Effect of ADR Issuance on the Liquidity of the Underlying Stock

Ainsley Quiohilag

The Leonard N. Stern School of Business Glucksman Institute for Research in Securities Markets Faculty Advisor: Joel Hasbrouck April 1, 2003

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I. INTRODUCTION

Depositary Receipts or DRs have played a significant role in the globalization of capital markets. First created by JPMorgan in 1927 to accommodate U.S. investment in U.K. equities, Depositary Receipts today are used by approximately 2,200 non-U.S. issuers from more than 80 countries to enable their shares to be traded in foreign equity markets. Of the 2,200 DRs, approximately 600 of them are American Depositary Receipts or ADRs which are listed on U.S. exchanges.

While ADRs are negotiable instrument that represents an ownership interest in securities of a non-U.S. company, they are quoted and traded in U.S. dollars, and are settled according to procedures governing the U.S. market. This enables investors to invest in non-U.S. securities without concern for often complex and expensive cross-border transactions, and offer substantially the same economic benefits enjoyed by the domestic shareholders of the non-U.S. issuer. On the other hand, ADRs are also believed to offer substantial benefits to non-U.S. companies as issuers, from broadening the investor base to increasing visibility in the U.S. markets.

This paper attempts to determine if establishing a Depositary Receipt program has any real measurable effect on the liquidity of the underlying stock. In this case, liquidity is being measured as a significant increase in trading volume turnover of the stock (both the underlying stock and the ADR) for the first six months following the establishment of a DR program, as compared to the six months immediately preceding it.

We considered stock trading data of companies from six countries, covering both developed and emerging economies. This also allowed us to see if there were any significant country patterns which can be identified from the data.

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II. PREVIOUS WORK AND OTHER RELATED LITERATURE

The increased market liquidity brought about by broadened and more diversified investor exposure has always been touted as one of the greatest advantages of establishing an ADR program. Therefore, it comes as no surprise that ADR-related improvement in market liquidity is often one of the most discussed topics among practitioners. There is also a considerable amount of academic research regarding this topic. A review of the information and data in these articles and academic papers is provided below.

Practitioners

Most practitioners agree that one of the primary benefits of establishing an ADR program is the increased liquidity that comes from an increased and diversified investor base. David Russell, Asian regional sales director of depositary receipts at Citibank, says that "the success of an ADR is in the trading – whether or not people are interested in buying or selling it. Investors wish to buy liquid tocks, analysts cover liquid stocks, and issuers can raise capital through a well-traded stock listing."¹

The attraction that an ADR holds for U.S. investors is believed to be different, depending on the stage of development and level of restrictions present in the domestic market where the ADR's underlying shares are trading. For instance, to invest in Taiwan or Korea, there are certain processes that an investor has to go through before they can invest directly. For these markets, ADRs provide a very efficient way for foreign investors to buy exposures into those huge markets without going through the approval process, and for issuers from such countries to tap these same investors. On the other hand, for free markets such as Singapore, foreign investors buy ADRs mainly for the ease and simplicity of trading in the U.S. Furthermore, these investors are more comfortable with the disclosure and transparency required under U.S. Securities and

¹ Rob Davies, "Sky's the Limit for Asian ADRs", Finance Asia (March 2002)

Exchange Commission (SEC) regulations, and thus find it easier to compare ADRs with a global peer group.²

Academic Papers

There has also been a considerable academic interest regarding ADRs and its relationship with improvements in market liquidity.

Some of the research focused on ADR issuances from particular countries. Antonio Sanvicente measured the effect of the listing of ADRs of Brazilian companies on the quality of the domestic stock market, represented by the Bovespa. His results indicate that both the companies and the domestic market have gained from the listing of ADRs in terms of price listing and trading flows, whereas no significant change in volatility was observed. Shahrokh Saudagaran and Manoj Kumar studied the impact of listing ADRs or GDRs (Global Depositary Receipt Programs outside the U.S.) on the liquidity of the firm's underlying domestic shares by using a sample of 30 Indian DR programs. They recorded mixed results – while ADRs in most cases reduce the liquidity of the domestic underlying shares, GDRs in most cases increased them.

On the other hand, Mazza, Rapaport, Rosenburg, Rossi and Zapata studied a group of 17 companies with large capitalization from developed markets to determine if there is increased liquidity in the underlying stock after ADR listing. They found their results to be inconclusive – there was no discernable trend in terms of a time series, but they found an increase in average trading volume after the ADR listing.

III. DESCRIPTION OF DATA

This paper looked at the data for 45 company stocks from seven countries. All the companies established Depositary Receipt programs between 1994 and 2002, and all of them have ADRs which are currently trading at the NYSE, NASDAQ, and other U.S. OTC markets.

² Rob Davies, "Sky's the Limit for Asian ADRs", Finance Asia (March 2002)

For each company, the following data were gathered:

- Trading volume of the underlying stock six months before establishing the ADR program
- Trading volume of the underlying stock six months after establishing the ADR program
- Trading volume of the ADR for the first six months after issuance
- Overall trading volume of the domestic stock market where the underlying stock is trading, covering a period starting six months before the ADR issuance and ending six months after
- Total number of outstanding shares

The trading volume of the underlying shares and the ADRs (converted into underlying shares using the conversion ratio) are added together to get the total trading volume for the stock for the six-month period following the ADR issuance. The trading volume data is then divided by the number of outstanding shares to get the trading volume turnover for the entire 12-month period.

The companies included in the data set are summarized in the table below.

| Country | Category | Company | ADR Issuance Date ³ |
|---------|-------------------------|---------------------|--------------------------------|
| Brazil | Emerging Markets | Banco Bradesco | November 2001 |
| | | Banco Itau | February 2002 |
| | | CEMIG | September 2001 |
| | | Brasil Telecom | November 2001 |
| | | Net Servicos | December 2001 |
| | | Tele Nordeste | June 2002 |
| | | Votorantim Celulose | May 2002 |
| | | Saneamento | May 2002 |
| | | Tele Celular | June 2002 |
| | | Vale de Rio | March 2002 |
| Korea | Emerging Markets | KT Corporation | May 1999 |
| | | SK Telecom | July 1996 |
| | | Korea Electric | October 1994 |
| | | Mirae Corporation | November 1999 |
| | | Hanaro Telecom | March 2000 |

| Table | 1 |
|-------|---|
|-------|---|

³ Source: Citibank ADR Services Universal Issuance Guide, http://wwss.citissb.com/adr/www/

| Country | Category | Company | ADR Issuance Date |
|-----------|-------------------|----------------------------|-------------------|
| India | Emerging Markets | ICICI Bank | March 2000 |
| | | Infosys Technologies | April 1999 |
| | | Satyam Computer | May 2001 |
| | | Dr. Reddy's | April 2001 |
| | | HDFC Bank | July 2001 |
| | | Silverline Technologies | June 2000 |
| | | Videsh Sanchar Nigam Ltd. | August 2000 |
| | | Wipro Limited | October 2000 |
| Taiwan | Emerging Markets | AU Optronics | May 2002 |
| | | Siliconware | June 2000 |
| | | United Microelectronics | September 2000 |
| | | Advanced Semiconductor | September 2000 |
| | | Macronix International | February 2002 |
| U.K. | Developed Markets | Scottish Power | May 2001 |
| | | Wolseley PLC | May 2001 |
| | | Spirent PLC | July 2001 |
| | | BG Group | May 2002 |
| | | BHP Billiton | April 2002 |
| | | Cambridge Antibody | June 2001 |
| | | Acambis PLC | February 2001 |
| | | Galen Holdings | September 2000 |
| | | GKN PLC | August 2000 |
| | | Reed Elsevier PLC | April 2002 |
| Hong Kong | Developed Markets | CITIC | January 2002 |
| | | Asia Satellite | October 2001 |
| | | Beijing Enterprises | May 2002 |
| Australia | Developed Markets | Ansell Limited | April 2002 |
| | | James Hardie | October 2001 |
| | | Southern Pacific Petroleum | March 2002 |
| | | Boral Limited | June 2000 |

IV. METHODOLOGY

This paper sets out to test the two main hypotheses:

1) In general, liquidity (defined as an increase in trading volume) of the underlying stock will

increase after an ADR listing.

 ADR listing will result in more significant liquidity benefits for stocks which trade domestically in emerging markets, relative to stocks which trade domestically in more developed markets.

To test this hypothesis, two separate regressions were performed.

