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JOURNAL OF INTERNATIONAL BUSINESS RESEARCH

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THE EFFECT OF THE EURO ON EUROPEAN EQUITY MARKETS AND INTERNATIONAL DIVERSIFICATION

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ABSTRACT

Interest in global investing has increased tremendously over the last two decades. Investors seek to reduce risk by diversifying globally. The risk reduction benefits hinge upon the relationships among international stock market indexes. Many research studies have shown that international diversification may provide risk reduction when an investor's portfolio is expanded to include foreign securities.

On January 1, 1999, the European Economic Community (EEC) introduced the Euro as the currency of eleven Member States of the European Union: i.e. Belgium, Germany, Spain, France, Ireland, Italy, Luxembourg, the Netherlands, Austria, Portugal and Finland. As a result of that, the national currencies of these countries ceased to exist. At the world level, the economic weight of the EEC has become roughly equal to that of the US. As a consequence, the euro is considered to be an alternative international currency to the dollar.

The introduction of the euro as a single currency (Euro) and the disappearance of currency risk implied that investors would be concerned with the benefits of diversification. Especially, if correlation coefficients among European equity markets are significantly increased, then diversification may fail to deliver the benefits which investors seek. The author found a significant increase in the correlation among stock returns between pre and post Euro periods. The results showed that diversification opportunities have largely decreased at a country level within the European Union for post euro periods. The author also tested the hypothesis that high correlation coefficients among equity markets (in the European Union) provided evidence of contagion or interdependence.

INTRODUCTION

Diversification has become more important as financial markets have become increasingly global. Previously, investors who were investing in France, Germany and England had to recognize the exchange rate risk of these countries. However, on January 1, 1999, the Euro became the currency of these countries and the national currencies of these countries ceased to exist. The question that this paper intends to answer is if the introduction of the Euro has changed the exchange rate risk for the investors? To examine this question, we will analyze the effect of the Euro on the

international market indexes and then examine the effects of the euro on U.S. investors' investment strategies.

This first part of the paper addresses the impact of the Euro on portfolio diversification opportunities. In this study, the author found a significant increase in the correlation between the returns on any two stocks. Diversification opportunities within the Euro-area have thus been reduced. The culprit appears to be the disappearance of currency risk, rather than the convergence of economic and/or the homogenization of economic structures across the European member states. This development should eliminate pure country allocation strategies within Europe. If no other investment alternatives were available, the increased correlation coefficients would imply that international diversification does not benefit the European investors.

The second part of the paper tests the concept of contagion among European stock markets. Several empirical studies have shown that a significant increase occurred in the market co-movement after changes in financial or economic factors. Do these periods (pre and post Euro) of highly correlated stock market co-movement provide evidence of contagion or interdependence?

Finally, given the support for international diversification, has the introduction of the Euro as a single currency in Europe changed the dimensions of international portfolio diversification? Is it still possible to enhance risk-return relationships by investing in European Economic Community (EEC)?

REVIEW OF THE RELATED LITERATURE

The case for diversification was made in Markowitz's seminal article "Portfolio Selection" in which he presented the theory of efficient diversification of investments. This article leads to the development of Modern Portfolio Theory. Numerous studies of portfolio diversification have followed. These studies examined various investment techniques to improve the risk and return trade-off represented graphically as the efficient frontier. For example, Solink (1974) examined the benefits of diversification for a number of major stock markets. His analysis showed that investors could diversify further to reduce portfolio risk by investing internationally. Eaker and Grant (1990) show that diversifying internationally, with or without currency hedging, will result in a higher rate of return for the portfolio than would a simple portfolio of domestic securities. Their results showed that portfolios based on the forward hedging rule tend to have a dominant efficient frontier compared with portfolios that do not. Jorion (1989) and Grauer and Hakansson (1987) showed that a combination of foreign equities with bonds dominated the U.S. markets on both return and risk dimensions.

A number of studies, over the last several years, have discussed the concepts of contagion and have provided evidence of increased correlation in global financial market returns. The underlying idea in these studies has been a comparison between cross-market correlation in tranquil and crisis periods. This idea then leads to a definition of the term "contagion". That definition

would the impact seen as the changes in the volatility of asset prices in one market are compared with changes in volatility in other markets. Therefore, a strong co-movement across markets is an indication of contagion.

Forbes and Rigobon (2001) and Rigobon (2002), and Bordo and Murshid, (2001) results showed the significant increases in equity correlations among equity markets during the "Asian Currency Crisis 1997" " Mexico Currency Crisis 1994" and "Russian Financial Crisis 1998" were not due to contagion but, rather, only to interdependence. Others, however, have shown that some of this evidence may have been biased. Corsetti, et al. (2002), with the use of a single factor model, found "some contagion, some interdependence" in their tests of financial contagion.

Although there has been considerable ambiguity on the definition and identification of contagion, as well as how it should be measured, several authors have proposed tests in an attempt to resolve these questions.   These tests have attempted to determine the difference between contagion and interdependence on empirical grounds. A joint conference sponsored by the World Bank and IMF , *International Financial Contagion: How it Spreads and How it Can be Stopped*, featured several papers including theoretical models of contagion (Pritsker, 2000; Schiniasi and Smith, 2000), conceptual, survey contributions (Forbes and Rigobon, 2000), country case studies (De Gregorio and Valdes, 2000; Eichengreen, Hale, and Mody, 2000; Park and Song, 2000) and broad-based empirical studies (Kaminsky, Lyons, and Schmukler, 2000; Gelos and Sahay, 2000). Other important recent contributions include Masson (1999), Kyle and Xiong (2001), Kaminsky and Reinhart (2000) and Allen and Gale (2000).

DATA AND METHODOLOGY

The monthly market returns data for this study were downloaded from MSCI Data.com on September 5, 2003 for the period December 1992 to August 2003. The data is partitioned into two sub-periods. The sub-periods encompass December 1992-December 1998 and January 1999-August 2003.

To study the effect of contagion, most of the researchers have been concerned with whether or not the equity markets move more closely together in the crisis period. Earlier tests for contagion had shown some evidence of contagion. For example, King and Wadhwani (1990) found that the correlation between international equities increased significantly after the October 1987 crash, and Lee and Kim (1993) arrived at a similar conclusion. However, more recent studies of this issue have shown mixed results. Additionally, the evidence does not support the hypothesis that a significant increase in the market co-movement, after changes in financial or economic factors, would be propagated from one country to other countries during crisis and non-crisis periods.

The reason for these inconclusive results was that a considerable amount of ambiguity continued to exist as to exactly what contagion is, how it should be tested, and how to distinguish between the crisis and non-crisis periods. Forbes and Rigobon (2002) defined *contagion* as

significant increases in cross-market co-movement. Any continued high level of market correlation has suggested strong linkages between the two economies in all the various countries of the world, and has been defined as *interdependence*. Several authors have proposed different definitions and statistical methodology to address the issue of contagion or interdependence on empirical grounds.

Some studies showed a significant increase in correlation coefficients during crises and concluded that there existed a contagion effect (for example, Baig and Goldfajn, 1998). However, Forbes and Rigobon (2001 and 2002) investigated the effect of contagion using correlation coefficients and they found no contagion after accounting for heteroskedasticity and omitted variables.

In this paper, the author utilized the methodology introduced by Forbes and Rigobon (2001) and Rigobon (2001). The Forbes-Rigobon methodology is based on an analysis of changes in the correlation coefficients between crisis and stable stock market returns. For model specification and detail information see Rigobon (2001).

Before testing the above models, one needs to define contagion in this paper. The introduction of the Euro as a single currency did not constitute a shock or crisis. It was a planned economic linkage among European countries. Therefore, the author has defined contagion as those significant increases in the co-movement among EEC market returns (low volatility to high volatility) which have been transmitted through a global factor such as EAFE index during pre-euro and post-euro. If the co-movement does not increase significantly, then any continued high level of market integration would suggest strong linkage due to interdependence. The author has have selected the EAFE index to be the transmission mechanism since 13 out of 21 countries are members of the EEC. As of December 2004, the MSCI EFAE consisted of the following 21 developed market country indexes: Australia, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland and the United Kingdom

By so defining the term "contagion", the existence of an advantage is experienced such that one can avoid the problem of identifying the particular country that has propagated the contagion. The author also used Jan. 1, 1999 as the starting point without setting an arbitrary beginning date of crisis.

EMPIRICAL RESULTS

Correlations between Equity Returns

The calculation of portfolio risk has been dependent upon both the standard deviations of returns for the securities(in the portfolio) and the respective correlation coefficients for these same securities. Tables 1 through 6 present correlations for major European indexes (13 countries), for

the U.S., and for the EAFE. These tables covered the period January 1993-August 2003 in U.S. dollars and local currency (hedged currency).

Table 1 indicates that correlations are positive in sign and low with no negative coefficients for the study period January 1993 to August 2003. Table 2 and 3 show the coefficients for the two sub-periods, pre-Euro (January 1993- December 1998) and post- Euro (January 1999 – August 2003). An examination of the correlations presented in these two tables shows a very strong relationship for the European equity markets. These coefficients have varied over time and among the European countries. The high positive correlations also imply that the advantage of cross border diversification has been reduced for the European investors. The average correlation coefficient in U.S. dollars is 0.64 for the period (1999-2003), in contrast to the average correlation coefficient of 0.71in Euros as presented in Table7. The correlations, however, have displayed some anticipated properties. Note the higher correlations for developed countries and the higher correlations for countries that are geographically proximate. The strong correlation between Germany and France (0.82 and 0.93) for the respective periods may be explained by observing that these two countries were engines of European economic unification.

The U.S. correlation with European markets illustrates the effects, over time, of Europe's economic integration. Consider that Solink (1988) studied the 15-year period 1971-1986 and found an average correlation of 0.35 between all countries. Solnik (1996) found the mean correlation of foreign and U.S. markets was about 0.40 for the period December 1958 to November 1995. The Eun and Resnick (1988) study found an average correlation of 0.41 for the period from 1973-1982. Hunter and Cogin (1990), in this later study, calculated an average correlation coefficient of about 0.55 for period from 1970-1986. These studies revealed an increase, over time, in the correlation coefficients. The implication of this effect could be intrepreted as follows: The investor's perception of a diversified portfolio (at one point in time) may provide smaller risk reduction benefits as correlation increases over time. This study provides further evidence that reduced restrictions on capital flows, increased institutional investments and market integration have raised the correlation coefficients for members of the EEC. The results of this paper also support the Solnick (1996) study conclusion that during periods of high market volatility correlations will increase.

Tables 5 and 6 present the correlations of the returns of the EEC members for pre- and- post Euro periods. The average correlations for the country pairs for the post-Euro have increased above pre-Euro (except for Austria). The average correlations have increased from 0.68 to 0.72.

The implication is that diversification opportunities for investors have diminished for portfolios consisting of the EEC equities. Similarly, the correlations of ECC members with the EAFE have also increased for pre-Euro and post-Euro. This increase would be expected as the ECC markets represent the dominant capitalization of the EAFE.

Table 1: Correlations for Monthly Equity Indexes Measured in U.S. Dollars January 1993 - August 2003														
Austria (AT)	AT													
Belgium (BE)	0.53	BL												
Denmark (DK)	0.29	0.27	DK											
Finland (FN)	0.19	0.31	0.31	FN										
France (FR)	0.47	0.71	0.38	0.57	FR									
Germany (GR)	0.50	0.69	0.40	0.56	0.82	GR								
Italy (IT)	0.35	0.47	0.33	0.46	0.61	0.57	IT							
Netherlands (ND)	0.58	0.77	0.42	0.55	0.84	0.84	0.57	ND						
Norway (NW)	0.50	0.55	0.52	0.49	0.64	0.59	0.49	0.66	NW					
Spain (SP)	0.46	0.59	0.48	0.48	0.73	0.69	0.62	0.71	0.64	SP				
Sweden (SW)	0.32	0.44	0.44	0.70	0.74	0.76	0.56	0.73	0.62	0.69	SW			
Switzerland (SZ)	0.52	0.64	0.37	0.38	0.63	0.58	0.41	0.73	0.55	0.59	0.53	SZ		
U.K.	0.51	0.67	0.41	0.57	0.76	0.69	0.45	0.80	0.62	0.68	0.62	0.66	U.K.	
U.S.	0.30	0.53	0.51	0.59	0.67	0.69	0.42	0.70	0.56	0.63	0.65	0.54	0.72	U.S.
EAFE	0.52	0.63	0.48	0.64	0.82	0.74	0.60	0.84	0.71	0.73	0.76	0.70	0.81	0.71

Table 2: Correlations for Monthly Equity Indexes Measured in U.S. Dollars January 1993- December 1998														
Austria (AT)	AT													
Belgium (BE)	0.44	BL												
Denmark (DK)	0.26	0.25	DK											
Finland (FN)	0.45	0.45	0.27	FN										
France (FR)	0.54	0.69	0.26	0.40	FR									
Germany (GR)	0.64	0.62	0.25	0.49	0.67	GR								
Italy (IT)	0.32	0.34	0.24	0.42	0.45	0.40	IT							
Netherlands (ND)	0.66	0.70	0.35	0.60	0.76	0.79	0.39	ND						
Norway (NW)	0.54	0.43	0.47	0.59	0.50	0.45	0.39	0.58	NW					
Spain (SP)	0.50	0.55	0.42	0.51	0.66	0.57	0.54	0.66	0.65	SP				
Sweden (SW)	0.47	0.38	0.35	0.68	0.57	0.57	0.45	0.71	0.64	0.64	SW			
Switzerland (SZ)	0.55	0.48	0.39	0.40	0.54	0.53	0.27	0.66	0.46	0.57	0.59	SZ		
U.K.	0.50	0.58	0.31	0.56	0.68	0.56	0.29	0.75	0.54	0.64	0.60	0.54	U.K	
U.S.	0.35	0.52	0.47	0.49	0.53	0.53	0.32	0.64	0.46	0.58	0.49	0.48	0.57	U.S
EAFE	0.56	0.59	0.38	0.62	0.70	0.58	0.49	0.77	0.62	0.68	0.70	0.65	0.73	0.56

Table 3: Correlations for Monthly Equity Indexes Measured in U.S. Dollars January 1999- August 2003

	AT	BL	DK	FN	FR	GR	IT	ND	NW	SP	SW	SZ	U.K.	U.S
Austria (AT)	AT													
Belgium (BE)	0.66	BL												
Denmark (DK)	0.35	0.36	DK											
Finland (FN)	-0.03	0.21	0.38	FN										
France (FR)	0.40	0.72	0.56	0.68	FR									
Germany (GR)	0.43	0.70	0.61	0.58	0.93	GR								
Italy (IT)	0.41	0.61	0.53	0.52	0.82	0.78	IT							
Netherlands (ND)	0.54	0.79	0.56	0.50	0.89	0.86	0.78	ND						
Norway (NW)	0.44	0.70	0.62	0.42	0.79	0.76	0.67	0.78	NW					
Spain (SP)	0.42	0.63	0.59	0.45	0.82	0.82	0.74	0.76	0.63	SP				
Sweden (SW)	0.21	0.45	0.59	0.70	0.85	0.86	0.71	0.74	0.63	0.77	SW			
Switzerland (SZ)	0.50	0.78	0.38	0.35	0.73	0.64	0.58	0.80	0.69	0.57	0.49	SZ		
U.K.	0.53	0.72	0.59	0.56	0.82	0.77	0.63	0.83	0.74	0.70	0.63	0.76	U.K.	
U.S.	0.27	0.50	0.62	0.64	0.76	0.76	0.53	0.72	0.69	0.67	0.75	0.57	0.81	U.S
EAFE	0.47	0.67	0.66	0.65	0.92	0.87	0.76	0.90	0.83	0.78	0.82	0.75	0.88	0.83

