, Liabilities, Research & Development, Intangibles and Sales Growth Rate as the independent variables. In order to make the dependent and the independent variables consistent, I divided the independent variables by the common shares outstanding. Similar to the regression before, I deleted the observations that had prices greater than the 99 percentile and prices lower than 1 percentile in order to reduce the impact of the very large and very small observations. I also multiplied all the data points by 10 in order to increase the scale. When the scale is increased by 10, it makes it easier to compare the regression results of the UK to those of the US.

Table 3 presents the descriptive statistics of the variables used in the regression. The mean of the stock prices is 25.77 and the mean of the Research & Development and Intangibles is 0.18 and 1.46 respectively. The results of the regression can be found in *Table 6* as model 2.

As it can be observed in the *Table 6* for model 2, the coefficient for R&D is 9.88 with a t-statistics of 20.3 and the coefficient for intangibles is 1.23 with a t-statistics of

18.5. Hence the similar t-statistics proves that both the Research & Development costs on the income statements as well as the Intangibles on the Balance Sheet have a significant influence on the UK stock prices.

5.3 Germany:

Hypothesis 4: *The influence of Research & Development costs on the Income Statement should be more significant than the influence of the Intangibles on the Balance Sheet in the valuation of German stocks.*

In order to examine this hypothesis, I conducted a regression with the Stock Price of the German Companies as the dependent variable and Assets, Liabilities, Research & Development, Intangibles and Sales Growth Rate as the independent variables. In order to make the dependent and the independent variables consistent, I divided the independent variables by the common shares outstanding. In order to reduce the impact of the very large and very small observations, I deleted the observations that had prices greater than the 99 percentile and prices lower than 1 percentile. I also divided all the data points by 10 in order to decrease the scale. As a result, it makes it easier to compare the regression results of Germany to those of the US and UK.

The descriptive statistics of the variables used in the regression can be found in *Table 4*. The mean of the stock prices is 20.15 and the mean of the Research & Development and Intangibles is 0.31 and 1.59 respectively. The results of the regression are presented in *Table 6* as model 3.

The model 3 in *Table 6* shows that the coefficient for R&D is 1.0 with a t-statistics of 3.61. On the other hand, the coefficient for intangibles is 0.19 with a t-statistics of 1.8. Hence the greater t-statistics and the coefficient validate that the

Research & Development costs on the income statements have a greater influence on the US stock prices when compared to the Intangibles on the Balance Sheets.

5.4 Japan:

Hypothesis 5: *Prior to 1999, the influence of Intangibles on the valuation of Japanese stocks should be more significant than the influence of the Research & Development costs.*

In order to confirm this hypothesis, I ran a regression with the Price as the dependent variable and Assets, Liabilities, Research & Development, Intangibles and Sales Growth Rate as the independent variables. In order to make the dependent and the independent variables consistent, I divided the independent variables by the common shares outstanding. In order to reduce the impact of the very large and very small observations, I deleted the observations that had prices greater than the 99 percentile and prices lower than 1 percentile.

Table 5 presents the descriptive statistics of the variables used in the regression. The mean of the stock prices is 24.43 and the mean of the Research & Development and Intangibles is 0.21 and 0.25 respectively. The results of the regression can be found in *Table 6* as model 4.

As it can be observed in the results in *Table 6*, the coefficient for Intangibles is 28.7 with a t-statistics of 23.5. On the other hand, the coefficient for Research & Development is -5.04 with a t-statistics of -3.2. Hence the greater t-statistics as well as the greater coefficient of the Intangibles prove that the Intangibles on the Balance Sheets have a greater influence on the Japanese stock prices when compared to the Research & Development costs on the Income Statements.

5.5 Common Regression:

Hypothesis 6: *The Research & Development costs on the Income Statements should be significant in the valuation of stock prices in the case of the US, UK and German companies. On the other hand, the Intangibles on the Balance sheets should have a significant influence on the valuation of stock prices in the case of the UK and Japanese companies.*

In order to simultaneously study the influence of Intangibles and Research & Development costs on the stock prices of all four countries, I ran a common regression for all the countries. In order to observe the incremental coefficient for the Research & Development and Intangibles across UK, Germany and Japan, I created the dummy variables. The dummy variables are UK, Germany and Japan and they are equal to 1 if an observation is for a company that is in UK, Germany and Japan respectively. I then ran a regression with the Stock Price as the dependent variable and Assets, Liabilities, Sales Growth Rate, Research & Development costs, Intangibles, $R\&D*UK$, $R\&D*Germany$, $R\&D*Japan$, $Intangibles*UK$, $Intangibles*Germany$ and $Intangibles*Japan$ as the independent variables.