Step 1

The monthly trading turnover data for each of the stocks was regressed against two variables. The first variable is the total monthly trading volume of the domestic stock exchange where the underlying share is traded. This is done to remove general market effects on the turnover data of the stock. The second variable consists of a dummy variable indicating whether an ADR has been established or not. The coefficient of this dummy variable can be taken as an indication of the effect an ADR listing has on the liquidity of the underlying stock.

The resulting regression equation is as follows:

 $turnover_{i,t} = a + b * Vol_D + c * ADRdummy + \varepsilon_{i,t}$

for stock *i* in month *t*, where

 Vol_D = total monthly volume of the domestic stock exchange for month *t*

ADRdummy = the dummy variable indicating the presence of an ADR

Step 2

The monthly trading turnover data of stocks from the same country were also combined to come up with a single regression equation for each of the seven countries. To be consistent with the second hypothesis, the regression results should show an ADR listing as having a significantly positive effect on countries which are classified as emerging markets, and relatively insignificant effect on countries classified as developed. The combined turnover data for each country was regressed against three variables:

- 1) *A dummy variable indicating the company*. Each company indicator was set up as a separate dummy variable. This allows us to isolate the individual effects of each company on the turnover data in the regression equation through the coefficient of the variable representing the company indicator.
- 2) The total trading volume of the domestic stock market where the underlying stock is trading. The stock market trading volume data corresponding to each company stock is also set up as separate variables. This allows us to isolate the general market effects on the trading turnover of each individual stock in the data set.
- 3) *A dummy variable to indicate the presence of an ADR*. The ADR indicator is set up as a single dummy variable for all companies in the data set. Again, the coefficient of this dummy variable can be taken as a reflection of the effect establishing an ADR program has on the trading turnover of the underlying stocks. Because the ADR indicator is set up as a single dummy variable, a single coefficient for the ADR indicator variable can be obtained for each of the countries.

The resulting regression equation is as follows:

 $turnover_{i,t} = a_1 * Company_1 + ... + a_n * Company_n + b_1 * Vol_{D1} + ... + b_n * Vol_{Dn} + c * ADR dummy + \varepsilon_{i,t}$ for a typical stock from country *i* at time *t*, where

 $Company_{1...n} = company indicators for all the firms in the country data set$

 $Vol_{D1...n}$ = monthly domestic stock exchange volume for the corresponding month for company *n* ADRdummy = the dummy variable indicating the presence of an ADR

V. RESULTS

Step 1

The individual company regressions seem to support the hypothesis that stocks whose domestic stock markets are classified as emerging markets benefit significantly from an ADR listing. Of the 28 company stocks whose domestic markets were classified as emerging markets, 23 of them showed that establishing an ADR program had a positive effect on their trading turnover. Of these results, 18 were statistically significant at conventional levels, with T-statistic of 2 or more. On the other hand, of the 5 company stocks which displayed a negative effect resulting from the ADR program, only 1 was statistically significant.

The results from the data on stocks from developing countries also seem to support the hypothesis. Of the 17 company stocks whose domestic markets were classified as developed markets, 8 of them showed that establishing an ADR program had a slight positive effect on their trading turnover. Of these, only 2 were statistically significant. On the other hand, of the other 9 stocks which showed a negative effect resulting from the ADR listing, only 3 were statistically significant. These results seem to support the hypothesis that establishing an ADR listing will have little or no effect on stocks whose domestic markets were already developed.

Results of the individual company regressions are summarized in the table below:

| | Emerging Markets | Developed Markets |
|---------------------------|------------------|-------------------|
| # of stocks in data set | 28 | 17 |
| Positive effect | 23 | 8 |
| Statistically significant | 18 | 2 |
| Negative effect | 5 | 9 |
| Statistically significant | 1 | 3 |

Table 2

When looking at the data on a per country basis, both Taiwan and Brazil seem to display strong positive effects on trading turnover resulting from the ADR program, with statistically significant results across all the stocks studied. On the other hand, ADR programs seem to have very little effect on the trading turnover of U.K. stocks, with only 1 stock displaying statistically significant results. These results also support the hypothesis.

Detailed results on the individual company regressions follow in the table below.

| Table | 3 |
|-------|---|
| 1 ant | 0 |

| Country | Company | ADR Coefficient | T-statistic |
|---------|---------------------------|-----------------|-------------|
| Brazil | Banco Bradesco | 0.0004653 | 4.09 |
| | Banco Itau | 0.00042303 | 4.44 |
| | CEMIG | 0.00092273 | 14.81 |
| | Brasil Telecom | 0.00004176 | 2.55 |
| | Net Servicos | 0.003957 | 2.35 |
| | Tele Nordeste | 0.0008938 | 4.31 |
| | Votorantim Celulose | 0.00079778 | 10.85 |
| | Saneamento | 0.0004129 | 2.59 |
| | Tele Celular | 0.0008612 | 6.53 |
| | Vale de Rio | 0.0010223 | 6.06 |
| Korea | KT Corporation | 0.532 | 0.42 |
| | SK Telecom | -1.9828 | -2.97 |
| | Korea Electric | -0.4634 | -1.36 |
| | Mirae Corporation | 0.000706 | 0.12 |
| | Hanaro Telecom | -0.001609 | -0.63 |
| India | ICICI Bank | 0.0001621 | 0.93 |
| | Infosys Technologies | -0.003135 | -1.40 |
| | Satyam Computer | -0.003309 | -1.19 |
| | Dr. Reddy's | 0.012821 | 6.48 |
| | HDFC Bank | 0.0007791 | 5.46 |
| | Silverline Technologies | 0.02446 | 2.21 |
| | Videsh Sanchar Nigam Ltd. | 0.001248 | 0.77 |
| | Wipro Limited | 0.0004407 | 0.95 |
| Taiwan | AU Optronics | 0.0022804 | 4.91 |
| | Siliconware | 0.0011073 | 10.63 |
| | United Microelectronics | 0.00048361 | 11.85 |
| | Advanced Semiconductor | 0.00008297 | 3.59 |
| | Macronix International | 0.00014598 | 4.61 |
| U.K. | Scottish Power | -0.0000470 | -0.07 |
| | Wolseley PLC | 0.0001747 | 0.36 |

| Country | Company | ADR Coefficient | T-statistic |
|-----------|---------------------|-----------------|-------------|
| U.K. | Spirent PLC | 0.000263 | 0.19 |
| | BG Group | 0.0001268 | 0.38 |
| | BHP Billiton | -0.0009028 | -1.25 |
| | Cambridge Antibody | -0.0019258 | -2.06 |
| | Acambis PLC | -0.001654 | -1.37 |
| | Galen Holdings | 0.001136 | 1.03 |
| | GKN PLC | 0.0001357 | 0.37 |
| | Reed Elsevier PLC | -0.0005614 | -0.66 |
| Hong Kong | CITIC | -0.0009580 | -2.80 |
| | Asia Satellite | 0.0004719 | 2.45 |
| | Beijing Enterprises | -0.0010332 | -2.10 |
| Australia | Ansell Limited | -0.015488 | -5.20 |
| | James Hardie | -0.000796 | -0.34 |
| | Southern Pacific | 0.0007805 | 3.35 |
| | Boral Limited | 0.0005914 | 1.60 |

<u>Step 2</u>

While the individual company regressions support the hypothesis, the results of the country regressions seem to be less conclusive.

The four countries classified as emerging markets all show evidence of statistically significant effect resulting from the ADR listing. The regression on Brazilian and Taiwan stocks display positive effects with strong T-statistic numbers, further confirming the results from the individual company regressions performed previously. The regression on Indian stocks showed a statistically significant positive effect as well.

However, the regression on the last group of emerging market stocks – the Korean stocks – showed a particularly strong negative effect resulting from the ADR listing. This negative effect also proved to be statistically significant, with a T-statistic of 2.05. This is a sharp contradiction to the hypothesis that emerging market stocks are supposed to experience a significant positive effect resulting from an ADR listing.

On the other hand, the regressions performed on the three sets of developed market stocks also showed mixed results.

The regression data from the U.K. stocks seem to support the hypothesis, showing statistically insignificant effects resulting the ADR listing. This also mirrors the results of the previous regressions performed on the individual U.K. stocks.

However, the regression on Hong Kong and Australian stocks showed a negative effect resulting from the ADR listing. Both of these results were statistically significant. These results are disturbing because, while the liquidity of stocks from developed markets were not expected to benefit significantly from an ADR listing, their turnover was not expected to be affected negatively by establishing an ADR program.