Table 4: Correlations for Monthly Equity Indexes Measured in Local Currency January 1993 - August 2003

	AT	BL	DK	FN	FR	GR	IT	ND	NW	SP	SW	SZ	U.K	U.S
Austria (AT)	AT													
Belgium (BL)	0.55	BL												
Denmark (DK)	0.52	0.60	DK											
Finland (FN)	0.26	0.38	0.44	FN										
France (FR)	0.53	0.74	0.65	0.64	FR									
Germany (GR)	0.55	0.73	0.69	0.61	0.86	GR								
Italy (IT)	0.43	0.56	0.60	0.52	0.71	0.66	IT							
Netherlands (ND)	0.61	0.79	0.71	0.59	0.86	0.86	0.65	ND						
Norway (NW)	0.56	0.61	0.65	0.52	0.68	0.64	0.54	0.71	NW					
Spain (SP)	0.52	0.63	0.66	0.54	0.78	0.73	0.69	0.75	0.69	SP				
Sweden (SW)	0.41	0.51	0.59	0.69	0.79	0.81	0.62	0.77	0.64	0.75	SW			
Switzerland (SZ)	0.56	0.70	0.64	0.46	0.73	0.70	0.53	0.79	0.66	0.72	0.61	SZ		
U.K.	0.59	0.70	0.63	0.57	0.78	0.73	0.58	0.82	0.66	0.73	0.66	0.73	U.K	
U.S.	0.39	0.62	0.60	0.62	0.70	0.71	0.49	0.74	0.61	0.68	0.66	0.67	0.76	U.S
EAFE	0.56	0.68	0.67	0.67	0.85	0.82	0.70	0.87	0.75	0.81	0.80	0.77	0.82	0.75

Table 5: Correlations for Monthly Equity Indexes Measured in pre-Euro (Local Currency) January 1993-December 1998														
Austria (AT)	AT													
Belgium (BL)	0.59	BL												
Denmark (DK)	0.64	0.66	DK											
Finland (FN)	0.52	0.53	0.47	FN										
France (FR)	0.66	0.78	0.59	0.51	FR									
Germany (GR)	0.71	0.75	0.67	0.57	0.78	GR								
Italy (IT)	0.48	0.56	0.66	0.50	0.63	0.58	IT							
Netherlands (ND)	0.73	0.79	0.70	0.64	0.82	0.85	0.56	ND						
Norway (NW)	0.62	0.55	0.59	0.63	0.57	0.52	0.47	0.65	NW					
Spain (SP)	0.61	0.64	0.66	0.59	0.73	0.65	0.64	0.72	0.71	SP				
Sweden (SW)	0.58	0.53	0.50	0.68	0.72	0.68	0.53	0.76	0.64	0.73	SW			
Switzerland (SZ)	0.65	0.65	0.61	0.48	0.69	0.70	0.47	0.77	0.58	0.75	0.66	SZ		
U.K.	0.66	0.62	0.58	0.57	0.74	0.66	0.48	0.74	0.59	0.72	0.63	0.65	U.K	
U.S.	0.41	0.57	0.43	0.58	0.56	0.57	0.38	0.67	0.50	0.63	0.53	0.59	0.63	U.S
EAFE	0.63	0.68	0.60	0.64	0.76	0.73	0.63	0.82	0.69	0.81	0.76	0.74	0.75	0.62
Average	0.50	0.64	0.63	0.58	0.77	0.74	0.60	0.78	0.67	0.74	0.68	0.72	0.79	

THE RISK-RETURN PERFORMANCE

The decade of the 1990s was a favorable period for U.S. markets relative to foreign markets; see Kashefi and McKee (2002). Table 8 presents the monthly return, risk and return-to-risk reward rations of Sharpe and Treynor for U.S. investors (in dollars) for the respective time intervals. Table 8 shows the same results in local currencies. The calculation of the Sharpe and Treynor ratios assumed a risk-free rate of zero to simplify the calculations. The result represents the expected rate of return divided by standard deviation.

The table 8 shows that only Finland and Switzerland had better Sharpe and Treynor ratios than U.S. markets during 1993-2003 periods. The U.S. markets did exhibit better performance (Sharpe=0.42) for the pre-Euro period. The result indicates that the risk, whether measured using standard deviations or betas, increased post- Euro. The average beta has increased from 0.93 for pre-Euro to 1.14 for the post-Euro, while the average standard deviation for returns increased from 5.53% to 6.56%.

Table 6: Correlations for Monthly Equity Indexes Measured in Euro January 1999-August 2003													
Austria (AT)	AT												
Belgium (BL)	0.57	BL											
Denmark (DK)	0.36	0.55	DK										
Finland (FN)	0.03	0.27	0.42	FN									
France (FR)	0.36	0.70	0.71	0.73	FR								
Germany (GR)	0.45	0.71	0.71	0.62	0.93	GR							
Italy (IT)	0.34	0.56	0.52	0.58	0.82	0.79	IT						
Netherlands (ND)	0.52	0.78	0.71	0.55	0.89	0.87	0.78	ND					
Norway (NW)	0.46	0.71	0.73	0.46	0.81	0.79	0.67	0.82	NW				
Spain (SP)	0.40	0.61	0.64	0.52	0.83	0.83	0.74	0.77	0.67	SP			
Sweden (SW)	0.27	0.49	0.65	0.69	0.86	0.87	0.76	0.77	0.67	0.80	SW		
Switzerland (SZ)	0.41	0.76	0.69	0.47	0.78	0.74	0.60	0.84	0.79	0.63	0.61	SZ	
U.K.	0.56	0.74	0.67	0.56	0.81	0.77	0.71	0.87	0.74	0.74	0.67	0.84	U.K
U.S.	0.41	0.62	0.73	0.64	0.82	0.79	0.61	0.78	0.75	0.71	0.73	0.76	0.85	U.S
EAFE	0.47	0.67	0.72	0.71	0.94	0.91	0.81	0.91	0.85	0.82	0.85	0.81	0.88	0.87
Average	0.40	0.63	0.66	0.59	0.85	0.82	0.71	0.82	0.75	0.74	0.71	0.80	0.86	

Table 7: Comparison of Correlations to the U.S. Market Monthly U.S. Dollar Returns Jan. 1999-August 2003		
	Correlation in Euros	Correlation in U.S. Dollars
Austria (AU)	0.41	0.27
Belgium (BL)	0.62	0.50
Denmark (DK)	0.73	0.62
Finland (FN)	0.64	0.64
France (FR)	0.82	0.76
Germany (GR)	0.79	0.76
Italy (IT)	0.61	0.53
Netherlands (ND)	0.78	0.72
Norway (NW)	0.75	0.69
Spain (SP)	0.71	0.67
Sweden (SW)	0.73	0.75
Switzerland (SZ)	0.76	0.57
U.K.	0.85	0.81
Average	0.71	0.64

| Table 8: Monthly Return and Risk to U.S. Investors in U.S. Dollar for Different Time Intervals | | | | | | | | | | | | | | |
| | Jan. 1993-Aug. 03 | | | | | Jan. 1993-Dec. 98 | | | | | Jan. 1999-Aug.03 | | | | |
	Return	Standard Deviations	Beta	Sharpe Ratio	Treynor	Return	Standard Deviations	Beta	Sharpe	Treynor	Return	Standard Deviations	Beta	Sharpe	Treynor
Austria	0.22%	5.17%	0.66	0.04	0.003	0.31%	5.17%	0.87	0.06	0.004	0.10%	5.22%	0.46	0.02	0.002
Belgium	0.48%	5.10%	0.78	0.09	0.006	1.61%	3.59%	0.69	0.45	0.023	-0.98%	6.29%	0.89	-0.16	-0.011
Denmark	0.42%	7.29%	0.84	0.06	0.005	0.36%	7.94%	0.75	0.05	0.005	0.50%	6.44%	0.92	0.08	0.005
Finland	2.31%	10.77%	1.64	0.21	0.014	3.54%	8.67%	1.24	0.41	0.029	0.72%	12.89%	1.80	0.06	0.004
France	0.64%	5.51%	1.14	0.12	0.006	1.28%	4.90%	1.02	0.26	0.013	-0.18%	6.16%	1.27	-0.03	-0.001
Germany	0.63%	6.39%	1.26	0.10	0.005	1.55%	4.64%	0.92	0.33	0.017	-0.54%	8.00%	1.60	-0.07	-0.003
Italy	0.84%	7.11%	1.10	0.12	0.008	1.87%	7.64%	1.1	0.25	0.017	-0.50%	6.18%	1.05	-0.08	-0.005
Netherlands	0.70%	5.39%	1.12	0.13	0.006	1.75%	4.30%	0.96	0.41	0.018	-0.64%	6.32%	1.26	-0.10	-0.005
Norway	0.70%	6.41%	1.05	0.11	0.007	0.91%	6.56%	1.04	0.14	0.009	0.43%	6.25%	1.11	0.07	0.004
Spain	1.02%	6.56%	1.21	0.16	0.008	2.03%	6.65%	1.26	0.30	0.016	-0.27%	6.27%	1.13	-0.04	-0.002
Sweden	1.21%	7.94%	1.37	0.15	0.009	1.98%	6.33%	1.05	0.31	0.019	0.22%	9.59%	1.69	0.02	0.001
Switzerland	0.91%	4.92%	0.87	0.19	0.010	1.97%	4.92%	0.93	0.40	0.021	-0.44%	4.62%	0.81	-0.10	-0.005
U.K.	0.43%	4.06%	0.76	0.11	0.006	1.21%	3.66%	0.63	0.33	0.019	-0.58%	4.35%	0.86	-0.13	-0.007
U.S.	0.76%	4.45%	0.76	0.17	0.010	1.58%	3.73%	0.56	0.42	0.028	-0.29%	5.08%	0.95	-0.06	-0.003
EAFE	0.38%	4.47%	1.00	0.09	0.004	0.97%	4.24%	1	0.23	0.010	-0.37%	4.68%	1.00	-0.08	-0.004
Average	0.78%	6.10%	1.04	0.12	0.007	1.53%	5.53%	0.93	0.29	0.016	-0.19%	6.56%	1.13	-0.04	-0.002

When the ratios were computed in local currencies, Finland and Spain exhibited the best performance measured by the Sharpe and Treynor ratios from 1993 to 1998. Tables 8 and 9 also provide evidence that during both the study period and the two sub periods (before and after Euro), the U.S. equity market was less volatile as measured by standard deviation. This was also observed for most of the European equity markets (U.K. is an exception) whether stated in dollars or local currency. The higher risk of European equity markets was clear when local currencies were used in the calculation of the standard deviations. The superior Sharpe and Treynor ratios for the U.S. were attributable to a period of economic boom in U.S. stock markets. The remarkable returns attracted investors who perceived the market risk to be substantially lower. Table 9 shows the Sharpe and Treynor ratios for the period January 1999 through August 2003. For this period, the turmoil in the U.S. equity markets following the dot com collapse and lackluster economy were reflected in quite different ratios.

Table 9:	Monthly Return and Risk for U.S. Investors in Local Currency for Different Time Intervals								
	Jan. 1993-Aug. 03			Jan. 1993-Dec. 98			Jan. 1999-Aug.03		
	Return	Standard Deviations	Sharpe	Return	Standard Deviations	Sharpe	Return	Standard Deviations	Sharpe
Austria	0.30%	5.25%	0.058	0.39%	5.76%	0.068	0.19%	4.55%	0.041
Belgium	0.56%	5.10%	0.110	1.69%	4.27%	0.396	-0.89%	5.72%	-0.156
Denmark	1.00%	5.59%	0.179	1.56%	5.27%	0.297	0.27%	5.94%	0.046
Finland	2.34%	10.82%	0.217	3.45%	8.15%	0.424	0.91%	13.44%	0.068
France	0.73%	5.94%	0.123	1.34%	5.63%	0.238	-0.05%	6.29%	-0.008
Germany	0.74%	6.79%	0.109	1.63%	5.32%	0.306	-0.41%	8.23%	-0.049
Italy	0.97%	6.98%	0.139	2.02%	7.49%	0.269	-0.38%	6.06%	-0.063
Netherlands	0.80%	5.72%	0.140	1.82%	4.93%	0.370	-0.52%	6.42%	-0.080
Norway	0.74%	6.17%	0.120	1.02%	6.39%	0.160	0.38%	5.92%	0.064
Spain	1.25%	6.60%	0.189	2.33%	6.56%	0.355	-0.14%	6.45%	-0.022
Sweden	1.31%	7.60%	0.173	2.15%	5.89%	0.365	0.24%	9.29%	0.026
Switzerland	0.89%	5.14%	0.173	1.90%	5.33%	0.356	-0.41%	4.62%	-0.088
U.K.	0.40%	4.10%	0.097	1.08%	3.63%	0.298	-0.48%	4.53%	-0.106
U.S.	0.76%	4.45%	0.171	1.58%	3.73%	0.424	-0.29%	5.08%	-0.057
EAFE	0.38%	4.42%	0.085	0.90%	4.21%	0.215	-0.30%	4.64%	-0.065
Average	0.88%	6.05%	0.139	1.66%	5.50%	0.303	-0.13%	6.48%	-0.030

RETURNS AND EXCHANGE GAINS

Risk reduction was not the sole explanation for increased interest in international diversification. Higher expected returns resulting from growing economies or from currency gains also had encouraged international investment and diversification. Table 10 depicts the average monthly returns and the exchange gain for the period January 1993- and January 1999- August 2003. The exchange gain column was computed as the difference between the local currency returns and the returns measured in U.S. dollars. The average monthly return, in local currency units for equities, was 1.72% (excluding U.S. and EAFE). The USD strengthened over this period, however, even with an exchange loss averaging –0.15% the average non-U.S. equity index returned 1.57%. This may be compared to 1.58% for the U.S. market during the period January 1993-December 1998. For the 1999-2003 period, the local currency monthly return was -.10% in contrast with -0.29% for the U.S. equity market.

The Return in U.S. Dollars column in Table 10 revealed that equity markets for five countries, Austria, Denmark, France, Norway, and the United Kingdom and the EAFE portfolio had

returns lower than the United States for the period 1993-1998. One could construct a diversified portfolio that contained equities of the remaining countries with higher rates of return than those in the U.S. The risk return tradeoff was assumed to be an integral factor in the choice of portfolio. The Sharpe ratio for the portfolio containing the countries with higher return yields was 0.35. The Sharpe ratio for the U.S. portfolio was 0.424. The superior Sharpe ratio for the U.S. portfolio reflected the lower risk of that portfolio. International diversification would not have risk reduction benefits for this portfolio over this period of time. In fact, the return does not compensate the investor for the added risk. The same conclusion holds for the period January 1999 through August 2003.