The coefficient for $R\&D*UK$ is the incremental coefficient for Research & Development costs if the observation is of a UK company. Similarly, the coefficients for $R\&D*Germany$ and $R\&D*Japan$ are the incremental coefficients for the Research & Development costs if the observation is of a German and Japanese companies respectively. The coefficient for $Intangibles*UK$ is the incremental coefficient for the Intangibles if the observation is of a UK company. Similarly, the coefficients for

Intangibles*Germany and Intangibles*Japan are the incremental coefficients for the Intangibles if the observation is of a German and Japanese companies respectively.

In order to avoid a biased regression model, I reduced the scale of the large observations. As a result, I divided the Japanese observations by 50, the German observations by 10 and I had multiplied the UK observations by 10. I also deleted the observations that had prices greater than the 99 percentile and prices lower than 1 percentile in order to avoid the influence of very large and very small observations. The results of the regression can be found in *Table 8*.

As it can be observed in the results of the regression in Table 8, the coefficient for Research & Development was considerably great confirming that the Research & Development on the income statement has a significant influence on the US stocks. The positive incremental coefficients for R&D*UK and Intangibles*UK were large and the large coefficients hint that the UK investors while valuing stocks give more importance to the Research & Development on Income Statement and Intangibles on Balance Sheet when compared to the US investors.

The incremental coefficients for R&D*Germany is considerably negative and this hints that the investors in Germany while valuing stocks give less importance to the Research & Development costs on the income statement when compared to the US investors.

The incremental coefficients for R&D*Japan and Intangibles*Japan are negative. However, the incremental coefficient for R&D*Japan is considerably more negative proving that the Japanese investors do not give much importance to the Research & Development costs on the income statement when compared to the US investors.

6. Conclusion

Given the validation of the first 5 hypothesis, it is evident that the accounting of intangibles has an influence on the Valuation of Intangibles. Hence, it would be a naïve approach to use similar valuation models while valuing stock prices across countries. For example, the comparables valuation method using P/E ratio may make sense if you are comparing two companies in the US with a similar operational structure. It may make sense because both the companies are expensing their Research & Development costs. However, if the similar P/E ratio was used for comparing an American and a Japanese company with somewhat similar operational structure, it will definitely not make sense as the Research & Development costs were capitalized in Japan prior to 1999. For example, the P/E ratio of General Motors Corporation on March 31, 1998 is 47. On the other hand, the P/E ratio of Toyota Motors Corporation was 29 on March 31, 1998. The P/E ratio of General Motors Corporation is larger than the P/E ratio of Toyota Motors Corporation because General Motors follows the US GAAP and as a result the Research & Development costs are expensed. Hence, the quality of earnings of General Motors Corporation is high and therefore more valuable leading to a higher P/E ratio.

Similarly, the comparables valuation method using Market value/Book value ratio may make sense if you are comparing two companies in Japan with a similar operational structure. It may make sense because both the companies capitalized their Research & Development costs prior to 1999. However, if the similar Market value/ Book value ratio was used for comparing a Japanese and an American company with similar operational structure it will not make sense as the Research & Development costs are expensed in the US. For example, the Market value/Book value ratio of General Motors Corporation on

March 31, 1998 was 3.1 and the Market value/Book value ratio of Nissan Motors Company Limited on March 21, 1998 was 1.02. The Market value/ Book value ratio of Nissan Motors Company Limited is lower than that of General Motors Corporation because Research & Development expenses were capitalized in Japan prior to 1999 and as a result the book value was closer to the market value of the company.

The above argument not only applies to companies across different borders but it is also valid for companies that are in the same industry & country and also have a similar operational structure but follow different accounting regulations. For example, the companies in the Computer & Software industry are required to capitalize the Research & Development costs but the regulations are lenient enough to allow the companies to avoid capitalization. As a result, a similar valuation model that uses accounting variables will not make sense when applied to two companies if one of the companies is capitalizing the Research & Development expenses and the other isn't.

The 6th hypothesis confirms that the investors across different borders value intangibles differently. Hence, the investors need to keep this in mind while carrying on cross-border investment because the US investor's perception of the items on the financial statements may not be same as that of the investors in UK markets. For example, the UK investors perceive more value from the cost on Intangibles than the US investors and hence, the US investors need to take this in to consideration while making cross-border investments in UK.