The summary of the results for the country regressions follow in the table below.

| Country | ADR Coefficient | T-statistic |
|-----------|-----------------|-------------|
| Brazil | 0.0009935 | 4.58 |
| Korea | -0.6144 | -2.05 |
| India | 0.004722 | 2.13 |
| Taiwan | 0.0006973 | 4.30 |
| U.K. | -0.0002198 | -0.76 |
| Hong Kong | -0.0005581 | -2.87 |
| Australia | -0.004300 | -2.83 |

| Т | al | bl | e | 4 |
|---|----|----|---|---|
|---|----|----|---|---|

(The detailed results for the country regressions can be found in Appendix 4.)

The significant drop in trading turnover found in the regressions of the Korean, Hong Kong and Australian stocks might possibly be due to other factors other than the ADR listing event. To verify this theory, the country regressions were repeated with two additional regression variables which might explain this drop in trading turnover – NYSE volume and the past month return for the underlying stock.

The NYSE volume data used were those which corresponded to the six months prior to the ADR listing, and the six months after the ADR listing. Since the stocks are now trading in the U.S. markets, the liquidity of the U.S. markets (represented by NYSE volume data) is bound to have some effect on the liquidity of the stocks.

On the other hand, the previous month return was calculated as *previous month return for month* $i = (price_{i-1} - price_{i-2}) / price_{i-2}$. It is expected that stock price performance during the previous month will have some effect on the trading volume in the current month.

The resulting new regression equation is as follows:

 $turnover_{i,t} = a_1 * Company_1 + ... + a_n * Company_n + b_1 * Vol_{D1} + ... + b_n * Vol_{Dn} + c_1 * Rturn_1 + ... + c_n * Rturn_n + d_1 * NYSE_1 + ... + d_n * NYSE_n + e * ADRdummy + \varepsilon_{i,t}$

for a typical stock from country *i* at time *t*, where

 $Company_{1...n} = company indicators for all the firms in the country data set$

 $Vol_{D1...n}$ = monthly domestic stock exchange volume for the corresponding month for company *n*

 $\operatorname{Rtrn}_{1...n}$ = previous month's return for company *n*

 $NYSE_{1...n} = NYSE$ volume for the corresponding month for company *n*

ADRdummy = the dummy variable indicating the presence of an ADR

However, the modified country regressions were not able to fully explain the negative ADR coefficient from the previous country regressions. While the negative ADR coefficient on the Korean stocks became statistically insignificant, the negative results for Hong Kong and Australian stocks remained statistically significant.

A summary of the results of the modified country regression follow in the table below:

| Table 5 |
|---------|
|---------|

| Country | ADR Coefficient | T-statistic |
|-----------|-----------------|-------------|
| Brazil | 0.0011095 | 4.81 |
| Korea | -0.5303 | -1.37 |
| India | 0.004862 | 1.77 |
| Taiwan | 0.0006845 | 3.29 |
| U.K. | -0.0003111 | -0.92 |
| Hong Kong | -0.0004519 | -2.28 |
| Australia | -0.004783 | -2.77 |

(The detailed results for the modified country regression can be found in Appendix 5.)

VI. SUMMARY

In this study, we looked at the establishment of American Depositary Receipt (ADR) Programs and explored their effects on the liquidity of the underlying stock. We examine data for 45 stocks from seven countries, covering a six-month period before and after the ADR listing event. The stocks were classified the stocks as either developed market or emerging market stocks. The initial hypothesis was that an ADR listing will have a significantly positive effect on stocks from emerging markets, but will have an insignificant effect on stocks from developed markets.

Initially, individual regressions were performed on each of the company stocks, regressing them against the domestic stock market volume and a dummy variable indicating the presence of an ADR. The results from this initial regression seem to support the hypothesis, with a substantial number of stocks in the emerging market data set displaying statistically significant positive effects resulting from the ADR listing, while most of the stocks in the developed market data set had statistically insignificant results. Another set of regressions were performed to confirm the first set of results, and to determine if there were any discernable country trends. Stocks from the same country were combined to come up with a single regression equation for each of the seven countries. However, the results from this second set of regressions were inconclusive.

While three of the four emerging market country regressions continued to show statistically significant positive effects resulting from the ADR listing, the last country regression displayed a statistically significant negative effect. This same significantly negative effect was also exhibited by two of the three developed market country regressions. While the liquidity of developed market stocks was not expected to benefit significantly from an ADR listing, there is no reason to believe that an ADR program will have a significant negative effect on liquidity either.

Further regressions were performed to include additional regression variables, such as NYSE volume and past month returns, in an attempt to explain this negative effect. However, these additional variables were not able to sufficiently explain this negative effect, particularly for the developed market data set.

In conclusion, it would seem that there is some evidence to suggest that emerging market stocks experience significant positive effects on liquidity resulting from an ADR listing. However, the effect of ADRs on developed market stocks is not as clear.

Appendix 1



Exhibit A: ADR market liquidity, 1990-2002

Source: adr.com, JPMorgan estimates

Top 10 ADRs by Trading Volume, First Half 2002

(in millions)

| Issuer | Country | Exchange | Ticker | Volume |
|-------------------------------|-------------|----------|--------|--------|
| LM Ericsson Telephone | Sweden | NASDAQ | ERICY | 2,051 |
| Nokia Corp. | Finland | NYSE | NOK | 1,574 |
| Elan Corp plc | Ireland | NYSE | ELN | 630 |
| Taiwan Semiconductor Mfg. Co. | Taiwan | NYSE | TSM | 630 |
| Vodafone Group plc | U.K. | NYSE | VOD | 470 |
| United Microelectronics Corp. | Taiwan | NYSE | UMC | 419 |
| Durban Roodeport Deep Ltd. | So. Africa | NASDAQ | DROOY | 385 |
| ASML Holding | Netherlands | NASDAQ | ASML | 340 |
| Gold Fields Ltd. | So. Africa | NYSE | GFI | 308 |
| Marconi plc | U.K. | NASDAQ | MONI | 305 |

Top 10 Capital Raisings Using ADRs

(US\$ millions, First Half 2002)

| Issuer | Country | Exchange | Date | Value |
|-----------------------------|---------|----------|---------|-------|
| Companhia Vale de Rio Doce | Brazil | NYSE | 3/27/02 | 1,087 |
| AU Optronics Corp. | Taiwan | NYSE | 5/29/02 | 659 |
| Realtek Semiconductor Corp. | Taiwan | PORTAL | 1/24/02 | 271 |
| KorAm Bank | Korea | PORTAL | 4/30/02 | 199 |
| Wimm-Bill-Dann Foods | Russia | NYSE | 2/28/02 | 165 |
| Powerchip Semiconductor | Taiwan | PORTAL | 5/8/02 | 149 |
| Promos Technologies | Taiwan | PORTAL | 5/17/02 | 146 |
| Ambit Microsystems | Taiwan | PORTAL | 1/8/02 | 70 |
| IONA Technologies | Ireland | NASDAQ | 3/5/02 | 69 |
| SABESP | Brazil | NYSE | 5/10/02 | 67 |

Appendix 4-A

Brazil Country Regression

| Turnover = 0.00038 - | 0.00069 Bradesco - 0.00024 ITAU + 0.00013 CEMIG |
|----------------------|---|
| + 0.00072 | Brasil Tlcm - 0.00314 Net Servicos |
| - 0.00144 | Tele Nordeste - 0.00072 Votorantim - 0.00019 Saneamento |
| - 0.00095 | Tele Celular +0.000000 Bovespa 1 -0.000000 Bovespa 2 |
| -0.000000 | Bovespa 3 -0.000000 Bovespa 4 +0.000000 Bovespa 5 |
| +0.000000 | Bovespa 6 +0.000000 Bovespa 7 -0.000000 Bovespa 8 |
| +0.00000 | Bovespa 9 -0.000000 Bovespa 10 +0.000994 ADR? |
| | |

| Predictor | Coef | SE Coef | Т | P |
|-----------|-------------|------------|-------|-------|
| Constant | 0.000376 | 0.002180 | 0.17 | 0.863 |
| Bradesco | -0.000691 | 0.003338 | -0.21 | 0.836 |
| ITAU | -0.000237 | 0.003205 | -0.07 | 0.941 |
| CEMIG | 0.000129 | 0.003044 | 0.04 | 0.966 |
| Brasil T | 0.000721 | 0.003338 | 0.22 | 0.829 |
| Net Serv | -0.003140 | 0.003086 | -1.02 | 0.311 |
| Tele Nor | -0.001439 | 0.003032 | -0.47 | 0.636 |
| Votorant | -0.000718 | 0.003011 | -0.24 | 0.812 |
| Saneamen | -0.000190 | 0.003011 | -0.06 | 0.950 |
| Tele Cel | -0.000946 | 0.003032 | -0.31 | 0.756 |
| Bovespa | 0.00000000 | 0.00000000 | 0.03 | 0.980 |
| Bovespa | -0.00000000 | 0.00000000 | -0.17 | 0.862 |
| Bovespa | -0.00000000 | 0.00000000 | -0.26 | 0.799 |
| Bovespa | -0.00000000 | 0.00000000 | -0.62 | 0.537 |
| Bovespa | 0.00000000 | 0.00000000 | 2.00 | 0.048 |
| Bovespa | 0.00000000 | 0.00000000 | 0.49 | 0.624 |
| Bovespa | 0.00000000 | 0.00000000 | 0.12 | 0.902 |
| Bovespa | -0.00000000 | 0.00000000 | -0.23 | 0.821 |
| Bovespa | 0.00000000 | 0.00000000 | 0.25 | 0.805 |
| Bovespa | -0.00000000 | 0.00000000 | -0.17 | 0.865 |
| ADR? | 0.0009935 | 0.0002168 | 4.58 | 0.000 |
| | | | | |