	Table 10					
	Return to U.S. Investors in Stocks January 1993-December 1998			Return to U.S. Investors in Stocks January 1999- August 2003		
Equity Market	Return in Local	Exchange Gain	Return in U.S. Dollar	Return in Euro	Exchange Gain	Return in U.S. Dollar
Austria	0.39%	-0.08%	0.31%	0.19%	-0.09%	0.10%
Belgium	1.69%	-0.07%	1.61%	-0.89%	-0.09%	-0.98%
Denmark	1.56%	-1.20%	0.36%	0.27%	0.23%	0.50%
Finland	3.45%	0.08%	3.54%	0.91%	-0.19%	0.72%
France	1.34%	-0.06%	1.28%	-0.05%	-0.13%	-0.18%
Germany	1.63%	-0.07%	1.55%	-0.41%	-0.14%	-0.54%
Italy	2.02%	-0.14%	1.87%	-0.38%	-0.11%	-0.50%
Netherlands	1.82%	-0.07%	1.75%	-0.52%	-0.13%	-0.64%
Norway	1.02%	-0.12%	0.91%	0.38%	0.05%	0.43%
Spain	2.33%	-0.30%	2.03%	-0.14%	-0.13%	-0.27%
Sweden	2.15%	-0.17%	1.98%	0.24%	-0.02%	0.22%
Switzerland	1.90%	0.07%	1.97%	-0.41%	-0.04%	-0.44%
U.K.	1.08%	0.13%	1.21%	-0.48%	-0.10%	-0.58%
U.S.	1.58%	0.00%	1.58%	-0.29%	0.00%	-0.29%
EAFE	0.90%	0.06%	0.97%	-0.30%	-0.07%	-0.37%
Average	1.66%	-0.13%	1.53%	-0.13%	-0.06%	-0.19%

EUROPEAN ECONOMIC UNITY AND MARKET INTEGRATION

During any examination of investment strategy by U.S. investors, with the stated purpose of achieving risk reduction through diversification, one would need to examine whether or not

European markets have become more integrated. Increased integration would be assumed to lower the diversification benefits. The trends in market integration need to be examined.

To measure the degree of integration, the author used the methodology employed by H. Akdogan (1996). Equation 1 is the standard single index asset pricing model:

$$R_i = \alpha_i + \beta_i R_M + e_i \qquad\qquad \text{Equation 1}$$

where R_i is the rate of return on the market portfolio of country i, and β_i is the beta of the ith country *vis-à-vis* the EAFE portfolio index (R_M).
α_i is the constant term of the regression and e_i is the idiosyncratic (residual) component of the country's index. Equation 2 presents the total country risk that is decomposed into its systematic risk (the first term on right-hand side) and its unsystematic risk. Equation 3 shows both risks as fractions of total risk.

$$\sigma_i{}^2 = \beta_i{}^2 \sigma_M{}^2 + \sigma_{ei}{}^2 \qquad\qquad \text{Equation 2}$$

$$1 = \frac{\beta_i{}^2 \sigma_M{}^2}{\sigma_i{}^2} + \frac{\sigma_{ei}{}^2}{\sigma_i{}^2} \qquad\qquad \text{Equation 3}$$

The systematic risk fraction measured the contribution of ith market risk to total market risk. To adjust for the country's market weight in the index, Akdogan divided the systematic risk fraction by the country's market capitalization. However, some argue that it might not be an ideal weighting scheme to measure each country's contribution to the total risk. This would be, in part, due to differing proportions of each country's corporate sector organized as publicly traded companies. Another problem with market capitalization weights resulted from the practice of cross-holding. This practice has tended to overstate the aggregate value of outstanding equity. Therefore, the author has elected to use the systematic risk fraction as a basis of comparison and to also use equal weights.

A growing fraction of systematic risk compared to the EAFE portfolio index suggested the market i has become more integrated into the portfolio index. A market with a smaller fraction of systematic risk would be less integrated relative to the portfolio index.

Table 11 contains the results for pre-and-post Euro. The systematic risk fraction for all of the EEC members (except Austria and Belgium) increased from the pre-Euro to post-Euro period. This would imply that these markets had become more integrated. Our results differ to some degree from Akdogan's (1996) study. Akodgon's analysis indicated that Finland, Spain, Denmark, and Italy had a lower systematic risk fraction for the decade of the 1980s compared with that of the 1970s.

The countries appeared to have been successful in their movement toward integration in the 1990's and into the first decade of 2000.

	Jan. 93-Dec-98			Jan 99-Aug.03		
Table 11: **Risk and market Integration Prior to December 1998 and After January 1999**						
Countries	Standard Deviation U.S. Dollar	Beta[a]	Systematic Risk Fraction[b]	Standard Deviation U.S. Dollar	Beta[a]	Systematic Risk Fraction[b]
Austria	5.17%	0.87	0.509	5.22%	0.46	0.171
Belgium	3.59%	0.69	0.665	6.29%	0.89	0.439
Denmark	7.94%	0.75	0.161	6.44%	0.92	0.449
Finland	8.67%	1.24	0.368	12.89%	1.80	0.428
France	4.90%	1.02	0.781	6.16%	1.27	0.932
Germany	4.64%	0.92	0.709	8.00%	1.60	0.877
Italy	7.64%	1.10	0.373	6.18%	1.05	0.633
Netherlands	4.30%	0.96	0.896	6.32%	1.26	0.872
Norway	6.56%	1.04	0.452	6.25%	1.11	0.692
Spain	6.65%	1.26	0.646	6.27%	1.13	0.713
Sweden	6.33%	1.05	0.495	9.59%	1.69	0.682
Switzerland	4.92%	0.93	0.642	4.62%	0.81	0.674
U.K.	3.66%	0.63	0.534	4.35%	0.86	0.857
U.S.	3.73%	0.56	0.406	5.08%	0.95	0.768
EAFE	4.24%	1.00	1.000	4.68%	1.00	1.000
Average	5.53%	0.93	0.58	0.07	1.13	0.68
a. Betas are computed in relation to a capitalization-weighted EAFE market portfolio b. Systematic fraction is the share of systematic risk to total risk						

TEST FOR CONTAGION EFFECT

The above analyses have shown that both volatility and correlations among the ECC members have increased in the post Euro period. It also indicated that the systematic risk for most of these countries had increased, thus indicating a higher degree of integration. Solnik, Boucrelle & Le Fur (1996) found that the level of correlation between the world's major stock markets had been increasing. They concluded that that the markets had become more financially integrated. Their results also showed that, although the correlation coefficients among markets were low during

normal times, they increased during crisis periods. This would become a challenge for investors who followed a correlation and country based risk diversification strategy, since the expected diversification benefit diminished during high correlation periods. Thus, what appeared to be a well-diversified portfolio frequently was not. Using an application of this correlation analysis to the European Union countries in the run-up to a monetary union, Beckers (1999) argued that the gradual increase in correlation between European equity markets would be boosted by the introduction of the Euro. For active portfolio managers, however, Beckers argued that the high degree of integration among the ECC would increase the overall risk of portfolios as diversification benefits eroded.

   This section investigated the contagion effect of Euro to European equity markets. Heteroskedasticity adjusted correlation coefficients were applied to discriminate between contagion and interdependence. The methodology was based on Forbes-Rigobon (2001 and 2002) by analyzing changes in the correlation between crisis (after Euro) and non-crisis (pre Euro) stock market returns. If there were contagion effects, then one should expect that the market volatility for post-euro would be higher than the pre-euro volatility. As the volatility increased over the time period under consideration, conditional estimates of cross-market correlations should be biased upward. Forbes and Rigobon (2002) showed how to adjust the correlation coefficient to correct for this bias. Table 12 shows the conditional correlation coefficient of each country with EAFE index. The result shows a strong increase in the correlation coefficients from non-crisis period (1993-1998) to crisis period (1999-2003). This was a precursor for contagion to occur.

Table 12 Comparison of Correlations to the EAFE index			
	1993-1998	19992003	1993-2003
AUS	0.63	0.47	0.56
BEL	0.68	0.67	0.68
DEN	0.60	0.72	0.67
FIN	0.64	0.71	0.67
FRA	0.76	0.94	0.85
GER	0.73	0.91	0.82
ITA	0.63	0.81	0.70
NET	0.82	0.91	0.87
NOR	0.69	0.85	0.75
SPN	0.81	0.82	0.81
SWE	0.76	0.85	0.80
SWZ	0.74	0.81	0.77
UK	0.75	0.88	0.82
US	0.62	0.87	0.75

However, one cannot compare both correlation coefficients directly to analyze whether this increase was due to contagion or fundamental linkage for both periods. The high volatility of returns in the EEC markets might be the result of stable fundamental linkages which had induced higher correlation between the markets, even when contagion did not occur.

Forbes and Rigobon (2002) showed that under the assumption of no omitted variables or heteroskedasticity, the unconditional correlation coefficient, which does not depend on the volatility of returns in the crisis market must satisfy:

$$\rho^u = \frac{\rho^c}{\sqrt{1+\delta[1-(\rho^c)^2]}}$$

Equation 4

where ρ^U and ρ^C are unconditional and conditional correlation coefficients. Appendix A shows the Forbes and Rigobon derivation of the equation 4.

After computing the conditional correlation coefficient for the non-crisis period ρ^c, and the unconditional correlation coefficient for the crisis period, ρ^u, both coefficients were converted with a Fisher transformation into approximately normally distributed variables and so that they could be compared by employing standard tests, as in Gelos and Sahay (2001). This paper investigated both the null hypotheses of no increase and no decrease in the relationship between the crisis and non-crisis countries, using standard one tail t-statistics. The corresponding alternative hypotheses would be that there **was** an increase (decrease) in correlation coefficients. A significant positive change in correlation coefficients between the stable period and the turmoil period would be interpreted as a shift in the structure of those relationships. This would result in evidence in favor of contagion. Furthermore, a significant decrease in correlation between the stock markets returns could be interpreted as a break in links between them.

Table 13 reported conditional and unconditional correlation coefficients and standard deviations for European equity markets for the three sample periods. The test statistic indicated that, after adjusting for heteroskedasticity, the only country which exhibited a contagion effect was Austria. In most of the countries, the unconditional correlation coefficients were lower than conditional correlation during crisis but slight higher during non-crisis periods.

For example, the average conditional correlation for the non-crisis period was 0.70 compared with 0.80 for the crisis period, while the average unconditional correlation for the non-crisis period was 0.67 compared with 0.78 for the crisis period. The fisher test for conditional correlation indicated contagion effects for Austria, Denmark, Finland**,** Italy, and the United States, while the test statistics for unconditional correlation showed contagion for Austria alone. In other words, the above results showed that there was only a contagion effect from European countries to Austria. The adjustment for heteroskedasticity indicates that these countries appeared to be highly correlated per and post Euro and the high correlations indicated no contagion effect.

	Non crisis 93-98 Conditional	Crisis 99-03 Conditional	Full Period 93-03 Conditional	Fisher Test	Contagion	93-98 Unconditional Correlation	99-03 Unconditional Correlation	93-03 Unconditional Correlation	Fisher Test	Contagion
Table 13										
AUS	0.63	0.47	0.56	1.81	C	0.6	0.42	0.51	4.73	C
BEL	0.68	0.67	0.68	1.48	N	0.64	0.63	0.64	1.49	N
DEN	0.6	0.72	0.67	2.34	C	0.55	0.7	0.63	1.06	N
FIN	0.64	0.71	0.67	2.32	C	0.55	0.68	0.63	1.17	N
FRA	0.76	0.94	0.85	0.78	N	0.75	0.94	0.84	0.14	N
GER	0.73	0.91	0.82	1.03	N	0.7	0.9	0.81	0.22	N
ITA	0.63	0.81	0.7	1.77	C	0.6	0.79	0.68	0.58	N
NET	0.82	0.91	0.87	0.54	N	0.81	0.91	0.86	0.21	N
NOR	0.69	0.85	0.75	1.27	N	0.66	0.84	0.74	0.43	N
SPN	0.81	0.82	0.81	0.6	N	0.79	0.8	0.8	0.56	N
SWE	0.76	0.85	0.8	0.87	N	0.73	0.84	0.78	0.43	N
SWZ	0.74	0.81	0.77	0.94	N	0.72	0.8	0.75	0.57	N
UK	0.75	0.88	0.82	0.9	N	0.73	0.87	0.8	0.32	N
US	0.62	0.87	0.75	1.92	C	0.58	0.86	0.73	0.36	N
Average	0.7	0.8	0.75			0.67	0.78	0.73		

CONCLUSION

Thus paper contributes to the existing literature as follows:

(1)   The study provides evidence that portfolios denominated in equity markets of countries that have adopted the Euro have a higher risk than does a portfolio of U.S. equities; and

(2)   That the correlation coefficients for EEC member countries have increased. The risk diversification benefits (to European investors) from international diversification among member countries were lowered; and.

(3)   U.S. equity markets have provided the best risk to reward ratio during the decade of 1990's; and

(4)   The high correlation among ECC members does not qualify as a contagion.

One may conclude that opportunities for global diversification have diminished and that investors' focus should be directed toward the emerging markets. As these markets mature, their Sharpe and Treynor ratios should improve if risk falls more rapidly than average returns and their correlation coefficients do not increase significantly. The efforts directed toward achieving economic integration of the European economies appears to have been successful and further progress might well lead to the establishment of a common equity market for EEC members in the near future.

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APPENDIX A[*]

To derive equation 4, assume that Ri and Rj are stochastic variables which represent stock market returns (in two different markets) and these returns are related according to the equation:

$$R_{it} = \alpha + \beta R_{jt} + e_t \tag{1}$$

where

$$E[e_t] = 0, \tag{2}$$
$$E[e_t^2] = \text{constant} \tag{3}$$
$$E[R_{jt}, e_t] = 0 \tag{4}$$

Divide the sample into two sets, so that the variance of R_{it} is lower in one group (A) and higher in the second group (B.) In terms of the previous discussion, the low-variance group is the period of relative market stability and the high-variance group is the period of market turmoil.

Next, since $E[R_{jt}, \epsilon_t] = 0$ by assumption, OLS estimates of equation 2 are consistent and efficient for both groups and $\beta_A = \beta_B$. By construction we know that $\sigma_{ii}^A > \sigma_{jj}^B$, which when combined with the standard definition of β:

$$\beta^A = \frac{\sigma_{ij}^A}{\sigma_{jj}^A} = \frac{\sigma_{ij}^B}{\sigma_{jj}^B} = \beta^B \tag{5}$$

implies that $\sigma_{ij}^B > \sigma_{ij}^A$ In other words, the cross-market covariance is higher in the second group, and this increase in the cross-market covariance from that in the first group is directly proportional to the increase in the variance of Rj. Meanwhile, according to (2), the variance of R_i is:

$$\sigma_i^2 = \beta_i^2 \sigma_j^2 + \sigma_{e_i}^2 \tag{6}$$

Since the variance of the residual is constant and $|\beta| < 1$, the increase in the variance of R_i across groups is less than proportional to the increase in the variance of R_j. Therefore,

$$\frac{\sigma_{jj}{}^B}{\sigma_{ii}{}^B} \rangle \frac{\sigma_{jj}{}^A}{\sigma_{jii}{}^A} \tag{7}$$

Finally, substitute (5) into the standard definition of the correlation coefficient:

$$\rho = \frac{\sigma_{ij}}{\sigma_j \sigma_i} = \beta \frac{\sigma_j}{\sigma_i} \tag{8}$$

and when combined with (7), this implies that $\rho^B > \rho^A$.

As a result, the estimated correlation between R_i and R_j will increase when the variance of R_j increases—even if the true relationship (β) between R_i and R_j does not change. Therefore, inference about the change of the propagation mechanism based on the correlation coefficient can be misleading; the unadjusted correlation coefficient is conditional on the variance of R_j.

It is possible to quantify this bias under certain conditions. Specifically, in the absence of endogeneity and omitted variables the conditional correlation can be written as:

$$\rho^C = \rho^U \sqrt{\frac{1+\delta}{1+\delta\rho^2}} \tag{9}$$

where ρ^C is the conditional correlation coefficient, ρ^U is the unconditional correlation coefficient, and δ is the relative increase in the variance of R_j:

$$\delta = \frac{\sigma_{jj}{}^A}{\sigma_{jj}{}^B} - 1 \tag{10}$$

Equation (9) clearly shows that the estimated correlation coefficient increases in δ. Therefore, during periods of high volatility in market j, the estimated correlation between markets i and j will be greater than the actual correlation. As a result, estimated correlation coefficients will be biased upward during periods of market turmoil. Since markets tend to be more volatile after a shock, this could lead us to incorrectly accept that cross-market correlations increase after a crisis. A simple manipulation of equation (5) to solve for the unconditional correlation yields:

$$\rho^U = \frac{\rho^C}{\sqrt{1+\delta[1-(\rho^C)^2}} \quad (11) \tag{11}$$

* This is based on Forbes and Rigobon (2002).