S = 0.001072 R-Sq = 38.5% R-Sq(adj) = 26.1%

Appendix 4-B

Korea Country Regression

Turnover = 0.17 - 0.91 KT + 1.08 SK Tlcm + 0.43 Korea Elec + 0.78 Mirae +0.000768 Korea Vol1 +0.000003 Korea Vol3 +0.000001 Korea Vol4 -0.000106 Korea Vol5 +0.000025 Korea Vol6 - 0.614 ADR?

| Predictor Constant KT | Coef 0.167 -0.908 | SE Coef 1.288 1.760 | T 0.13 -0.52 | P 0.897 0.608 |
|-----------------------------|-------------------------|---------------------------|--------------------|---------------------|
| SK Tlcm | 1.076 | 1.660 | 0.65 | 0.520 |
| Korea El | 0.428 | 1.776 | 0.24 | 0.810 |
| Mirae | 0.777 | 2.174 | 0.36 | 0.722 |
| Korea Vo | 0.0007676 | 0.0002024 | 3.79 | 0.000 |
| Korea Vo | 0.0000326 | 0.00000149 | 2.19 | 0.033 |
| Korea Vo | 0.0000063 | 0.00000151 | 0.42 | 0.680 |
| Korea Vo | -0.0001061 | 0.0003010 | -0.35 | 0.726 |
| Korea Vo | 0.0000246 | 0.0002029 | 0.12 | 0.904 |
| ADR? | -0.6144 | 0.3002 | -2.05 | 0.046 |

| S = 1.091 R-Sq = 72.9% | R-Sq(adj) = 67.3% |
|------------------------|-------------------|
|------------------------|-------------------|

Appendix 4-C

India Country Regression

| Turnover | = 0.00214 - 0 | .0097 ICICI | + 0.0102 In | nfosys - (| 0.00975 Satyam |
|-----------|---------------|--------------|-------------|------------|-----------------------|
| | + 0.0113 Dr | Reddys - 0. | 00644 HDFC | + 0.0079 | Silverline |
| | - 0.00403 V | idesh +0.000 | 003 BSE 1 - | 0.000005 | BSE 2 +0.000019 BSE 3 |
| | -0.000003 B | SE 4 +0.0000 | 01 BSE 5 +0 | .000022 E | BSE 6 +0.000001 BSE 7 |
| | -0.000001 B | SE 8 + 0.004 | 72 ADR? | | |
| | | | | | |
| Predictor | Coef | SE Coef | Т | P | |
| Constant | 0.002142 | 0.006523 | 0.33 | 0.744 | |
| ICICI | -0.00974 | 0.01419 | -0.69 | 0.494 | |
| Infosys | 0.01023 | 0.01136 | 0.90 | 0.371 | |
| Satyam | -0.009753 | 0.009388 | -1.04 | 0.302 | |
| Dr Reddy | 0.011350 | 0.009565 | 1.19 | 0.239 | |
| HDFC | -0.006443 | 0.009379 | -0.69 | 0.494 | |
| Silverli | 0.00792 | 0.01172 | 0.68 | 0.501 | |
| Videsh | -0.004026 | 0.009217 | -0.44 | 0.663 | |
| BSE 1 | 0.0000329 | 0.00000681 | 0.48 | 0.630 | |
| BSE 2 | -0.00000507 | 0.00000649 | -0.78 | 0.437 | |
| bse 3 | 0.00001891 | 0.00000277 | 6.83 | 0.000 | |
| BSE 4 | -0.00000336 | 0.0000284 | -1.18 | 0.240 | |
| BSE 5 | 0.00000142 | 0.00000291 | 0.49 | 0.629 | |
| BSE 6 | 0.00002182 | 0.00000515 | 4.24 | 0.000 | |
| BSE 7 | 0.00000105 | 0.0000308 | 0.34 | 0.734 | |
| BSE 8 | -0.00000067 | 0.00000301 | -0.22 | 0.825 | |
| ADR? | 0.004722 | 0.002215 | 2.13 | 0.036 | |
| | | | | | |
| S = 0.008 | 097 R-Sq = | 87.2% R | -Sq(adj) = | 84.6% | |
| | | | | | |

Appendix 4-D

Taiwan Country Regression

| Turnover | = -0.000154 + | 0.00243 AUO + | -0.000795 Si | iliconwr | | | |
|-----------|---------------|----------------|--------------|------------|--------------|-------------|--|
| | +0.000016 U | nitd Mcroelect | rc = 0.00012 | 29 Advnc S | Semicon -0.0 | 00000 TSE 1 | |
| | | SE 2 +0.000000 | | | | | |
| | +0.000697 A | | 101 0.0 | 000000 151 | 1 - 0.00000 | 0 100 0 | |
| | +0.000097 A | DR: | | | | | |
| | ~ ~ ~ | ~~ ~ ~ | _ | _ | | | |
| Predictor | | SE Coef | Т | P | | | |
| Constant | -0.0001538 | 0.0005096 | -0.30 | 0.764 | | | |
| AUO | 0.0024321 | 0.0007797 | 3.12 | 0.003 | | | |
| Siliconw | 0.0007945 | 0.0008548 | 0.93 | 0.357 | | | |
| Unitd Mc | 0.0000162 | 0.0008368 | 0.02 | 0.985 | | | |
| Advnc Se | -0.0001294 | 0.0008368 | -0.15 | 0.878 | | | |
| TSE 1 | -0.0000002 | 0.0000001 | -2.65 | 0.011 | | | |
| TSE 2 | -0.0000001 | 0.0000001 | -0.65 | 0.521 | | | |
| TSE 3 | 0.0000000 | 0.0000001 | 0.06 | 0.950 | | | |
| TSE 4 | -0.00000000 | 0.0000001 | -0.02 | 0.985 | | | |
| TSE 5 | -0.00000000 | 0.0000001 | -0.20 | 0.845 | | | |
| ADR? | 0.0006973 | 0.0001620 | 4.30 | 0.000 | | | |
| | | | | | | | |
| S = 0.000 | 5809 R-Sq = | 57.6% R-S | Sq(adj) = 48 | 3.9% | | | |
| | _ | | | | | | |

Appendix 4-E

U.K. Country Regression

| Turnover = 0.00310 - | 0.00542 Scottish Pwr? - 0.00483 Wolseley? |
|----------------------|---|
| - 0.00380 | Spirent? - 0.00376 BG Grp? - 0.00037 BHP Bll? |
| - 0.00159 | Cambrige Ant? + 0.00254 Acambis? + 0.00157 Galen? |
| - 0.00118 | GKN? +0.000000 LSE Vol1 +0.000000 LSE Vol2 |
| +0.000000 | LSE Vol3 +0.000000 LSE Vol4 +0.000000 LSE Vol5 |
| +0.000000 | LSE Vol6 -0.000000 LSE Vol7 -0.000000 LSE Vol8 |
| +0.000000 | LSE Vol9 +0.000000 LSE Vol10 -0.000220 ADR? |