MODELING THE TRANSFER OF TECHNOLOGY TO TAIWAN FROM CHINA

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ABSTRACT

For decreasing their cost, the Taiwan's traditional industries' companies move their production base to the areas the income is lower. In the meantime, the China's technological research and development departments lack the expenditure to maintain their operation. This study wants to know how let the Taiwan's companies cooperate with the China's technological research and development departments. This study found the Taiwan's companies cooperate with the China's research and development departments because the technologies they need are too advanced or the other country's' companies they own this technology ask higher prices. The objects the Taiwan's companies cooperate with are including not only the companies but also the research and development departments. The models they use are including buying in the market, alliance and cooperating between the companies. From these foundlings of this study, we found five propositions:

1. *The ability to absorb technical knowledge influences the method used to build such knowledge.*
2. *The industry life cycle affects the type of technical knowledge transfer.*
3. *Those whose technical knowledge has relatively little external exposure will bring in large numbers of specialized personnel from Mainland China; in the case where the technical knowledge has relatively high external exposure, the manufacturers will tend to not bring in specialized personnel from Mainland China.*
4. *The manufacturer's ability to absorb technology affects the manufacturer's ability to bring in specialized personnel from Mainland China to assist the manufacturer in receiving technical knowledge.*
5. *Manufacturers that prepare tenders for the transfer of technology that have relatively high external exposure will resort to purchases in the market and strategic alliances, while manufacturers that prepare tenders for the transfer of technology that have relatively low external exposure will adopt the external assistance/ internal R&D approach.*

INTRODUCTION

After Communist China and the former Soviet Union broke up with each other, the former Soviet Union not only stopped providing the Communist Chinese with assistance, but it also suddenly cut off China's main source of technology. In view of its defense requirements, Communist China was thus forced to rely on its own ability to develop various kinds of technology. However, as reforms were slowly introduced, the focus of the research activities of the research units at various levels of government and also among domestic enterprises shifted from being primarily defense-oriented to that where equal consideration was given to both defense and the people's livelihood. Furthermore, in certain specific areas, Communist China's technology was already as good as that of the advanced countries, while many people were trained as basic-level technicians and R&D personnel. However, in later years as the economic reforms and market-opening policies were implemented, not only did many publicly-run institutions go bankrupt, but also the national budget was used up. In an attempt to economize on national expenditure and enable public enterprises to survive, the vast majority of research units were forced to accept market competition, and hence they maintained a relatively positive attitude towards technological cooperation and technology transfer.

In the past, Taiwanese manufacturers were able to obtain the technical knowledge that they needed from the industrialized nations, including European countries, the U.S. and Japan. However, as Taiwan has become stronger in terms of its production, manufacturing and R&D activities, it has gradually placed greater emphasis on value added within the overall value cycle. Taiwanese manufacturers are now finding it increasingly difficult to obtain the technical knowledge that they need from the advanced countries, as was the case in the past. Furthermore, because Taiwan and Mainland China share a similar language and culture, and because industries on the two sides of the Taiwan Strait are characterized by a high degree of complementarity, for this reason, the transfer of technology from Mainland China to Taiwan is the main focus of our research.

Based on the research questions mentioned above, our specific research objectives are as follows:

1. To understand the types of technical knowledge needed by Taiwanese manufacturers that are currently being transferred from Mainland China to Taiwan, the reasons why the technical knowledge is being transferred, and the actual procedures being followed for bringing in the technology.

2. To analyze the special features of both parties involved in the importation of technical knowledge, the special characteristics of the technical knowledge, and the effects of new product development on the process by which the manufacturers bring in the technology.

LITERATURE REVIEW

The Definition of Technical Knowledge Transfer

Technical knowledge is not the same, generally speaking, as a product-type good, and it is not produced to be sold. The reason why technology transfer takes place is because of the needs that both sides to the technology transfer have. Because significant differences exist in terms of the level of technology of the technologically-advanced and the technologically-backward, and it is also difficult to rely on one's own efforts to upgrade one's own level of technology, those that are technologically-backward will cooperate with technologically-advanced organizations. The market for technology may thus be seen as a market in which monopolistic competition prevails. Both the product and the manufacturing process have their own special characteristics, to the extent that each of them has different patents. For these reasons, because of competition, the technology itself actually becomes a kind of product. It is actually quite difficult to make technology a monopoly. The various definitions of technology transfer as follows: The process by which an organization adopts an innovation made by another organization (Rogers, 1972), Technology transfer is that which takes place between advanced countries and developing countries. In order to expand new manufacturing equipment and existing manufacturing equipment, technology transfer refers to the act of transferring the needed technical knowledge that has been designed and managed (UNCTAD, 1973) and The application of new technology to a new use or user (Rodrigues, 198).

We can see that scholars frequently define the transfer of technical knowledge as a process. It is a process by which an organization or a country transfers scientific or technological achievements, new uses for technology, designs and the technical knowledge needed for administrative projects or the knowledge that can be used in production, i.e. patents and scientific principles that can be used in a wide variety of ways to transfer the technical knowledge to another entity.

The Transfer of Technical Knowledge Model

Studies by researchers on the types of technology transfer are too numerous to mention, and each scholar seeks to explain the different types of technology transfer in his own way. However, since many of these approaches are difficult to classify in a concrete manner, we adopt the approach of Mansfield (1968) who categorizes the sources of technical knowledge into horizontal transfers of technical knowledge within the same industry and vertical transfers whereby research institutions transfer technical knowledge to firms. We also adopt the categorization of Solow (1972) who distinguishes between the uses put to the technology after the recipient manufacturer has received it. There is that where the transfer takes place without any change in the use to which the technology is put, i.e. a single-track transfer, that where a partial adjustment takes place following the transfer,

i.e. a new-track transfer, and that where the technology is used for a different purpose, i.e. a cross track transfer.

Methods of Transferring Technical Knowledge

When studying the ways in which technical knowledge is transferred, most researchers focus on the recipient of the technical knowledge and the timing of the transfer (Johnson, 1976), these being the two main considerations from the point of view of the purchaser. They never seem able to look at it from the angle of learning and knowledge. Helleloid, Duane, Simonin and Bernard (1994) believe that, in order to maintain the organization's competitiveness, the organization must learn and strengthen its core competitiveness. Learning includes the acquisition, handling and gathering of knowledge, while the acquisition of knowledge involves five different methods:

1. Developing it oneself: Organizations have frequently had the relevant technology to make decisions to develop potential products themselves. It is likely that this is pure research or basic research.

2. External assistance/ Internal R&D: Many companies that have developed products in-house have had assistance from outside. This has enabled such firms to use outside personnel to monitor external resources and knowledge.

3. Purchases in the open market: Organizations that use this kind of approach to obtain knowledge will also frequently find that other organizations use such an approach to obtain knowledge. For this reason, the organization will focus on keeping up with developments in the outside world.

4. Strategic alliances: When different organizations possess different types of specialized or complementary knowledge, they can learn from and complement each other by means of strategic alliances.

5. Mergers and Acquisitions: When knowledge cannot be obtained anywhere, or else when knowledge is built into other organizations and cannot be separated from them, this approach is likely to be the best approach for acquiring knowledge.

In this study, our emphasis is on modeling the recipient of technical knowledge's transfer of knowledge and not on pure technology transfer, and for this reason we adopt the standpoint of Helleloid, Duane, Simonin & Bernard (1994).

Special Teams for Developing New Products

The so-called teams are necessary for such teams to have a common objective and a significant ability to coordinate their activities if they are to complete their common tasks. Furthermore, new product development teams are teams that are formed by the organization to receive technical knowledge and develop new products. Clark & Wheelwright (1992) distinguish four kinds of teams based on the relationships between their members:

1. Functional teams: Functional teams are teams that are formed as part of traditionally functioning organizational structures, and agreement among departments is reached within the scope of work or through meetings convened for this purpose.

2. Lightweight teams: The structure of these lightweight teams is similar to that for functional teams except that there is also a coordinator. This coordinator is frequently a relatively low-ranking manager within the organization.

3. Heavyweight teams: The heavyweight team's special purpose manager can directly lead those personnel assigned to this special task. At the same time he is directly responsible for the success or failure of the project. Such a manager often has much authority within the organization.

4. Autonomous teams: Autonomous teams are formed when personnel with different functions are brought together, and cooperate together and wholeheartedly involve themselves in these special projects.

Factors Influencing the Transfer of Technical Knowledge

The factors influencing the transfer of technical knowledge have always been the focus of attention on the part of scholars. However, the factors that influence the transfer of technical knowledge have in general been categorized into three main groups, namely, technological factors, organizational factors and environmental factors.

(1) Technical factors

Samli (1985) and Tsai (1991) are of the opinion that the types of technical knowledge, the extent of the technology's newness and the products resulting from cooperation are all factors that influence the transfer of technical knowledge. However, based on the cases observed in this study,

it is also found that Polanyi's (1967) reference to the extent to which the technical knowledge has been outwardly exposed is one of the important factors influencing such technical knowledge.

(2) Organizational factors

As regards the influence that organizational factors have on the technical knowledge transfer model, Tsai (1991) points out that expenditure on the establishment of a research department and on R&D itself as a share of turnover are two important factors. However, in this studies we also conclude that the recipient of the technical knowledge having patents as well as the ability to absorb technical knowledge are two important organizational factors. That the recipient of the technical knowledge has patents refers to whether or not the recipient of the technical knowledge has received patents and ownership rights related to that technical knowledge. Such patent rights in terms of the right to own technical knowledge are not merely rights to use such technical knowledge. The ability to absorb technical knowledge is based on two main considerations, namely, the extent to which the recipient of the technical knowledge is familiar with that technical knowledge and whether or not the manufacturer in the case being considered has experience of receiving such technical knowledge.

(3) Environmental factors

Scholars such as Baranson (1970), Samli (1985), and the Ministry of Economic Affairs' Science and Technology Advisory Group (1990) each refer to certain influential factors that affect the transfer of technical knowledge. However, none of them do so very clearly, so that it is difficult for them to make concrete proposals. Therefore, in this study we use the industry's life cycle to denote that industry's environmental conditions. Lowe (1993) is of the opinion that the maturity of an industry can be analyzed from that industry's life cycle. When the industry is categorized as one which just happens to be in its initial growth period, and a period of maturity has been established in which a division of labor system is in place, the impact of the industry's environment on the transfer of technology can be understood.

From the above discussions in the literature, it can be seen how previous scholars viewed the factors influencing the transfer of technology. In this study, we bring together the different scholars' viewpoints referred to above as well as some of our propositions to serve as our conceptual framework prior to modification, as Figure 1 shows. We also use this conceptual framework to discuss how each case is progressing. The symbol "*" which appears before some of the variables indicates that this has been mentioned by scholars in the past, whereas "blank" refers to a proposition put forward in this paper.
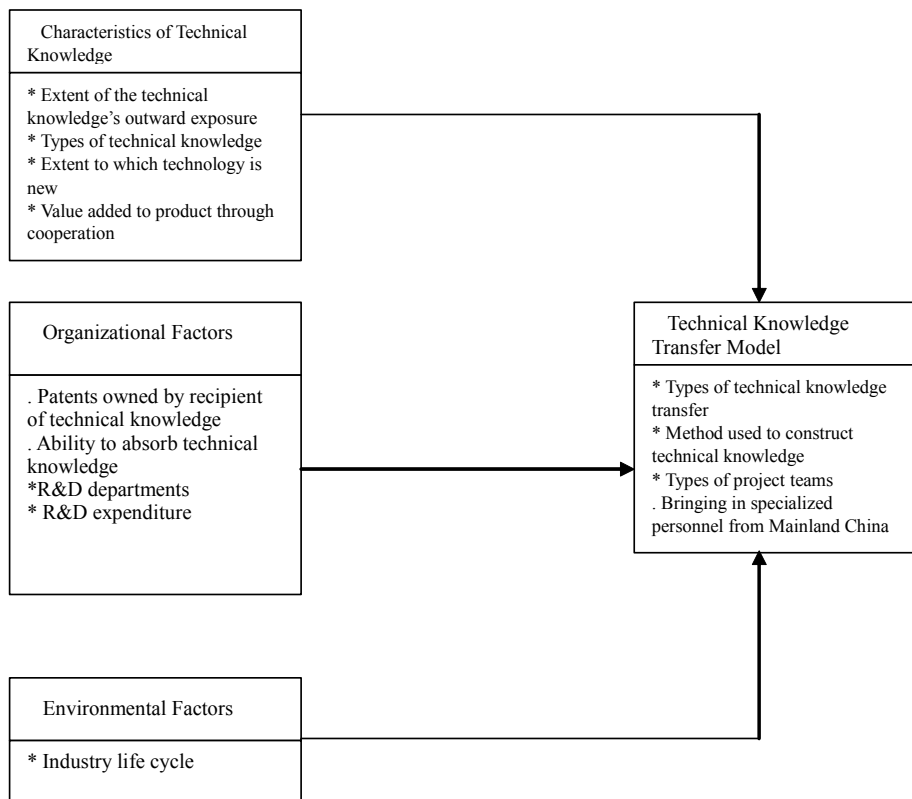
Figure 1: Conceptual Framework for this Study

METHODOLOGY

Research Design

Because of the complexity of the political and economic relationships between the two sides of the Taiwan Strait, it is not possible to use a survey approach to concretely explain the mutual relationships that exist in terms of the transfer of technical knowledge from one side to the other. Furthermore, Taiwan's manufacturers have in the past had the technical knowledge that they needed transferred from the so-called technologically advanced countries to Taiwan, as opposed to bringing in technology from developing countries such as Mainland China. For the above reasons, in this study we attempt to conduct research on a case-by-case basis by first looking back at related theories in order to complete a preliminary conceptual framework, and only later discussing in depth the

actual experiences of manufacturers, as a means to verifying the accuracy of our inferences and hypotheses, and modifying them where deemed necessary.

Scope of the Research

In this study we selected ten private sector firms or research institutions registered with the Ministry of Economic Affairs' Investment Commission that had already brought technology from Mainland China into Taiwan. After examining each of these cases, we were left with eight cases of firms or research institutions, which we refer to as Case 1, Case 2, Case 3, Case 4, Case 5, Case 6, Case 7 and Case 8.

Limitations of the Research

1. Because in this study we conducted our research on a case-by-case basis, our research results are by analogy somewhat limited.
2. In this study we used a qualitative approach to interpret the data, and often proceeded with the logical inference approach, and thus there is the problem of subjective judgments being made.
3. When those being interviewed gave their reports, there were some items or concepts that depended on various individuals' subjective interpretations or predictions, and which sometimes were misrepresented due to absent-mindedness.

RESEARCH FINDINGS

When discussing the transfer of technical knowledge by Taiwanese businesses from Mainland China, it is necessary to first of all understand the reason why the technical knowledge is being transferred, and then secondly to determine the method being used to obtain the technical knowledge, as well as the types of technical knowledge transferred and the project teams involved.

Reasons for the Transfer of Technical Knowledge

Those factors that affect the manufacturers' transfer of technology are arranged in Table 1. From Table 1 we can discover that all eight manufacturers want to speed up their product development by receiving technical knowledge, learning and using core technology (Skowronski, 1987; Kuang-tao Hsueh & Tain-jy Chen, 1986). Since there are some manufacturers who, because their products are currently part of their respective industries' growth stage, or else the domestic manufacturers of these products are unable to make them or else they lack substitute products that

can really substitute for them, foreign enterprises may as a result enjoy a monopoly position in regard to such products in Taiwan. Based on these two above-mentioned factors, European manufacturers are unwilling to transfer their technical knowledge to Taiwan. Cases 6, 7, 5 and 8 are somewhat different. Although U.S. and European companies are willing to sell or transfer the technical knowledge that these four manufacturers need, the prices charged are extremely high, and therefore based on cost considerations the manufacturers have turned to Mainland China to transfer the technical knowledge that they need.

As far as the manufacturers that have been viewed on the basis of cost considerations are concerned, apart from Cases 7, 5 6 and 8 that have been referred to above, the manufacturers represented by Cases 1 and 2 were unable to obtain the technical knowledge that they needed from U.S. and European firms. They thus turned to former Warsaw Pact countries such as several Eastern European countries and also Russia, as well as Mainland China. After comparisons were made, for similar technological levels, it was found that Mainland China could provide relatively inexpensive technical knowledge.

Although the greatest advantage to be derived from cross-Strait cooperation is the easier communication resulting from both sides sharing similar language and racial characteristics, only two manufacturers have seriously considered cooperation on this basis. This is mainly because Taiwanese manufacturers have for a long time accepted the assistance provided by foreign technology, and has become accustomed to interacting with firms where different languages are spoken. Thus language is not the main consideration when it comes to engaging in technical cooperation with foreign firms.

Table 1: Environmental and Organizational Factors for the Transfer of Technical Knowledge									
	Case 1(1)	Case 1(2)	Case 2	Case 3	Case 4(1)	Case 4(2)	Case 5	Case 6	Case 7	Case 8
Industry life cycle	Mature	Growing	Growing	Mature	Mature	Growing	Mature	Growing	Growing	Mature
Import substitution	Yes	Yes	No	No	Yes	No	Yes	No	No	No
Cost considerations	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes
Language and communication considerations	Yes	Yes	Yes	No	No	No	No	No	No	No

From the above we can learn that there are two main reasons why Taiwanese manufacturers transfer technical knowledge from Mainland China, these being as follows:

1. The knowledge that Taiwanese manufacturers ask to be transferred is relatively advanced, and the goods that they produce are in their growth stage. In addition, Taiwanese

manufacturers lack knowledge regarding manufacturing and equipment, with the result that U.S. and European manufacturers monopolize the Taiwan market. Thus, in order to prevent Taiwanese manufacturers from entering the market and thereby increasing the number of competitors, European manufacturers adopt a relatively conservative stance toward the transfer of knowledge.

2.   There were European manufacturers that on a case-by-case basis were willing to provide or transfer relevant machinery and equipment or knowledge to Taiwanese manufacturers, but the fees that they asked Taiwanese manufacturers to pay were so high that none of the manufacturers could afford them.

Types of technical knowledge transferred

(1)   The ten cases are compiled in Table 2 in accordance with Solow's (1972) classification followed by an explanation.

Table 2 Environmental and Organizational Factors for the Transfer of Technical Knowledge	
Type of technical knowledge transfer	Cases of Manufacturers
Single-track	Case 1(1), Case 4(1), Case 4(2), Case 8
New-track	Case 1(2), Case 2, Case 3, Case 6, Case 5, Case 7
Cross-track	

From Table 2 it can be seen that, for those cases characterized by single-track transfers, because the transferors of technical knowledge can fully match the desires of the Taiwanese manufacturers or else because the manufacturers are insufficiently capable of conducting research into technology, the transferor of the technical knowledge is asked to provide the whole of the product's technology or else the production equipment.

In the case of new-track transfers, after the manufacturers bring in the technical knowledge that is relatively unfamiliar to them, they rely either on their own abilities or those of the transferor of technical knowledge to see that the technical knowledge conforms to the firms' expectations.

No examples of cross-track transfers are found in this study. This is probably because it is required that a firm have a deep understanding of what constitutes technical knowledge in at least two industries, which also requires that the firm have a strong research capability. It would appear that none of the manufacturers in our sample are characterized by such ability.

(2)   Our ten cases of manufacturers are now compiled in accordance with Mansfield's (1975) classification in Table 3 below, which is followed by the necessary explanations.

Table 3: Type 2 Transfer of Technical Knowledge	
Type of Technical Knowledge Transfer	Cases of Manufacturers
Horizontal	Case 1(2), Case 5, Case 7, Case 6
Vertical	Case 1(1), Case 2, Case 3, Case 8, Case 4(1), Case 4(2)

From Table 3 we can learn that the principal reason why the above vertical transfers of technical knowledge from Mainland China took place was because U.S. and European companies were unwilling to transfer technical knowledge to those particular manufacturers. For this reason, these manufacturers turned their attention to Mainland China in order to find appropriate technical knowledge. Moreover, because research institutions in Mainland China needed to compete in the market based on national policy considerations, they were willing to transfer the results of their research to those who needed them in order to obtain sufficient funding. Because the flow of information in Mainland China is relatively closed, these research institutions are not well informed of the market value of their technical knowledge and the way in which it can be used. From the point of view of the manufacturers in these case studies, the costs associated with buying such research are relatively low, and the manufacturer often has the upper hand.

As for the horizontal transfers of technical knowledge, although the manufacturers represented by Cases 5, 6 and 7 could have transferred the technical knowledge that they needed from Europe and the U.S., by transferring the technical knowledge from Mainland China these manufacturers were in a position to save a portion of the costs associated with transferring the technical knowledge. Although the local market for the product for which the technical knowledge needed by the manufacturer in Case 1(2) to produce it was still monopolized by a foreign firm, because European and U.S. companies were unwilling to transfer the needed technology, this particular manufacturer turned to Mainland China for help. Because these Mainland Chinese companies on the one hand were faced with a huge domestic market and did not have any plans to export their products, and on the other hand the technical knowledge was very backward when compared with that for the industry as a whole and thus did not have any added value to the Chinese firms, transferring the technical knowledge to the outside world would at least bring these firms some income. Therefore, following the transfer, the needed technical knowledge could be further improved and developed by these Chinese firms.

Types of Project Teams for Receiving Technical Knowledge and Product Development

We now list the project teams used in the process of developing new products in accordance with Clark and Wheelwright's (1992) classification in Table 4 followed by an explanation.

From Table 4 we can see that the main reason why the manufacturers in the above cases use these types of project teams is because they take into consideration their own resources and abilities.

The three manufacturers that use lightweight teams are all Taiwanese small and medium-sized enterprises. Because they have limited resources in terms of personnel, each of them has designated a member of their respective organizations as a project manager with responsibility for receiving technical knowledge from Mainland China and for new product development. In their study, Clark and Wheelwright (1992) point out that the leaders of such project teams frequently have little status or wield little influence within their respective organizations. Such people often have many years of experience working in their respective functional departments. For them to now be appointed as a project manager is merely an outcome of their rich experience. The key resource of these lightweight project teams rests in the hands of the managers of the various functional departments, and it is very hard in practice for the project managers to have any effective control over related resources. However, in two of the three cases referred to above, the firm's highest-ranking officer is also the project team leader, while in the other case it is the firm's chief advisor who holds this position. Because in these cases the project team leaders are very high up within their respective organizations, they each exercise a significant degree of control over their companies' resources.

Table 4 Types of Project Teams for New Product Development	
Types of Project Teams	Cases of Manufacturers
Functional	
Lightweight	Case 8, Case 5, Case 7
Heavyweight	Case 1(1), Case 6, Case 1(2), Case 2, Case 3, Case 4(1), Case 4(2)
Tiger/ Autonomous	

The companies that use heavyweight project teams have relatively large scales of operations and, compared with other firms, they have an abundance of resources and personnel. In order to ensure that company objectives are achieved, the manufacturers in the cases listed above are prepared to engage a relatively large number of personnel in for the purpose of receiving the technical knowledge. In the case of these manufacturers, in order to receive the technical knowledge transferred and with it develop new products; a firm will typically form a rather large project team that will be made up of the firm's resource research personnel or managers. Because the prospects for the future development of these project-related firms are especially significant, the project leaders will be particularly powerful within their respective organizations. At the same time, they will also carry a relatively large amount of responsibility. In this respect, our research findings tend to agree with those of Clark and Wheelwright (1992).

With regard to our failure to find any of the cases here using functional teams or autonomous teams, a probable reason for this is that functional teams tend to be rather loosely structured, and

autonomous teams have too much autonomy, and so the manufacturers considered here are all inclined to use lightweight or heavyweight teams.

Bringing in Specialist Personnel from the Chinese Mainland

We shall now compile the information regarding whether or not the case examples of manufacturers bring in specialized personnel from Mainland China in Table 5 and follow this with an explanation.

Table 5: Bringing in Specialized Personnel from Mainland China	
Bringing in Specialized Personnel from Mainland China	Cases of Manufacturers
Yes	Case 5, Case 7, Case 6, Case 4(2)
No	Case 8, Case 1(1), Case 1(2), Case 2, Case 3, Case 4(1)

From Table 3-5 we discover that those manufacturers that brought in specialized personnel from Mainland China did so because of the technical knowledge they needed. They were all relatively inexperienced, the main reason for this being that these manufacturers had limited opportunities for growth within their respective industries, and thus in order to grow they crossed over into areas with which they were unfamiliar. Or else it may have been that the technical knowledge that these manufacturers needed was not the core technical knowledge that they needed, but rather that, because of government regulations, they needed some extra equipment in the manufacturing process, or that these manufacturers had brought in the designs for the production equipment, but they lacked the relevant testing personnel. Since these manufacturers were insufficiently capable of overcoming the problems they had encountered, they tended to bring in specialized personnel from Mainland China to assist in receiving the technical knowledge.

Those manufacturers that did not bring in specialized personnel from Mainland China were themselves relatively familiar in terms of bringing in technical knowledge, or else they had a relatively strong ability to apply the technical knowledge. For this reason, they could rely on their past experience or the extent of their familiarity with the technical knowledge in order to receive what they needed, and they did not have to rely on support in transferring technical knowledge.

Types of Recipients of Technical Knowledge

In accordance with the classification by Helleloid & Simon (1994), we divide the manufacturers for the above cases in terms of transferring technical knowledge from Mainland China into three groups, as follows:

Table 6: Methods Used to Build Technical Knowledge	
Methods Used to Build Technical Knowledge	Cases of Manufacturers
Open market purchases	Case 1(1), Case 1(2), Case 3
Strategic alliances	Case 2, Case 4(1), Case 4(2), Case 8
External assistance and internal R&D	Case 6, Case 7, Case 5
Mergers & Acquisitions	
Completely autonomous development	

As Table 6 shows, the manufacturers in these cases use three approaches, namely, purchases in the open market, strategic alliances and external assistance combined with internal R&D to construct knowledge. None of the cases we have considered, however, adopt the completely autonomous development approach to build knowledge. The reason for this is that these manufacturers lack the ability to acquire the relevant knowledge themselves and also lack information about Mainland China. They also do not resort to mergers and acquisitions to obtain the knowledge, and since some of them cooperate with state-owned enterprises in Mainland China, they are unable to engage in M&A activity. If they abruptly merge with or acquire Mainland Chinese manufacturers, this may bring them significant levels of risk and uncertainty.

There are two manufacturers or research institutions and a total of three cases where purchases of technical knowledge are made in the market. These are mostly case examples of manufacturers or research institutions that have a very strong ability to apply the results of basic research, or where the technical knowledge transferred is very clearly a commodity such as machinery and equipment that can be tendered. The requirement for purchases to be made in the market is that the manufacturer or the research institution should have a strong ability to absorb technology, and that the exposure of such technical knowledge should be relatively high. These three cases not only do not have comparable research departments, but their experiences of receiving such kinds of technical knowledge and the extent of the familiarity of these manufacturers and research institutions with such technical knowledge is relatively high. Because the ability of these manufacturers or research institutions to absorb such technical knowledge is relatively high, they can absorb technical knowledge and engage in new product development without needing to place so much reliance on the transferor of technical knowledge. Furthermore, the extent of the codifiability and teachability that these manufacturers want to receive is relatively high, which causes the extent of the outward exposure of this technical knowledge to be relatively high, and also results in these case manufacturers or research institutions wanting all the more to reduce their reliance upon the transfer of technical knowledge. Such developments are beneficial to engaging in open market purchases. In addition, because they have a relatively strong ability to absorb technical knowledge, none of these types of manufacturers or research institutions bring in specialized personnel from Mainland China to help them absorb technical knowledge. In addition, none of these

manufacturers purchase patents in relation to the technical knowledge that they receive, the reason for this being that the transferor of technical knowledge can by repeating such transfers of technical knowledge to different companies increase its own income, and thus the manufacturers do not wish to wish to make their technical knowledge patents easily available to other persons.

From Table 7 it can be discovered that many of the types of technology transferred by manufacturers as a result of market purchases are "new-track" transfers, horizontal transfers and vertical transfers, there being relatively few "single-track" transfers. This is because the manufacturers who purchase their technology in the market are, comparatively speaking, better able to apply it, and so they can improve the technical knowledge or basic research results transferred with which they are not very familiar. The technical knowledge that the vertical and "single-track" transferors provide to the transferor of technical knowledge can satisfy the needs of the recipient of the technical knowledge. The technical knowledge of the vertical and "new-track" transferors and the horizontal and "new-track" transferors that is the technical knowledge provided by the transferors of technical knowledge is unable to satisfy the needs of the recipient of the technical knowledge; it is still necessary for the recipient of the technical knowledge to engage in necessary improvements.

Table 7 Comparison of Purchases of Technical Knowledge in the Market			
Type	Type of Market Purchase		
Method to build technical knowledge	Purchases in the open market		
Source of technical knowledge transfer	Vertical transfer		Horizontal transfer
Use of technical knowledge transfer	"Single track" transfer	"New track" transfer	"New track" transfer
Cases/Manufacturers	Case 1(1)	Case 3	Case 1(2)
Ability to absorb technical knowledge	Strong		
External exposure of technical knowledge	High		Medium

There were three manufacturers and a total of four cases that resorted to strategic alliances to build technical knowledge. Most of them were manufacturers that had been in the process of developing a series of different new products, and who lacked the R&D expertise to fabricate the key components of these products. It was for this reason that they sought to enter into technical cooperation agreements by forming strategic alliances. The Taiwanese manufacturers established the objectives and product specifications and put up the funding, while the Mainland Chinese research institutions developed the technical knowledge needed to manufacture the new products both now and in the future in accordance with preset objectives and product specifications. A condition for such strategic alliances is that the manufacturer's ability to absorb technical knowledge

should be of a medium level or higher, while the external exposure of the technical knowledge should be relatively high. These kinds of strategic alliances are not R&D alliances, but rather involve the manufacturer setting R&D objectives, obtaining research results and meeting the R&D expenses. They are strategic alliances that are formed between institutions for their mutual benefit. On the face of it, the manufacturers participate in these strategic alliances by paying money. However, in order for them to be able before engaging in such R&D to establish research objectives for the research institutions in Mainland China, or to examine progress during the production process, or at the same time develop products and test them after they have been developed, the manufacturer needs to have a certain degree of understanding and familiarity with the technical knowledge that is to be developed by the other partner to the alliance. For this reason, the ability to absorb technical knowledge needs to exceed a certain level.

In addition, in order for the manufacturers to validate the research results and monitor progress within the R&D process, it is necessary for there to be a high degree of codifiability and teachability if they are to be able to clearly lay hold of the progress and results of the Mainland Chinese research institutions. Furthermore, in order to ensure that what these manufacturers stand to gain and the technical knowledge developed with their funds will not fall into the hands of a competitor, the manufacturers will together buy the patent rights for that technical knowledge. As regards bringing specialized personnel from Mainland China to Taiwan, it was only in Case 4(2), in which case the manufacturer was entering a new field and so was not familiar with the technical knowledge, that it was difficult to find people with the needed expertise within a relatively short period of time and the manufacturer only had one experience of receiving technical knowledge, and so specialized personnel were brought in from Mainland China to assist in receiving the technical knowledge in order to develop new products. In all other cases, the manufacturers did not bring in specialized personnel from Mainland China.