| Predictor | Coef | SE Coef | Т | P |
|-----------|------------|------------|-------|-------|
| Constant | 0.003096 | 0.002705 | 1.14 | 0.255 |
| Scottish | -0.005424 | 0.003623 | -1.50 | 0.138 |
| Wolseley | -0.004831 | 0.003623 | -1.33 | 0.185 |
| Spirent? | -0.003796 | 0.004025 | -0.94 | 0.348 |
| BG Grp? | -0.003762 | 0.003689 | -1.02 | 0.310 |
| BHP Bll? | -0.000373 | 0.003802 | -0.10 | 0.922 |
| Cambrige | -0.001587 | 0.003653 | -0.43 | 0.665 |
| Acambis? | 0.002542 | 0.004061 | 0.63 | 0.533 |
| Galen? | 0.001571 | 0.003651 | 0.43 | 0.668 |
| GKN? | -0.001176 | 0.003448 | -0.34 | 0.734 |
| LSE Voll | 0.0000013 | 0.00000005 | 2.66 | 0.009 |
| LSE Vol2 | 0.0000012 | 0.0000005 | 2.46 | 0.016 |
| LSE Vol3 | 0.0000019 | 0.0000006 | 3.08 | 0.003 |
| LSE Vol4 | 0.0000009 | 0.0000004 | 2.03 | 0.045 |
| LSE Vol5 | 0.0000007 | 0.0000005 | 1.41 | 0.161 |
| LSE Vol6 | 0.0000008 | 0.0000005 | 1.62 | 0.109 |
| LSE Vol7 | -0.0000002 | 0.0000007 | -0.32 | 0.746 |
| LSE Vol8 | -0.0000006 | 0.0000006 | -0.98 | 0.330 |
| LSE Vol9 | 0.0000005 | 0.00000005 | 0.94 | 0.349 |
| LSE Voll | 0.0000007 | 0.0000005 | 1.43 | 0.156 |
| ADR? | -0.0002198 | 0.0002901 | -0.76 | 0.451 |
| | | | | |

S = 0.001409 R-Sq = 68.1% R-Sq(adj) = 61.6%

Appendix 4-F

Hong Kong Country Regression

Turnover = 0.00225 - 0.00148 CITIC? -0.000586 Asia Sat? +0.000000 HK Vol1 -0.000000 HK Vol2 -0.000000 HK Vol3 -0.000558 ADR?

| Predictor | Coef 0.0022535 | SE Coef 0.0007895 | Т 2.85 | P 0.008 |
|-----------|-------------------|----------------------|-----------|------------|
| Constant | | | | |
| CITIC? | -0.0014767 | 0.0009306 | -1.59 | 0.124 |
| Asia Sat | -0.0005855 | 0.0009318 | -0.63 | 0.535 |
| HK Voll | 0.0000001 | 0.00000000 | 3.00 | 0.006 |
| HK Vol2 | -0.0000000 | 0.00000000 | -0.87 | 0.391 |
| HK Vol3 | -0.0000001 | 0.0000001 | -0.78 | 0.445 |
| ADR? | -0.0005581 | 0.0001945 | -2.87 | 0.008 |

S = 0.0005245 R-Sq = 55.9% R-Sq(adj) = 46.1%

Appendix 4-G

Australia Country Regression

Turnover = 0.00678 + 0.0009 Ansell + 0.0045 James Hardie - 0.0099 Sthrn Pac +0.000000 AUS1 +0.000000 AUS2 +0.000000 AUS3 -0.000000 AUS4 - 0.00430 ADR?

| Predictor | Coef | SE Coef | Т | P |
|------------|------------|------------|-------------|-------|
| Constant | 0.006780 | 0.004205 | 1.61 | 0.115 |
| Ansell | 0.00095 | 0.01371 | 0.07 | 0.945 |
| James Ha | 0.00453 | 0.01246 | 0.36 | 0.718 |
| Sthrn Pa | -0.00993 | 0.01288 | -0.77 | 0.445 |
| AUS1 | 0.0000038 | 0.00000102 | 0.37 | 0.710 |
| AUS2 | 0.00000021 | 0.0000094 | 0.22 | 0.829 |
| AUS3 | 0.0000047 | 0.0000096 | 0.49 | 0.627 |
| AUS4 | -0.0000016 | 0.0000028 | -0.58 | 0.564 |
| ADR? | -0.004300 | 0.001518 | -2.83 | 0.007 |
| | | | | |
| S = 0.0048 | 830 R-Sq = | 59.0% F | R-Sq(adj) = | 50.6% |

Brazil Modified Country Regression

Turnover = 0.00049 - 0.00093 Bradesco + 0.00024 ITAU + 0.00068 CEMIG + 0.00049 Brasil Tlcm + 0.00864 Net Servicos - 0.00115 Tele Nordeste - 0.00049 Votorantim + 0.00182 Saneamento - 0.00060 Tele Celular +0.000000 Bovespa 1 -0.000000 Bovespa 2 -0.000000 Bovespa 3 -0.000000 Bovespa 4 +0.000000 Bovespa 5 +0.000000 Bovespa 6 +0.000000 Bovespa 7 -0.000000 Bovespa 8 +0.000000 Bovespa 9 -0.000000 Bovespa 10 - 0.00204 Retn1 - 0.00073 Retn2 + 0.00012 Retn3 - 0.00131 Retn4 + 0.00880 Retn5 + 0.00009 Retn6 + 0.00010 Retn7 - 0.00192 Retn8 + 0.00064 Retn9 + 0.00242 Retn10 -0.000000 NYSE1 -0.000000 NYSE2 -0.000000 NYSE3 +0.000000 NYSE4 -0.000000 NYSE5 -0.000000 NYSE6 -0.000000 NYSE7 -0.000000 NYSE8 -0.000000 NYSE9 +0.000000 NYSE10 + 0.00111 ADR?

| Predictor | Coef | SE Coef | Т | Р |
|-----------|-------------|------------|-------|-------|
| Constant | 0.000488 | 0.002653 | 0.18 | 0.855 |
| Bradesco | -0.000931 | 0.004553 | -0.20 | 0.839 |
| ITAU | 0.000240 | 0.003805 | 0.06 | 0.950 |
| CEMIG | 0.000683 | 0.004757 | 0.14 | 0.886 |
| Brasil T | 0.000488 | 0.004597 | 0.11 | 0.916 |
| Net Serv | 0.008638 | 0.004819 | 1.79 | 0.077 |
| Tele Nor | -0.001155 | 0.003491 | -0.33 | 0.742 |
| Votorant | -0.000490 | 0.003588 | -0.14 | 0.892 |
| Saneamen | 0.001817 | 0.004109 | 0.44 | 0.660 |
| Tele Cel | -0.000597 | 0.003483 | -0.17 | 0.864 |
| Bovespa | 0.00000000 | 0.00000000 | 0.07 | 0.942 |
| Bovespa | -0.00000000 | 0.00000000 | -0.20 | 0.842 |
| Bovespa | -0.00000000 | 0.00000000 | -0.39 | 0.696 |
| Bovespa | -0.00000000 | 0.00000000 | -0.62 | 0.536 |
| Bovespa | 0.00000000 | 0.00000000 | 2.30 | 0.024 |
| Bovespa | 0.00000000 | 0.00000000 | 0.43 | 0.665 |
| Bovespa | 0.00000000 | 0.00000000 | 0.13 | 0.898 |
| Bovespa | -0.00000000 | 0.00000000 | -0.24 | 0.814 |
| Bovespa | 0.00000000 | 0.00000000 | 0.29 | 0.776 |
| Bovespa | -0.00000000 | 0.00000000 | -0.46 | 0.649 |
| Retn1 | -0.002037 | 0.004631 | -0.44 | 0.661 |
| Retn2 | -0.000729 | 0.003416 | -0.21 | 0.832 |
| Retn3 | 0.000124 | 0.003625 | 0.03 | 0.973 |
| Retn4 | -0.001312 | 0.002780 | -0.47 | 0.638 |
| Retn5 | 0.008796 | 0.001790 | 4.91 | 0.000 |
| Retn6 | 0.000092 | 0.002315 | 0.04 | 0.969 |
| Retn7 | 0.000100 | 0.004860 | 0.02 | 0.984 |
| Retn8 | -0.001924 | 0.003592 | -0.54 | 0.594 |
| Retn9 | 0.000638 | 0.002887 | 0.22 | 0.826 |
| Retn10 | 0.002422 | 0.004504 | 0.54 | 0.592 |
| NYSE1 | -0.0000000 | 0.00000000 | -0.00 | 0.998 |
| NYSE2 | -0.0000000 | 0.00000000 | -0.25 | 0.805 |
| NYSE3 | -0.0000000 | 0.00000000 | -0.14 | 0.890 |
| NYSE4 | 0.00000000 | 0.00000000 | 0.02 | 0.987 |
| NYSE5 | -0.0000000 | 0.00000000 | -3.38 | 0.001 |
| NYSE6 | -0.0000000 | 0.00000000 | -0.23 | 0.817 |
| NYSE7 | -0.0000000 | 0.00000000 | -0.21 | 0.835 |
| NYSE8 | -0.0000000 | 0.00000000 | -0.89 | 0.375 |

| NYSE9 | -0.00000000 | 0.00000000 | -0.30 | 0.762 |
|--------|-------------|------------|-------|-------|
| NYSE10 | 0.00000000 | 0.00000000 | 0.22 | 0.830 |
| ADR? | 0.0011095 | 0.0002307 | 4.81 | 0.000 |

S = 0.001039 R-Sq = 53.9% R-Sq(adj) = 30.5%

Appendix 5-B

Korea Modified Country Regression

Turnover = - 1.05 - 2.77 KT + 4.79 SK Tlcm - 0.12 Korea Elec + 0.38 Mirae +0.000535 Korea1 +0.000004 Korea2 +0.000001 Korea3 -0.000049 Korea4 +0.000031 Korea5 + 4.16 Retn1 + 5.30 Retn2 + 0.02 Retn3 - 0.01 Retn4 - 0.41 Retn5 +0.000000 NYSE1 -0.000000 NYSE2 +0.000000 NYSE3 +0.000000 NYSE4 +0.000000 NYSE5 - 0.530 ADR?

| Predictor | Coef | SE Coef | Т | P |
|-----------|-------------|------------|-------|-------|
| Constant | -1.050 | 5.158 | -0.20 | 0.840 |
| KT | -2.774 | 6.590 | -0.42 | 0.676 |
| SK Tlcm | 4.786 | 5.905 | 0.81 | 0.423 |
| Korea El | -0.124 | 6.361 | -0.02 | 0.985 |
| Mirae | 0.381 | 5.926 | 0.06 | 0.949 |
| Koreal | 0.0005347 | 0.0002879 | 1.86 | 0.071 |
| Korea2 | 0.0000384 | 0.00000170 | 2.26 | 0.030 |
| Korea3 | 0.0000090 | 0.00000164 | 0.55 | 0.587 |
| Korea4 | -0.0000494 | 0.0003240 | -0.15 | 0.880 |
| Korea5 | 0.0000312 | 0.0002114 | 0.15 | 0.884 |
| Retnl | 4.163 | 4.129 | 1.01 | 0.320 |
| Retn2 | 5.298 | 2.613 | 2.03 | 0.050 |
| Retn3 | 0.018 | 3.285 | 0.01 | 0.996 |
| Retn4 | -0.014 | 1.735 | -0.01 | 0.994 |
| Retn5 | -0.408 | 2.134 | -0.19 | 0.849 |
| NYSE1 | 0.00000000 | 0.00000000 | 0.91 | 0.367 |
| NYSE2 | -0.00000000 | 0.00000000 | -0.94 | 0.353 |
| NYSE3 | 0.00000000 | 0.00000000 | 0.44 | 0.660 |
| NYSE4 | 0.00000000 | 0.00000000 | 0.55 | 0.586 |
| NYSE5 | 0.00000000 | 0.00000000 | 0.22 | 0.825 |
| ADR? | -0.5303 | 0.3864 | -1.37 | 0.178 |
| | | | | |

| S = | = 1.123 | R-Sq = 77.3% | R-Sq(adj) = 65 | .3% |
|-----|---------|--------------|----------------|-----|
|-----|---------|--------------|----------------|-----|

Appendix 5-C

India Modified Country Regression

Turnover = 0.0090 + 0.0039 ICICI - 0.0177 Infosys - 0.0144 Satyam + 0.0075 Dr Reddys - 0.0001 HDFC + 0.0158 Silverline - 0.0018 Videsh +0.000003 BSE 1 -0.000007 BSE 2 +0.000020 BSE 3 -0.000004 BSE 4 +0.000002 BSE 5 +0.000032 BSE 6 +0.000001 BSE 7 -0.000000 BSE 8 + 0.00374 Retn1 - 0.0011 Retn2 - 0.0193 Retn3 - 0.0019 Retn4 - 0.0238 Retn5 - 0.0355 Retn6 + 0.0035 Retn7 + 0.00122 Retn8 -0.000000 NYSE1 +0.000000 NYSE2 -0.000000 NYSE3 -0.000000 NYSE4 -0.000000 NYSE5 -0.000000 NYSE6 -0.000000 NYSE7 -0.000000 NYSE8 + 0.00486 ADR?

| Predictor Constant ICICI Infosys Satyam Dr Reddy HDFC Silverli Videsh BSE 1 BSE 2 BSE 3 BSE 4 BSE 5 BSE 6 BSE 7 BSE 8 Retn1 Retn2 Retn3 Retn4 Retn5 Retn6 Retn7 Retn8 NYSE1 | Coef 0.00901 0.00387 -0.01768 -0.01443 0.00751 -0.00009 0.01578 -0.00184 0.00000312 -0.000000312 -0.000000352 0.00000205 0.00000205 0.00000110 -0.00000352 0.00000110 -0.0000035 0.003744 -0.00195 -0.02381 -0.03551 0.00347 0.001224 -0.0000000 | SE Coef 0.01964 0.04067 0.03212 0.02991 0.03047 0.03617 0.02942 0.02866 0.00000684 0.00000325 0.00000325 0.00000320 0.00000372 0.00000382 0.00000382 0.00000372 0.0000372 0.0000372 0.0000372 0.0000372 0.0000372 0.0000372 0.0000372 0.0000372 0.0000372 0.0000372 0.0000372 0.0000372 0.0000372 0.0000372 0.0000372 0.0000372 0.00000372 0.00000372 0.00000000 0.01357 0.02546 0.05115 0.01024 0.01708 0.009146 0.0000000 | T 0.46 0.10 -0.55 -0.48 0.25 -0.00 0.54 -0.06 0.46 -0.86 6.26 -1.10 0.61 5.40 0.29 -0.09 0.58 -0.08 -1.42 -0.08 -1.42 -0.08 -1.42 -0.08 -0.47 -3.47 0.20 0.13 -0.57 | P 0.648 0.925 0.584 0.631 0.806 0.998 0.593 0.949 0.650 0.391 0.000 0.275 0.546 0.000 0.275 0.546 0.000 0.775 0.925 0.563 0.936 0.160 0.939 0.643 0.001 0.840 0.894 0.574 |
|--|--|---|--|---|
| | | | | |
| | | | | |
| | | | | |
| NYSE1 NYSE2 | 0.00000000 | 0.00000000 | -0.57 | 0.574 |
| NYSE3 | -0.00000000 | 0.0000000 | -0.33 | 0.740 |
| NYSE4 | -0.0000000 | 0.0000000 | -0.14 | 0.886 |
| NYSE5 | -0.0000000 | 0.0000000 | -0.44 | 0.660 |
| NYSE6 NYSE7 | -0.00000000 | 0.0000000000000000000000000000000000000 | -1.51 -0.42 | 0.135 0.673 |
| NYSE8 | -0.00000000 | 0.00000000 | -0.33 | 0.742 |
| ADR? | 0.004862 | 0.002748 | 1.77 | 0.082 |
| S = 0.007 | 939 R-Sq = | 90.2% | R-Sq(adj) = | 85.2% |

Appendix 5-D

Taiwan Modified Country Regression

Turnover = 0.00097 - 0.00178 AUO - 0.00076 Siliconwr - 0.00072 Unitd Mcroelectrc + 0.00030 Advnc Semicon -0.000000 TSE 1 -0.000000 TSE 2 +0.000000 TSE 3 +0.000000 TSE 4 -0.000000 TSE 5 -0.000765 Retn1 -0.000240 Retn2 + 0.00044 Retn3 -0.000638 Retn4 + 0.00093 Retn5 +0.000000 NYSE1 +0.000000 NYSE2 -0.000000 NYSE3 -0.000000 NYSE4 -0.000000 NYSE5 +0.000685 ADR?