From Table 8 it can be seen that the technical knowledge transferred involves a vertical transfer, which is because the technical knowledge that the manufacturers need is key technology for making the important parts of the products, which the U.S. and European firms are unwilling to provide. Similarly, Mainland Chinese companies are also unwilling to transfer the technology, and hence all the Mainland Chinese partners that formed the strategic alliances were research institutions. Many of the manufacturers engaged in single-track transfers, while only one manufacturer was involved in a new-track transfer. This was because if the technical knowledge transferor was unable to develop technical knowledge that conformed to what the manufacturer wanted, the manufacturer would not provide a bonus for the successful completion of the R&D project nor pay the remainder of the R&D expenses, and so all of the technical knowledge provided could meet the needs of the manufacturer. As for the new-track transferor, although the technical knowledge that he transferred conformed to the needs of the manufacturer, the technical knowledge transferred was one of many important components of the company's product, and thus some

improvements were needed to the technology in line with the other raw materials, which is why this was a new-track transfer.

Table 8: A Comparison of Strategic Alliances		
Type	Type of Strategic Alliances	
Method to build technical knowledge	Strategic alliances	
Source of technical knowledge transfer	Vertical transfer	
Use of technical knowledge transfer	Single-track transfer	New-track transfer
Cases of manufacturers	Case 4(1), Case 4(2), Case 8	Case 2
Ability to absorb technical know-how	Medium, Strong	Strong
External exposure of technical knowledge	High	

There were a total of three cases of manufacturers to which the "external subsidy and internal R&D" approach to building technical knowledge applied. All of them wanted to develop what were to their respective companies relatively unfamiliar products, and so they needed much support provided by the transferors of technical knowledge. None of these manufacturers had established related R&D departments within their firms, with only Case 6 having relevant experience of having absorbed technical knowledge, although it was not very familiar with this type of technical knowledge. Although Case 7 and Case 5 were more knowledgeable of the technical knowledge that they needed, they lacked experience of technical knowledge transfer, and we can thus learn from this that the ability of these manufacturers to absorb technical knowledge was not as strong as in the case of those manufacturers who built their technical knowledge through open market purchases and strategic alliances. On the other hand, in the case of those manufacturers that focused on external assistance and internal R&D to build their technical knowledge, the codifiability and teachability of the technical knowledge that they needed was relatively low, and so the external exposure of their technical knowledge was only medium or less than medium. Those manufacturers whose ability to absorb technical knowledge was inadequate and for which the external exposure of the technical knowledge was low were only able to adopt the external subsidy-internal R&D approach to receive the technical knowledge that their firms needed. Moreover, because the firms' ability to absorb technical knowledge was relatively low, all of the manufacturers brought in specialized personnel from Mainland China to assist their respective companies in receiving technical knowledge. In addition, because all of the technical knowledge brought in by the manufacturers was core technical knowledge; there were many patents, as they did not want such knowledge to be sold to others.

From Table 9 it can be discovered that the type of technical knowledge transfer involves a horizontal transfer, with all of the transferors being private enterprises. The reason for this lies with the subjective judgments of the recipients of the technical knowledge, so that the transfer of technical knowledge will not become a threat to the transferors of technical knowledge. As for the

recipients of technical knowledge, the technical knowledge provided by the transferors of technical knowledge is unable to conform to the recipient companies' expectations, and the companies lack the ability to make improvements. For this reason, with the support provided by the transferors of the technology or help obtained in the outside community, technical knowledge can be adjusted to conform to each company's needs.

Table 9: A Comparison of Types of External Assistance/ Internal R&D	
Type	Types of external assistance/ internal R&D
Method to build technical knowledge	External assistance/ internal R&D
Source of technical knowledge transfer	Horizontal transfer
Use of technical knowledge transferred	New-track transfer
Cases of manufacturers	Case 7, Case 6, Case 5
Ability to absorb technical knowledge	Weak
External exposure of technical knowledge	Medium, Low

From the above research findings, we find that it is mostly research institutions that acquire technical knowledge through purchases in the market or by means of strategic alliances, as well as through vertical transfers. The reason for this is that, for firms in general, transferring product-related technical knowledge from one organization to another will result in increasingly fierce market competition. However, it will not serve as a threat to the research institutions. Private companies are the source of the external assistance/ internal R&D type of technical knowledge and thus, subjectively speaking, transferring this type of technical knowledge will not serve as a threat to the technology transferor. In this study, we use several indicators to explain the differences in these three means of acquiring technical knowledge, namely, purchases in the market, strategic alliances and external assistance/ internal R&D. In terms of the ability of these manufacturers to absorb technology, those that purchase technology in the market are the strongest, followed by those that form strategic alliances, while those that adopt the external assistance/ internal R&D approach are the weakest. As to the degree of control exercised over the transferor of technical knowledge, that is greatest where strategic alliances are formed, followed by those that adopt the external assistance/ internal R&D approach, and weakest in the case where purchases are made in the open market.

Based on the research findings discussed above, the conceptual framework previously discussed has been modified to become Figure 2. Prior to the modifications, this conceptual framework contained certain variables that were difficult to measure, and so to avoid ending up with misleading results, such variables that could not be easily measured were discarded.

By revising the influential factors within the above conceptual framework to do with the hypothetical technical knowledge transfer, and by using these hypothetical factors to test the

individual cases, we test for the correctness of the previous hypothetical influential factors and find out which influencing factors had been previously neglected. In what follows we briefly explain the new variables discovered within the individual cases as well as the principles behind the selection of these variables.
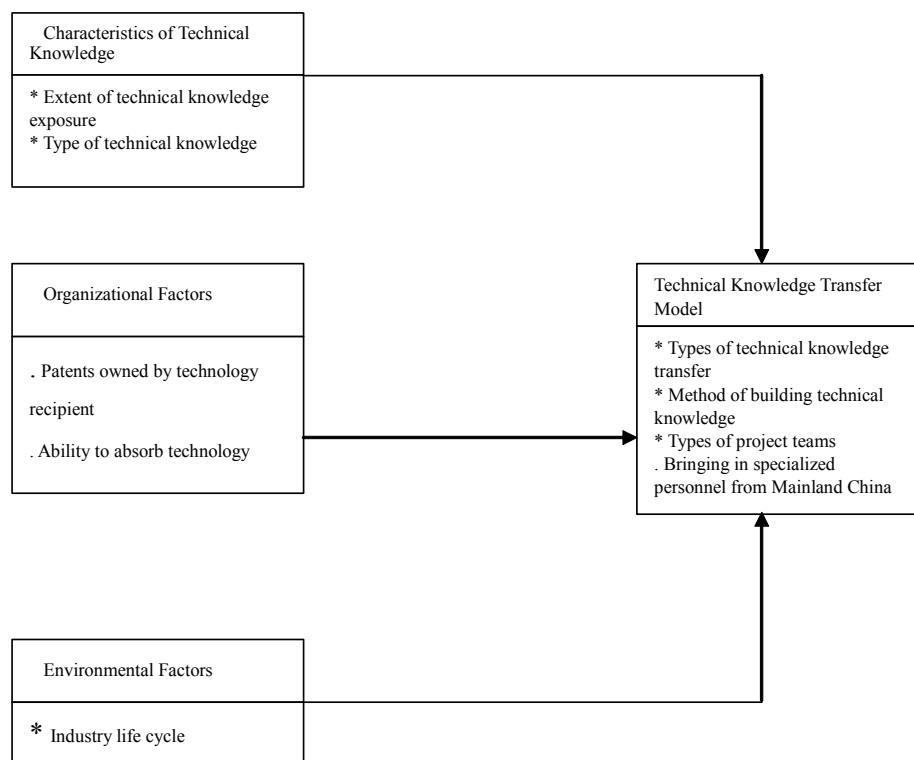

Fig. 2 Conceptual Framework after Modification

(1)   Organizational factors

In modifying the variables related to "organization" within the above conceptual framework, when comparisons of R&D expenditure are made, the different industry characteristics for each industry will affect each firm's scale of operations and the amount spent on R&D. Moreover, by including "Experience of receiving similar technology" and "Setting up a relevant R&D department," together with the newly added variable in this study, namely, the "Extent of the manufacturers' familiarity with the technical knowledge," we can measure the ability of the manufacturers to absorb technical knowledge.

(2) Characteristics of technical knowledge

In modifying the "special characteristics of technical knowledge" within the above conceptual framework, the "newness of technology" and the "value-added of the joint product" are both inclined to be rather subjective. However, since among the manufacturers in this study it is observed that the extent to which technical knowledge is externally exposed will affect the technical knowledge transfer model, in terms of the characteristics of technical knowledge we include the "Extent of the external exposure of the technical knowledge" as one of the influencing variables.

(3) Technical knowledge transfer model

The technical knowledge transfer model mainly consists of the "Method of building technical knowledge" and sources of technical knowledge and the conditions surrounding the use of the "technical knowledge transfer model" following the receipt of the technical knowledge. After examining each case it is also found that "Types of project teams" and "Bringing in specialized personnel from Mainland China" to assist manufacturers in absorbing technical knowledge are also important variables within the technical knowledge transfer model, and for this reason they are included within that model.

RESEARCH PROPOSITIONS

Proposition 1:   The ability to absorb technical knowledge influences the method used to build such knowledge.

Proposition 1(1):   Those with a relatively high ability to absorb technical knowledge will resort to purchases in the market and strategic alliances to build technical knowledge.

Manufacturers with a relatively high ability to absorb technical knowledge they have a great deal of experience of the technology that they need, and thus do not need the support of the transferor of technical knowledge when receiving the technical knowledge. They will therefore transfer the technical knowledge by purchasing it in the market.

The ability to absorb technical knowledge of those who resort to strategic alliances is in the middle range or higher, and they have abundant experience of transferring technology. However, based on these firms' strategic considerations, they need a partner to provide stability and together with them develop technology over the long term, and for this reason Mainland China's scientific and R&D units form R&D alliances to support the Taiwanese firms' plans to develop new products

in the future. Proposition 1(2): Those with a relatively weak ability to absorb technical knowledge combine external assistance with internal R&D to build technical knowledge.

A relatively weak ability to absorb technical knowledge indicates that the manufacturer's ability to receive technical knowledge is relatively poor. This is due to the fact that in the past the manufacturer's experiences associated with technology transfer have been relatively limited or else that the technical knowledge that the manufacturer has wanted to transfer relates to an area of business in which the manufacturer is not particularly competent. Thus the manufacturer is relatively unfamiliar with this type of technical knowledge and so, based on the above reasoning, when receiving the technical knowledge being transferred, the manufacturer will adopt the external assistance/ internal R&D approach with a view to gaining a significant level of support from the transferor of the technical knowledge.

Proposition 2:	The industry life cycle affects the type of technical knowledge transfer.
Proposition 2(1):	The type of technology transfer for products in the stage of growth is a new-track transfer.

Because competition in the market for products in the stage of growth is relatively strong, in order to reduce the number of competitors in the market and hence lessen the competition, many of the competitors in the market are unwilling to transfer their technical knowledge to other potential competitors that may wish to enter the market. In order to acquire their technical knowledge, a manufacturer will seek to transfer relatively immature technical knowledge from scientific or R&D institutions or else will transfer relatively inferior technical knowledge from other manufacturers. After receiving this relatively immature or inferior technical knowledge, the manufacturer will seek to improve it and make appropriate adjustments so that it conforms to the technical knowledge that the firm needs.

Proposition 2(2):	The type of technology transfer for products in the stage of maturity is a single-track transfer.

As far as products in the stage of maturity are concerned, the relevant manufacturers and research units have already developed over a long period of time, and thus the technical knowledge can be said to be fully developed. Because products in the stage of maturity have already entered the time of harvest, for the manufacturers to reap the highest profits, the technical knowledge embodied in these products no longer has very much value in the eyes of those who hold the technology, and so for these holders of the technology to obtain any remaining value out of it, they will tend to view in a positive light those manufacturers who still have a need for the technology.

However, in so far as the recipient of the technology is concerned, for the product development strategy to not be disclosed to other firms in the industry, many of the manufacturers will still choose to partner with scientific and R&D institutions.

Proposition 3: Those whose technical knowledge has relatively little external exposure will bring in large numbers of specialized personnel from Mainland China; in the case where the technical knowledge has relatively high external exposure, the manufacturers will tend to not bring in specialized personnel from Mainland China.

The extent of the external exposure of technical knowledge will affect the ease or difficulty with which manufacturers receive technical knowledge. A relatively low external exposure of technical knowledge is indicative of relatively low levels of codifiability and teachability. Such recipients of technical knowledge are unable to clearly and fully grasp the content of the technical knowledge, which results in time being wasted in transferring the technical knowledge, thus making it difficult for the transfer to be successful. For these reasons, the recipients of the technical knowledge need to bring in specialized personnel from Mainland China to assist in receiving the technical knowledge.

When the external exposure of technical knowledge is relatively high, this is an indication that the levels of codifiability and teachability are also relatively high. The manufacturer that receives the technical knowledge can very clearly and very quickly grasp the content of that knowledge. Thus, when the recipient of the technical knowledge can easily absorb the technical knowledge that has been transferred, that manufacturer naturally does not need to bring in specialized personnel from Mainland China to assist in absorbing technical knowledge.

Proposition 4: The manufacturer's ability to absorb technology affects the manufacturer's ability to bring in specialized personnel from Mainland China to assist the manufacturer in receiving technical knowledge.

Because manufacturers whose ability to absorb technical knowledge is relatively weak are themselves unfamiliar with the technical knowledge received or else they have not had prior experience of receiving technical knowledge, with the result that their ability to absorb technical knowledge is relatively poor, those who need technical knowledge transferred should dispatch specialized personnel to assist the recipient of technical knowledge in receiving the technology.

Because manufacturers whose ability to absorb technical knowledge is relatively strong had previously engaged in detailed research on the technical knowledge that they wished to receive or

else already had experience of receiving technical knowledge, they were relatively familiar with the technical knowledge, and hence did not need the transferor of the technical knowledge to dispatch personnel to assist the recipient of the technical knowledge to receive the technical knowledge¡C

Proposition 5:   Manufacturers that prepare tenders for the transfer of technology that have relatively high external exposure will resort to purchases in the market and strategic alliances, while manufacturers that prepare tenders for the transfer of technology that have relatively low external exposure will adopt the external assistance/ internal R&D approach.

Those manufacturers that used purchases in the market and those who relied on external assistance/ internal R&D each cooperated with the transferors of the technology. However, the way in which the two differed was that those who purchased technology in the market had a much greater understanding of the technical knowledge being transferred and a relatively richer experience of technology transfer, so that it was not necessary for them to receive support from the transferor of the technical knowledge. Those manufacturers who relied on external assistance/ internal R&D were relatively unfamiliar with the technical knowledge being transferred and their ability to absorb the technical knowledge was relatively weak. For this reason, they needed the support of the technical knowledge transferor.

As for those manufacturers that resorted to strategic alliances, because these alliances were formed on the basis of the Taiwanese manufacturers setting the research objectives and paying the research expenses, in order for these manufacturers to be able to effectively supervise and evaluate the research effectiveness of these Mainland Chinese scientific and research units, many of them requested that the research units write out their research results or else provide other concrete evidence, and so for this reason the external exposure of technical knowledge was relatively high.

CONCLUSIONS

After Taiwan and China had been separately governed for a decade, because their respective environments differed, it was natural they would develop in different directions. Because of its particular historical background, the focus of Mainland China's development was all along on its defense-related industries. In its own name and in those of its public enterprises, Mainland China established research units in every sector and in every location. By meeting expenses out of public funds, Mainland China trained a large number of research personnel in order to support its defense requirements. However, as its economic reform policies were later implemented, Mainland China forced its scientific research units into the market, and exposed them to the forces of market competition.