| Constant0.0009730.0012920.750.456AUO-0.0017770.001929-0.920.363Siliconw-0.0007560.002074-0.360.717Unitd Mc-0.0007170.001734-0.410.682Advnc Se0.0002970.0017960.170.870TSE 1-0.00000010.00000001-1.750.089TSE 2-0.000000010.00000001-0.510.612TSE 30.000000010.000000010.310.761TSE 40.000000010.00000001-0.510.610Retn1-0.00076500.0008346-0.920.365Retn2-0.00023980.0014470.310.761Retn30.0004430.0014470.310.761Retn4-0.00063780.0009234-0.690.494Retn50.0009250.0019340.480.635NYSE10.00000000.00000001.920.63NYSE3-0.00000000.00000000.210.833NYSE3-0.00000000.0000000-0.410.687 | Predictor | Coef | SE Coef | Т | P |
|--|-----------|-------------|------------|-------|-------|
| Siliconw-0.0007560.002074-0.360.717Unitd Mc-0.0007170.001734-0.410.682Advnc Se0.0002970.0017960.170.870TSE 1-0.000000010.00000001-1.750.089TSE 2-0.000000010.00000001-0.510.612TSE 30.000000010.000000020.730.471TSE 40.000000010.00000001-0.510.610Retn1-0.00076500.0008346-0.920.365Retn2-0.00023980.0014470.310.761Retn30.0004430.0014470.310.761Retn4-0.00063780.0009234-0.690.494Retn50.0009250.0019340.480.635NYSE10.00000000.00000001.920.063NYSE3-0.00000000.0000000-0.410.687 | Constant | 0.000973 | 0.001292 | 0.75 | 0.456 |
| Unitd Mc-0.0007170.001734-0.410.682Advnc Se0.0002970.0017960.170.870TSE 1-0.00000010.0000001-1.750.089TSE 2-0.000000010.00000001-0.510.612TSE 30.00000000.000000020.730.471TSE 40.00000010.00000001-0.510.610Retn1-0.00076500.0008346-0.920.365Retn2-0.00023980.0014470.310.761Retn30.0004430.0014470.310.761Retn4-0.00063780.0009234-0.690.494Retn50.0009250.0019340.480.635NYSE10.00000000.00000001.920.063NYSE3-0.00000000.0000000-0.410.687 | AUO | -0.001777 | 0.001929 | -0.92 | 0.363 |
| Advnc Se0.0002970.0017960.170.870TSE 1-0.00000010.0000001-1.750.089TSE 2-0.00000010.0000001-0.510.612TSE 30.00000000.000000010.310.761TSE 40.00000010.00000001-0.510.610Retn1-0.00076500.0008346-0.920.365Retn2-0.00023980.0014470.310.761Retn30.0004430.0014470.310.761Retn50.0009250.0019340.480.635NYSE10.00000000.00000001.920.063NYSE3-0.00000000.0000000-0.410.687 | Siliconw | -0.000756 | 0.002074 | -0.36 | 0.717 |
| TSE 1-0.000000010.00000001-1.750.089TSE 2-0.00000000.00000001-0.510.612TSE 30.00000000.000000010.310.761TSE 40.000000010.000000020.730.471TSE 5-0.000000010.00000001-0.510.610Retn1-0.00076500.0008346-0.920.365Retn2-0.00023980.0008175-0.290.771Retn30.0004430.0014470.310.761Retn4-0.00063780.0009234-0.690.494Retn50.0009250.0019340.480.635NYSE10.00000000.00000001.920.063NYSE3-0.00000000.0000000-0.410.687 | Unitd Mc | -0.000717 | 0.001734 | -0.41 | 0.682 |
| TSE 2-0.00000010.0000001-0.510.612TSE 30.00000000.000000010.310.761TSE 40.00000010.000000020.730.471TSE 5-0.00000010.00000001-0.510.610Retn1-0.00076500.0008346-0.920.365Retn2-0.00023980.0008175-0.290.771Retn30.0004430.0014470.310.761Retn4-0.00063780.0009234-0.690.494Retn50.0009250.0019340.480.635NYSE10.00000000.00000001.920.063NYSE3-0.00000000.0000000-0.410.687 | Advnc Se | 0.000297 | 0.001796 | 0.17 | 0.870 |
| TSE 30.000000000.000000010.310.761TSE 40.000000010.000000020.730.471TSE 5-0.000000010.00000001-0.510.610Retn1-0.00076500.0008346-0.920.365Retn2-0.00023980.0008175-0.290.771Retn30.0004430.0014470.310.761Retn4-0.00063780.0009234-0.690.494Retn50.0009250.0019340.480.635NYSE10.00000000.00000001.920.063NYSE3-0.00000000.0000000-0.410.687 | TSE 1 | -0.0000001 | 0.0000001 | -1.75 | 0.089 |
| TSE 40.00000010.00000020.730.471TSE 5-0.00000010.0000001-0.510.610Retn1-0.00076500.0008346-0.920.365Retn2-0.00023980.0008175-0.290.771Retn30.0004430.0014470.310.761Retn4-0.00063780.0009234-0.690.494Retn50.0009250.0019340.480.635NYSE10.00000000.00000001.920.063NYSE3-0.00000000.0000000-0.410.687 | TSE 2 | -0.0000001 | 0.0000001 | -0.51 | 0.612 |
| TSE 5-0.000000010.00000001-0.510.610Retn1-0.00076500.0008346-0.920.365Retn2-0.00023980.0008175-0.290.771Retn30.0004430.0014470.310.761Retn4-0.00063780.0009234-0.690.494Retn50.0009250.0019340.480.635NYSE10.00000000.00000001.920.063NYSE3-0.00000000.0000000-0.410.687 | TSE 3 | 0.00000000 | 0.0000001 | 0.31 | 0.761 |
| Retn1-0.00076500.0008346-0.920.365Retn2-0.00023980.0008175-0.290.771Retn30.0004430.0014470.310.761Retn4-0.00063780.0009234-0.690.494Retn50.0009250.0019340.480.635NYSE10.00000000.00000001.920.063NYSE20.00000000.00000000.210.833NYSE3-0.00000000.0000000-0.410.687 | TSE 4 | 0.0000001 | 0.0000002 | 0.73 | 0.471 |
| Retn2-0.00023980.0008175-0.290.771Retn30.0004430.0014470.310.761Retn4-0.00063780.0009234-0.690.494Retn50.0009250.0019340.480.635NYSE10.00000000.00000001.920.063NYSE20.00000000.00000000.210.833NYSE3-0.00000000.0000000-0.410.687 | TSE 5 | -0.0000001 | 0.0000001 | -0.51 | 0.610 |
| Retn30.0004430.0014470.310.761Retn4-0.00063780.0009234-0.690.494Retn50.0009250.0019340.480.635NYSE10.00000000.00000001.920.063NYSE20.00000000.00000000.210.833NYSE3-0.00000000.0000000-0.410.687 | Retnl | -0.0007650 | 0.0008346 | -0.92 | 0.365 |
| Retn4-0.00063780.0009234-0.690.494Retn50.0009250.0019340.480.635NYSE10.00000000.00000001.920.063NYSE20.00000000.00000000.210.833NYSE3-0.00000000.0000000-0.410.687 | Retn2 | -0.0002398 | 0.0008175 | -0.29 | 0.771 |
| Retn50.0009250.0019340.480.635NYSE10.00000000.00000001.920.063NYSE20.00000000.00000000.210.833NYSE3-0.00000000.0000000-0.410.687 | Retn3 | 0.000443 | 0.001447 | 0.31 | 0.761 |
| NYSE10.00000000.00000001.920.063NYSE20.00000000.00000000.210.833NYSE3-0.00000000.0000000-0.410.687 | Retn4 | -0.0006378 | 0.0009234 | -0.69 | 0.494 |
| NYSE20.00000000.00000000.210.833NYSE3-0.000000000.00000000-0.410.687 | Retn5 | 0.000925 | 0.001934 | 0.48 | 0.635 |
| NYSE3 -0.0000000 0.0000000 -0.41 0.687 | NYSE1 | 0.00000000 | 0.00000000 | 1.92 | 0.063 |
| | NYSE2 | 0.00000000 | 0.00000000 | 0.21 | 0.833 |
| | NYSE3 | -0.00000000 | 0.00000000 | -0.41 | 0.687 |
| NYSE4 -0.0000000 0.0000000 -1.23 0.225 | NYSE4 | -0.0000000 | 0.00000000 | -1.23 | 0.225 |
| NYSE5 -0.0000000 0.0000000 -0.65 0.521 | NYSE5 | -0.00000000 | 0.00000000 | -0.65 | 0.521 |
| ADR? 0.0006845 0.0002078 3.29 0.002 | ADR? | 0.0006845 | 0.0002078 | 3.29 | 0.002 |