A lack of market information and the ability to apply technology have all along been an insurmountable difficulty for Mainland China's scientific research units. Moreover, many U.S. and European companies have exploited this weakness of Mainland China to purchase the technology that they need at a lower than market price, or else they have lured Mainland China's outstanding research personnel to their own countries to benefit from their effectiveness.

In this study, we found that for Mainland China and Taiwan to engage in technical cooperation in order to speed up the process of upgrading Taiwan's traditional industries was certainly feasible. Because China's history has resulted in its having not a few distinguished scientific and R&D personnel, and because its reform policies have resulted in its research institutions completely lacking funds, when compared with their Mainland Chinese counterparts, Taiwanese manufacturers have been able to obtain and control a relatively large amount of information. For this reason, when compared with European and U.S. firms that engage in technical cooperation, Taiwanese businesses can not only find outstanding research personnel in Mainland China and obtain the various kinds of technology that they require, but they can also within the overall process of technical cooperation involving Mainland Chinese scientific and R&D institutions exercise a relatively large degree of control. Based on the above advantages, at present, with the Mainland Chinese government's encouragement and the daring on the part of a number of Taiwanese manufacturers, there have been at least fifty cases of Taiwanese manufacturers that have engaged in technical cooperation with Mainland Chinese counterparts. In this study, we divide these manufacturing cases into three different types based on our actual observations: purchases in the open market, strategic alliances and external assistance/internal R&D.

Because the ability to absorb technical knowledge of manufacturers who purchase technology in the market is relatively strong, they tend to be more capable of improving technical knowledge that is relatively immature, to conform to their individual needs. In such cases, the ability of these manufacturers to absorb technical knowledge is relatively strong. Furthermore, when the technical knowledge that they need can be more clearly tendered, the manufacturers can use purchases in the open market to buy the technical knowledge they need and then improve it in line with their own needs.

Strategic alliances are used when manufacturers engage in relatively unfamiliar business areas or else are in the process of developing a series of new products, and where those who can provide the necessary technical support are needed. Such manufacturers will engage in strategic alliances with Mainland Chinese scientific and R&D institutions in order to develop the new technology. Of the cases considered at present, such cooperation takes the form whereby the Taiwanese manufacturers establish the objectives and pay the research expenses, while the Mainland Chinese scientific and research institutions are responsible for the R&D. Furthermore, because the manufacturer needs to set R&D objectives, it needs to be able to clearly know what type of technical knowledge it needs, if it is not to end up wasting its resources. Taiwanese manufacturers adopted the external assistance/ internal R&D approach when Mainland Chinese manufacturers had the

technology, yet lacked the market distribution channels. The Taiwanese manufacturers would then obtain the right to manufacture the products from their Mainland Chinese counterparts Mainland China as well as the right to act as agent. In cases where government regulations restricted the Taiwanese manufacturer from importing the whole of the machinery and equipment from Mainland China and the manufacturer hoped to manufacture the machinery and equipment, it could adopt the external subsidy/ internal R&D approach to bring in the technical knowledge.

As far as Taiwanese manufacturers are concerned, and since Taiwan consists mainly of small and medium-sized enterprises, in view of their limited resources, most manufacturers focus their efforts on improving the manufacturing process or else enhancing the products' applicability. Moreover, due to the resource limitations, most firms are unable to engage in basic research or to study more advanced production technology in depth. Because Taiwan in the past has already dispensed of its role as a manufacturer of inexpensive products, and has engaged in industrial upgrading with the government's strong encouragement and has increasingly become more high-technology-oriented, U.S. and European firms, fearing that Taiwanese manufacturers will become strong competitors, have become less willing to transfer technology to Taiwan than in the past, which has caused traditional manufacturers in Taiwan that are responding to the government's efforts to upgrade technology to face increasing difficulties. Regardless of the kind of technical cooperation they are seeking with Mainland China, based on the observations of this study, most of the manufacturers have already obtained the technology that they would like to have from Mainland China. Moreover, as private exchanges between the two sides of the Taiwan Strait become more intimate, there are good grounds for believing that technical cooperation with Mainland China will continue to increase.

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AN EXPLORATORY INVESTIGATION OF THE BRANDING STRATEGIES OF THE TOP 50 GLOBAL MBA PROGRAMS

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ABSTRACT

Starting in the 1980's, many business newspapers and magazines (Financial Times, Wall Street Journal, BusinessWeek) started ranking MBA programs. B-School deans realized that reputation management is a critical component impacting rankings and responded by using a variety of marketing measures, one of which was to "brand" their MBA program.

Ingram, Gopalan, and Loughman (2004) assessed the branding strategies of BusinessWeek's top 50 MBA programs based on information contained in the websites of these programs. They proposed a typology that identified five specific branding strategies. The Ingram et al study included only U.S. based schools and their full-time MBA programs. Given that MBA degrees are offered in many countries, we decided to assess branding strategies of the top 50 Global MBA programs ranked by Financial Times (2006 ranking). 28 MBA programs were based in the U.S. while 22 programs were from other countries. Three researchers performed a content analysis of the brand name, logo, and text information contained in the web-pages of these MBA programs Our analysis revealed that branding typologies that originate in the U.S. have limited application overseas and that there are several strategic branding differences between U.S. and European and Asian MBA programs. We discuss current and emerging branding trends for global MBA programs.

INTRODUCTION

MBA programs have emerged as the one of the key ways by which business schools (hereafter referred to as B-Schools) build their reputation. Starting in the late 1980's, many business newspapers and magazines (*Financial Times, Wall Street Journal, BusinessWeek, U.S. News and World Report*) started ranking MBA programs thereby directly or indirectly assigning a rank to the respective B-School as well. Ranking MBA programs has not been without controversy (Gioia & Corley, 2002). While some claim that this practice diverts valuable resources towards image management and making superficial curricular changes to project change, others laud it as a means of competition, pitting one school's MBA against another to let customers (i.e., students, employers,

and alumni) decide which programs are of high quality and value (Anderson, 2003). One thing is for sure: ranking is here to stay and it impacts a B-School's reputation in the marketplace. Increasingly, potential students, alumni, and members of the corporate community pay careful attention to these rankings (Merritt, 2003). B-School deans have realized that reputation management is a critical component impacting rankings and have responded aggressively by using a variety of marketing measures, one of which is to "brand" their MBA program (Argenti, 2000; Gioia & Corley, 2002). According to Shinn (2006) B-schools have increasingly hired communication directors PR firms, advertising agencies, and even professional marketers to manage their brand name.

THE MBA PROGRAM-BRANDING AN INTANGIBLE COMMODITY

Branding has historically been a major concept in strategic marketing and is used to achieve multiple purposes (Inskip, 2004). The *American Marketing Association* defines a brand as "a name, term, sign, symbol, or design, or some combination of them, intended to identify the goods or services of one seller or group of sellers to differentiate them from those of competitors" (cited in Lin and Kan, 2004). Branding is not done in isolation—ideally it is part of a larger strategy that seeks to achieve certain long term objectives. Organizations spend millions of dollars in building a brand name so that customers feel a sense of reassurance when purchasing or consuming a "branded product or service." Branding is also done to achieve product differentiation amongst consumers. According to Porter (1980, p. 37)..."differentiating the product or service offering of the firm, creating something that is perceived industry wide as being unique. Approaches to differentiating can take many forms..., including design or brand image." Branding is also done to create a unique corporate identity of an organization (Argenti, 2005).

BusinessWeek and *Interbrand* perform studies each year on the most valuable brands. In 2005, Coca-Cola, Microsoft, and IBM ranked first, second, and third respectively. That same ranking was held by the same companies for the previous year as well, demonstrating the power of branding strategies (Berner and Kiley, 2005). Many branded products have significant meaning to consumers. For example, the Mercedes Benz brand suggests well-built and expensive automobiles, while the Great Value brand by Walmart suggests affordability and availability.

While consumers associate strong brands with tangible goods, the increased emphasis on a knowledge-based economy has a variety of services attempting to acquire and retain customers through strategic branding. And educational institutions are no exception (Melewar & Akel, 2005; Gray, Fam & Lanes, 2003). But branding MBA programs is not an easy task. The MBA degree is not a physical commodity-it has no shape, substance, form, or odor. It is a service provided by universities to their consumers (Nicholls, Harris, Morgan, Clarke, & Sims, 1995). Additionally, there are many types of MBA programs within a university (full-time, part-time, executive). Does branding impact all types of MBA programs? In the United States, many B-Schools are housed

within universities. When branding MBA programs, is it done independent of the University in which the school is housed? Or is the University's brand "imposed" on the B-school? To what extend are dual branding strategies followed?

Ingram, Gopalan, and Loughman (2004) sought to answer some the branding questions raised earlier by assessing the branding strategies of the *BusinessWeek's* top 50 MBA programs based on information contained in the websites of these respective programs. They concluded that MBA programs have utilized various types of branding strategies with varying degrees of success. Furthermore, with the exception of two MBA programs, the rest (48) followed a certain type of branding strategy. Ingram et al proposed a typology that identified five specific branding strategies.

Table 1: Classification of Branding Strategies (based on Ingram, Gopalan, Loughman, 2004)		
Type	Emphasis of Branding Strategy	Examples of MBA programs
S	School Only	Wharton
Su	School primary-university secondary	York University: Schulich
D	Dual: Equal emphasis is given to both the school and the university	MIT: Sloan
Us	University primary-school secondary	University of Oxford: Said
U	University Only	Harvard Business School

At one end of the spectrum, MBA programs were branded only with the University's name/logo/symbol (U). At the opposite end, MBA programs were branded only with the School's name/logo/symbol and verbiage with no reference to the University (S). In the middle was a hybrid approach embracing a dual branding whereby both the University and School's identities received equal attention (D). Two other strategies included the (Us) and (Su) branding strategies. Under the "Us" strategy, the University received more emphasis and importance assigning a secondary importance to the School while in the "Su" strategy the School's identity is given more importance than that of the University.

OBJECTIVES AND METHODOLOGY

The Ingram et al (2004) study that was discussed in the earlier section was based on *BusinessWeek's* ranking which included only U.S. based schools and their full-time MBA programs. This ranking did not examine any MBA programs from non-U.S. location. Given that MBA degrees are offered in many countries and international students are a vital part of any MBA program, we felt that an assessment of branding strategies of MBA programs needed a *global* perspective (Adenekan, 2004; Ewing, 2005). To address this issue, we decided to assess branding strategies of the top 50 Global MBA programs identified by *Financial Times* in a special report. (Note: the FT 2006 rankings were for 100 global MBA programs. We limited our analysis to those MBA programs

that were ranked in the top 50). In the 2006 *Financial Times* ranking (January 30, p. 35), 28 MBA programs were based in the U.S. while 22 programs were from other countries. Given that 44% of the MBA programs in this study were outside the U.S., we also wanted to examine the degree of similarity/difference between U.S., European, and Asian branding strategies.

Due to time and resource constraints, we analyzed information solely obtained from the web pages (devoted to the full-time MBA programs) that were published on the Internet. Similar to the Ingram et al (2004) study, our content analysis included a rigorous examination of the brand name, logo, symbol, font size, and content published in the web page. Besides a visual examination of each website, hard copies from all the 50 full-time MBA web pages were printed and used in our analysis. We adopted the Ingram et al branding typology (see Table 1) as a framework to conduct our assessment. Each researcher conducted his/her assessment of the branding strategy and separately reached his/her conclusions. Following the separate assessment, all three researchers, examined the degree of similarity/difference between their findings. There were 8 MBA programs where there significant differences in the conclusion reached as to the "right" branding strategy. When two researchers were unable to reach an agreement, the third researcher's conclusion *along* with a meticulous assessment of the web text was used to arrive at a result. The results are displayed in Tables 2 and 3 and discussed in the following sections.

Table 2: Top 50 Global MBA Program Classifications (Financial Times-2006)			
Rank	School	Country	Classification
1	University of Pennsylvania: Wharton	U.S.A.	S
2	Harvard Business School	U.S.A.	U
3	Stanford University GSB	U.S.A.	D
4	Columbia Business School	U.S.A.	U
5	London Business School	U.K.	Unable to categorize
6	University of Chicago GSB	U.S.A.	D
7	New York University: Stern	U.S.A.	Su
8	Insead	France / Singapore	Unable to categorize
8	Dartmouth College: Tuck	U.S.A.	S
10	MIT: Sloan	U.S.A.	D
11	Yale School of Management	U.S.A.	U
12	Instituto de Empresa	Spain	Unable to categorize
13	Iese Business School	Spain	Unable to categorize
14	IMD	Switzerland	Unable to categorize
14	University of Michigan: Ross	U.S.A.	Su
16	UC Berkeley: Haas	U.S.A.	U
17	Northwestern University: Kellogg	U.S.A.	S

Rank	School	Country	Classification
	Table 2: Top 50 Global MBA Program Classifications (Financial Times-2006)		
18	York University: Schulich	Canada	Su
19	UCLA: Anderson	U.S.A.	D
20	University of Oxford: Said	U.K.	Us
21	Ceibs	China	Unable to categorize
22	HEC Paris	France	Unable to categorize
22	Manchester Business School	U.K.	Us
24	University of Toronto: Rotman	Canada	S
24	RSM Erasmus University	Netherlands	Su
24	University of Virginia: Darden	U.S.A.	S
27	Esade Business School	Spain	Unable to categorize
27	Duke University: Fuqua	U.S.A.	Us
29	University of North Carolina: Kenan-Flagler	U.S.A.	Us
30	Lancaster University Management School	U.K.	U
31	University of Western Ontario: Ivey	Canada / China	S
31	Michigan State University: Broad	U.S.A.	D
33	University of Iowa: Tippie	U.S.A.	S
34	SDA Bocconi	Italy	U
35	University of Cambridge: Judge	U.K.	U
36	Georgetown University: McDonough	U.S.A.	Us
36	Cornell University: Johnson	U.S.A.	No conscious branding
38	University of Maryland: Smith	U.S.A.	S
39	University of Illinois at Urbana-Champaign	U.S.A.	U
40	University of Rochester: Simon	U.S.A.	S
41	Carnegie Mellon: Tepper	U.S.A.	Su
42	Pennsylvania State: Smeal	U.S.A.	Su
42	Emory University: Goizueta	U.S.A.	S
44	McGill University	Canada	U
45	Brigham Young University: Marriott	U.S.A.	Su
46	Cranfield School of Management	U.K.	U
47	Hong Kong UST Business School	China	Unable to categorize
47	City University: Cass	U.K.	Unable to categorize
47	Imperial College London: Tanaka	U.K.	D
50	Boston University School of Management	U.S.A.	No conscious branding

RESULTS

Our analysis revealed that of the 50 MBA programs that were assessed, 10 MBA programs followed a "University only" branding strategy; 10 followed a "School only" approach; 6 adopted a dual/hybrid branding strategy; 5 chose to focus on the University assigning secondary status to the B-School; and 7 chose to emphasize the B-school while relegating the University to play a secondary role. We concluded that two U.S. based MBA programs did not have a discernible branding strategy. A significant result was that we were unable to identify a branding strategy for 10 MBA programs, using the Ingram et al typology (see Table 3). All these MBA programs were located in Spain, Switzerland, U.K., China, France, and Singapore (see Table 2). Given that the Ingram et al branding typology was solely derived from U.S. MBA programs, this approach had limitations in its application overseas where graduate management programs are housed in institutions with vastly different structures than those of U.S. based MBA programs. This is not to suggest, that the non-U.S. based MBA programs lack a branding strategy. Indeed, they have specific branding approaches that are discussed later.