S = 0.0005501 R-Sq = 69.7% R-Sq(adj) = 54.2%

Appendix 5-E

U.K. Modified Country Regression

Turnover = 0.00189 - 0.00240 Scottish Pwr? - 0.00370 Wolseley? + 0.00110 Spirent? - 0.00238 BG Grp? + 0.00330 BHP Bll? - 0.00115 Cambrige Ant? + 0.00314 Acambis? - 0.00170 Galen? - 0.00072 GKN? +0.000000 LSE Vol1 +0.000000 LSE Vol2 +0.000000 LSE Vol3 +0.000000 LSE Vol4 +0.000000 LSE Vol5 +0.000000 LSE Vol6 -0.000000 LSE Vol7 -0.000000 LSE Vol8 +0.000000 LSE Vol9 +0.000000 LSE Vol10 + 0.00025 Retn1 - 0.00082 Retn2 - 0.00140 Retn3 - 0.0007 Retn4 - 0.00414 Retn5 - 0.00021 Retn6 + 0.00020 Retn7 - 0.00789 Retn8 - 0.00054 Retn9 + 0.00413 Retn10 -0.000000 NYSE1 +0.000000 NYSE2 -0.000000 NYSE3 -0.000000 NYSE4 -0.000000 NYSE5 +0.000000 NYSE6 +0.000000 NYSE7 +0.000000 NYSE8 +0.000000 NYSE9 +0.000000 NYSE10 -0.000311 ADR?

| Predictor Constant | Coef 0.001895 | SE Coef 0.003326 | T 0.57 | P 0.571 |
|-----------------------|---------------------------|--------------------------|---------------|----------------|
| Scottish | -0.002404 | 0.004823 | -0.50 | 0.620 |
| Wolseley | -0.003705 | 0.004863 | -0.76 | 0.448 |
| Spirent? | 0.001099 | 0.005717 | 0.19 | 0.848 |
| BG Grp? | -0.002383 | 0.004813 | -0.50 | 0.622 |
| BHP Bll? | 0.003299 | 0.005114 | 0.65 | 0.521 |
| Cambrige | -0.001154 | 0.005430 | -0.21 | 0.832 |
| Acambis? | 0.003141 | 0.005452 | 0.58 | 0.566 |
| Galen? | -0.001697 | 0.004698 | -0.36 | 0.719 |
| GKN? | -0.000722 | 0.005096 | -0.14 | 0.888 |
| LSE Voll | 0.0000016 | 0.0000006 | 2.58 | 0.012 |
| LSE Vol2 | 0.0000013 | 0.0000006 | 2.14 | 0.036 |
| LSE Vol3 | 0.0000023 | 0.0000008 | 2.94 | 0.004 |
| LSE Vol4 | 0.0000010 | 0.0000007 | 1.44 | 0.153 |
| LSE Vol5 | 0.0000010 | 0.0000008 | 1.21 | 0.230 |
| LSE Vol6 | 0.0000008 | 0.0000007 | 1.17 | 0.245 |
| LSE Vol7 | -0.0000004 | 0.0000010 | -0.44 | 0.662 |
| LSE Vol8 | -0.0000014 | 0.00000010 | -1.45 | 0.152 |
| LSE Vol9 | 0.0000004 | 0.0000006 | 0.68 | 0.499 |
| LSE Voll | 0.0000003 | 0.0000008 | 0.45 | 0.657 |
| Retn1 | 0.000251 | 0.005277 | 0.05 | 0.962 |
| Retn2 | -0.000821 | 0.004194 | -0.20 | 0.845 |
| Retn3 | -0.001399 | 0.001834 | -0.76 | 0.448 |
| Retn4 | -0.00066 | 0.01438 | -0.05 | 0.964 |
| Retn5 | -0.004143 | 0.006709 | -0.62 | 0.539 |
| Retn6 | -0.000206 | 0.002682 | -0.08 | 0.939 |
| Retn7 | 0.000199 | 0.004389 | 0.05 | 0.964 |
| Retn8 | -0.007886 | 0.004418 | -1.79 | 0.078 |
| Retn9 | -0.000543 | 0.003425 | -0.16 | 0.874 |
| Retn10 | 0.004133 | 0.008573 | 0.48 | 0.631 |
| NYSE1 | -0.00000000 | 0.0000000 | -0.79 | 0.432 |
| NYSE2 NYSE3 | 0.00000000 -0.00000000 | 0.00000000 0.00000000 | 0.03 -1.04 | 0.980 0.300 |
| NYSE4 | -0.00000000 | 0.00000000 | -0.14 | 0.300 |
| NYSE5 | -0.00000000 | 0.00000000 | -1.07 | 0.288 |
| NYSE6 | 0.00000000 | 0.00000000 | 0.18 | 0.200 |
| NYSE7 | 0.00000000 | 0.00000000 | 0.10 | 0.691 |
| NYSE8 | 0.00000000 | 0.00000000 | 1.65 | 0.104 |
| | | | =: ;;; | |

| NYSE9 | 0.00000000 | 0.0000000 | 0.28 | 0.777 |
|--------|------------|-----------|-------|-------|
| NYSE10 | 0.00000000 | 0.0000000 | 0.64 | 0.524 |
| ADR? | -0.0003111 | 0.0003394 | -0.92 | 0.362 |

S = 0.001482 R-Sq = 71.8% R-Sq(adj) = 57.5%

Appendix 5-F

Hong Kong Modified Country Regression

Turnover = 0.00101 + 0.00140 CITIC? + 0.00006 Asia Sat? +0.000000 HK Vol1 -0.000000 HK Vol2 +0.000000 HK Vol3 - 0.00172 Retn1 +0.000202 Retn2 + 0.00475 Retn3 -0.000000 NYSE1 +0.000000 NYSE2 +0.000000 NYSE3 -0.000452 ADR?

| Predictor Constant CITIC? Asia Sat HK Vol1 HK Vol2 HK Vol3 Retn1 Retn2 Retn3 NYSE1 NYSE2 NYSE3 | Coef 0.0010121 0.001403 0.000056 0.00000000 -0.0000000 0.0000000 0.0002020 0.004749 -0.0000000 0.0000000 0.0000000 | SE Coef 0.0009876 0.001344 0.001785 0.00000000 0.00000000 0.00000001 0.001485 0.0009792 0.001562 0.0000000 0.00000000 0.00000000 | T 1.02 1.04 0.03 3.68 -0.80 0.11 -1.16 0.21 3.04 -2.09 0.36 0.37 | P 0.316 0.307 0.975 0.001 0.430 0.915 0.258 0.838 0.006 0.047 0.721 0.712 |
|--|---|--|--|---|
| | | | | |
| ADR? | -0.0004519 | 0.0001979 | -2.28 | 0.032 |

S = 0.0004677 R-Sq = 73.6% R-Sq(adj) = 59.8%

Appendix 5-G

Australia Modified Country Regression

Turnover = 0.0093 - 0.0306 Ansell + 0.0136 James Hardie - 0.0184 Sthrn Pac +0.000001 AUS1 -0.000000 AUS2 +0.000000 AUS3 -0.000001 AUS4 + 0.0889 Retn1 + 0.0135 Retn2 + 0.00167 Retn3 + 0.0069 Retn4 +0.000000 NYSE1 -0.000000 NYSE2 +0.000000 NYSE3 +0.000000 NYSE4 - 0.00478 ADR?

| Predictor | Coef | SE Coef | Т | P |
|-----------|-------------|------------|-------|-------|
| Constant | 0.00928 | 0.02069 | 0.45 | 0.657 |
| Ansell | -0.03062 | 0.03225 | -0.95 | 0.351 |
| James Ha | 0.01365 | 0.02765 | 0.49 | 0.626 |
| Sthrn Pa | -0.01844 | 0.02594 | -0.71 | 0.483 |
| AUS1 | 0.00000130 | 0.00000106 | 1.23 | 0.231 |
| AUS2 | -0.0000047 | 0.00000115 | -0.41 | 0.684 |
| AUS3 | 0.0000027 | 0.00000107 | 0.25 | 0.803 |
| AUS4 | -0.00000077 | 0.0000089 | -0.87 | 0.394 |
| Retnl | 0.08888 | 0.03579 | 2.48 | 0.020 |
| Retn2 | 0.01347 | 0.01462 | 0.92 | 0.365 |
| Retn3 | 0.001672 | 0.005789 | 0.29 | 0.775 |
| Retn4 | 0.00692 | 0.02226 | 0.31 | 0.758 |
| NYSE1 | 0.00000000 | 0.00000000 | 0.90 | 0.376 |
| NYSE2 | -0.00000000 | 0.00000000 | -0.19 | 0.852 |
| NYSE3 | 0.00000000 | 0.00000000 | 0.89 | 0.381 |
| NYSE4 | 0.00000000 | 0.00000000 | 0.30 | 0.768 |
| ADR? | -0.004783 | 0.001724 | -2.77 | 0.010 |
| | | | | |

S = 0.004544 R-Sq = 74.6% R-Sq(adj) = 59.5%

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