Table 3: Classification of Branding Strategies of top 50 global MBA programs (Financial Times, 2006)		
Type	Emphasis of Branding Strategy	Number of MBA programs
S	School Only	10
Su	School primary-university secondary	7
D	Dual**: e**qual emphasis is given to both the school and the university	6
Us	University primary-school secondary	5
U	University Only	10
No branding	No emphasis given to either University or School	2
Unable to categorize	Different organizational structure-unable to categorize using Ingram et al typology	10

BRANDING STRATEGIES OF U.S. BASED MBA PROGRAMS

The best examples of a "University only" branding strategy (**U**) are reflected by the MBA programs at Harvard, Stanford, and Illinois. There was a tremendous amount of consistency reflected in all aspects of communication (brand name, logo, symbol, and text). This type of strategy is similar to the product strategy of family branding, where a single brand (for example Samsung) identifies several related products such as mobile phones, digital cameras, plasma TVs, etc. Harvard, Stanford

and Illinois deploy this strategy because of the strong reputation that these Universities have in the public's minds. Thus, a "halo-effect" may occur where a consumer associates any offering of the university with the positive attributes of the family brand. Hence, the Harvard brand will be positively associated with any offering, MBA, Law, Medicine, etc. According to Merritt (2003, p. 93), "…at top flight schools like Harvard and Stanford, alums gave more credit to their school's brand name than they gave to any body of knowledge gained in class."

On the other end of the spectrum, the "School only" (S) strategy was employed by several MBA programs, including Wharton (University of Pennsylvania), Tuck (Dartmouth) and Kellogg (Northwestern). These MBA programs are indicative of the individual branding strategy, whereby the school's brand name is a unique identifier for the product (MBA degree) offered. Proctor and Gamble, the consumer product giant has utilized this type of strategy for its line of dishwashing liquids. Each of them, Ivory, Joy, Cascade, and Dawn have their separate brand name unconnected to the family name. This strategy is effective when the strengths of the individual product (MBA program) stand on its own merits, and can be identified easily by consumers (for example, the Wharton MBA; the Tuck MBA etc). While somewhat costly, this strategy may be result in a broader identification from global consumers who are interested in the reputation of the MBA program more so than the University itself. On the flip side this is a somewhat risky strategy to undertake when the University's brand name is well-known and an attempt is made to promote a lesser known "School only" brand name. We wish to cite the examples of the MBA programs offered by UT-Austin and the University of Georgia which are exclusively promoted as the "McComb MBA" and "Terry MBA" respectively.

The dual/hybrid (D) strategy was only used by 6 MBA programs all based in the USA. Dual branding attempts to create take advantage of customer appeal by having two powerful name brands "clubbed" together. In our analysis, we found that effective dual positioning was done by the "MIT-Sloan" and "UCLA-Anderson" MBA programs. Not only were the font size and logo consistent with the dual branding approach, the text in the web site reinforced this branding strategy. As an example, the MBA program at MIT-Sloan referred to its alumni and students as "MIT-Sloan alumni" and "MIT-Sloan students." One variation of the dual/hybrid branding is the equal emphasis given to the University and graduate school of business (GSB) which is adopted by the University of Chicago and Stanford University. In this case, the *Graduate School of Business* becomes a brand name (although generic in nature) paired with the University name. Thus, the Graduate School, not the individual program has the emphasis. This is similar to the line extension strategy used by many companies where brand names are carried over to other related products.

The "Us" (University-primary, school-secondary) classification of branding strategy is employed by MBA programs offered by UNC (Kenan-Flagler) and Duke (Fuqua). This strategy tends to accentuate well known University strengths and wide spread name recognition with the MBA program. The University name tends to hold a great deal of prominence with the external community, while the school brand tends to have a drawing among its internal constituents

(students, alumni, faculty). The "Su" (School primary, university secondary) branding strategy is being practiced by Smeal (Penn State) and Marriott (BYU). This type of strategy allows a lesser known brand to establish itself over time by being associated with a more well-known brand. It is possible to theorize, that in the future, some of these types of MBA Programs may completely remove the University name, as the school name becomes more acceptable by its consumers.

We felt that there was a measure of inconsistency and confusion in the branding approaches of some MBA programs. As an example, while NYU-Stern School of Business MBA program's logo prominently gives equal importance to both the University and the School, there is absolutely no reference to the University in the MBA web page. The narrative and related links in the web page make reference to a "Stern MBA" on multiple occasions with no reference to New York University. Another example of an inconsistent branding strategy is that of schools which had a relatively strong University name (such as Carnegie-Mellon and University of Michigan) attempting to promote lesser known school brand names (such as Tepper MBA and Ross MBA) with little or no reference to the university. A possible explanation is that the Ross brand may be more of a global brand name when trying to market to international consumers, while the University of Michigan has more of a domestic connotation. And as the European MBA market becomes more stable compared to the United States market (Adenekan, 2004), it will become more important to acquire and retain those international students through a more globally understood competitive advantage. Another possible explanation is that the branding strategy is in a transitional phase, where in the long run, these MBA programs are attempting to reposition themselves with a "**S"** only strategy, while gradually removing any references to the university. A historical analysis of the branding strategies used would be appropriate for comparison purposes.

BRANDING STRATEGIES OF EUROPEAN, ASIAN, CANADIAN, AND U.K. MBA PROGRAMS

A key finding was that the Ingram et al branding typology, which was derived from an assessment of U.S. MBA programs did not lend itself well when analyzing European MBA programs. It should be noted that many prestigious European programs such as INSEAD and IESE Business School offer "stand-alone" MBA programs that are not affiliated with any university. These programs are offered by institutions that were solely created for the purpose of offering *graduate business degrees*. So from a structural perspective, they are quite different from U.S. B-schools that are housed in universities and do not operate as independent entities. Therefore we concluded that we were unable to categorize them with the Ingram et al branding typology.

B-Schools located in Canada and the U.K. follow an organizational structure similar to the U.S. Therefore, it was easier to diagnose their branding strategies using the Ingram et al. typology. As an example, the Rotman MBA (University of Toronto) and Ivey MBA (University of Western Ontario) have both adopted the "S" (School only) strategy. In contrast, the McGill MBA (McGill

University) has chosen the "U" (University only) branding strategy. The University of Oxford-Said School of Business places more emphasis on Oxford (U) while giving lesser emphasis on Said (s)-this would be a Us branding strategy for its MBA program.

We noticed that several European and Asian MBA programs (such as HEC Paris and Hong Kong UST Business School) prominently display the logos of their accreditation agencies. More importantly, many European MBA programs have achieved *triple* accreditation from three agencies which include AACSB-International (well known in the U.S.), EQUIS (European accreditation agency), and the Association of MBA programs. We concluded that the European MBA programs sought and achieved accreditations from many agencies as they were geared towards attracting a wider audience from a number of countries besides the host country. Multiple accreditations help in enhancing a "global" brand image. The global theme is reinforced by creating opportunities for MBA students to become proficient in at least two if not three languages. INSEAD accepts only students who are proficient in another language in addition to English; additionally, they have to learn a third language before they graduate from the MBA program (Ewing, 2006). These admission and graduation requirements reinforce the global branding associated with the MBA program.

Several European MBA programs emphasized their location as part of their overall branding strategy (as an example, London). Two U.K. based MBA programs, specifically include London next to their name (Imperial College in London and the CITY of London while France based HEC has "Paris" in its logo. The location of the program is based on the idea that the "destination" impacts branding. Cities, regions, and countries can be branded with certain type of qualities and/or products (Yan, 2003; Gray, Fam & Llanes, 2003; Lin and Kan, 2004). If for example, London or Paris become successful in being branded as an "international city" then MBA programs based in these cities may be considered to share the same international flavor.

There was a concerted effort made by some European B-Schools to expand the geographical reach of their MBA programs by entering into strategic alliances and joint ventures with other B-Schools. As an example, INSEAD has an arrangement with the Wharton School of Business to teach classes in the United States and vice-versa. INSEAD also has a campus in Singapore. HEC (France) offers a dual degree in conjunction with the Stern School of Business-New York University. These types of alliances are able to take advantage of the branding efforts of both entities.

London Business School offers a unique perspective on a branding strategy (Shinn, 2006). Rather than attempting to brand the school's programs or degrees, LBS has positioned itself as a "global thought leader" focusing on "faculty and thought leadership" and where the institution is perceived to be a "repository of knowledge, insight and global perspective" (Shinn, 2006, p. 26). LBS has entered into an exclusive arrangement with CNN, whereby CNN markets in U.K., Europe, the Middle East, and North Africa air a 45-second commercial featuring LBS faculty members discussing important business issues. These commercials are aired in prime time, business oriented news. In return, CNN is the sole sponsor for all of LBS's key events. Additionally, CNN sponsored plasma televisions adorn the LBS campus which continuously broadcast the network's programs.

According to David Lane, communication director for LBS (Shinn 2006, p. 28), "Cleary for CNN it's fantastic to be associated with a brand like London Business School, and for London Business School it's fantastic to be associated with a brand like CNN."

CONCLUSION AND DIRECTIONS FOR FUTURE RESEARCH

Our assessment of the branding strategies of the top 50 global MBA programs yielded several interesting insights of current and emerging trends. Competition amongst educational institutions and programs is becoming increasingly global and is not confined within national borders—in this context branding one's institution or program is a key to gaining a competitive advantage in the global marketplace (Black, 2002). It is interesting to note the approach of European MBA programs. They obtain accreditation from multiple agencies and highlight that information as part of their overall branding strategy to attract a more diverse global audience. This branding strategy seems to be gaining in popularity with U.S. students who are increasingly seeking European MBAs for their international diversity and multilingual experience-something that even Kellogg or Wharton cannot offer (Adenekan, 2004). Our analysis led us to conclude that the vast majority of U.S. based MBA programs that made the top 50 ranking, do not emphasize either multiple accreditation or a rich multicultural experiences as part of their branding strategy. It is possible to understand the complacency of U.S. B-schools' given the huge domestic supply of managers along with thousands of internationals who crave a U.S. MBA. But there are more global competitors on the horizon (who are offering MBA degrees) and it has become increasingly difficult for many international students to obtain a student visa to enter the U.S. after September, 11 2001.

We also observed different organizational structures with respect to graduate business programs. While U.S., U.K., and Canada appear to follow a university-based structure that houses a B-School-- Spain, Switzerland, France, and other countries offer a MBA program from a stand-alone entity solely created for graduate business education. Is it easier for these latter institutions to create a brand name given that they do not have to work under a university structure or framework? Or is it more difficult to engage in a branding strategy as these institutions have to operate without a University structure and with fewer resources? These questions also leave the door open for future studies to develop a newer, broader global branding typology. Clearly, additional research is needed to answer these questions.

The European structure appears to be prevalent in India where there are many B-Schools like the prestigious IIMs (Indian Institute of Management) that have a strong Asian reputation and now are now seeking to establish a global presence. It is interesting to note that Director of the IIM at Ahmedabad (based in India) has explicitly stated a long term objective to position the institution as one of the top 10 B-Schools in the world and feels it can be done based on its strong brand name (Merchant, 2006). As Asian MBA programs continue to acquire prominence, they will create increased competition for U.S., European, and Australian MBA programs (Elliot, 2005; Mehra,

2005). The implications are clear. As the Chinese and Indian economies continue to expand at an accelerated pace, home country managers are increasingly displaying a preference to obtain a MBA from a local institution with a strong brand name instead of traveling to the U.S. or U.K. (Bradshaw, 2005). Mehra (2005) points that many Indian students who have worked abroad and who have obtained graduate degrees are returning to India to pursue their MBA degrees. Their motivation is to obtain a "branded" education that will enable them to have an advantage when working in an Indian environment.

Table 4: Differences in branding strategies between U.S. based MBA programs and European & Asian MBA programs (Top 50 Global MBA programs identified by Financial Times, 2006)		
	U.S. Based MBA programs	European & Asian MBA programs
Accreditation	Only AACSB	AACSB, EQUIS, The Association of MBA programs
Structure	All MBA programs are affiliated with a Business School/College that is part of a University structure	Many European programs are offered by "stand-alone" business schools or similar institutions and are not part of a university structure
Foreign Language Proficiency (besides English)	Not required	Requirement in some programs
Target audience	Mostly U.S. based students; some global emphasis	Predominantly global in nature attracting students from all countries; global theme emphasized
Positioning approaches	Location not emphasized	Location of city (London, Paris, etc.) are an integral part of branding

Given that country of origin and cross-cultural values impact consumers' perceptions of education brands, additional studies are needed to more thoroughly explore these relationships (Alreck & Settle, 1999; Yan, 2003). Throughout the 1980's and 1990's, U.S. universities were an attractive alternative for many international students to pursue their higher education. After 9/11, many aspects of U.S. foreign policy have created a backlash against U.S. branded products in many parts of the world. In this context, it will be interesting to conduct longitudinal studies to track the popularity and growth of European and Asian branded MBAs versus U.S. branded MBAs with various geographical and religious market segments.

Branding is part of a larger strategy—to create and maintain a unique corporate identity. Therefore, it is imperative that all parts must fit well. We urge that all information contained in the website including color, brand, logo, symbol, verbiage are consistent with one another to support the overall corporate identity (Gioia, Schultz, & Corley, 2000). The website has been identified as one of primary ways by which students obtain information about a MBA program. One way to

differentiate one's MBA program from competitors is to maintain websites in multiple languages to appeal to a more diverse audience.

Branding is an expensive exercise! Creating and maintaining brand awareness and equity for a MBA program can easily consume a budget of hundreds of thousands of dollars. Established programs with strong brand names can be more focused on maintaining their brand name. In contrast, newer and emerging MBA programs or those that are attempting to reposition themselves, have to both create and maintain a strong brand name. The latter programs have to be committed for the long haul as it takes a substantial amount of time and resources to accomplish successful outcomes. It can be a risky and trying exercise especially if the vast majority of potential customers are relatively unreceptive or unaware of the new brand. Branding can divert resources away from other pressing issues like hiring additional faculty, funding research, and buying new equipment. We urge the Deans and other members of higher administration to engage in a robust cost-benefit debate before making a decision to pursue a branding strategy for their MBA program.

Finally, it appears that ranking and branding will be inextricably linked (at least for the vast majority of U.S. based programs). Ranking is used by many B-schools to boost their brand name and image. We noticed that schools that are placed in the top 50 in multiple rankings (or even a single one), tend to display that information in a prominent manner in their website. Would it be possible for a MBA program to grow a prominent brand name and not be ranked? It is an intriguing proposition that only time can tell.

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THE CAUSALITY BETWEEN STOCK INDEX RETURNS AND VOLUMES IN THE ASIAN EQUITY MARKETS

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ABSTRACT

This investigation empirically examines the relation between daily rates of return and trading volumes on the stock market indices of six developing markets from Asia over the recent 34-month period ending in October 2005. The evidence of these markets supports the view that rising markets are accompanied by rising volumes and vice versa. The volume-return relation is found to depend on the direction of the market itself. The volume-absolute return relation is found to be significantly positive. The Granger causality tests find the absence of causality running in either direction in four of the six markets. In South Korean market, the evidence of causality running from returns to volume is found while the causality running in the diametrically opposite direction is uncovered in the Taiwanese market.

INTRODUCTION

The relation between security prices and the accompanying trading volume has been studied for almost five decades. One of the earliest published studies on this subject can be traced to Osborne (1959). In a 1987 paper, Karpoff provided an excellent review of the research on the relation between price changes and volume until the mid-1980s. Four crucial factors why the investigations of the said relation are important were outlined by Karpoff. Indeed, the various nuances of the relation between price changes and trading volume have continued to capture the interest of researchers and practitioners alike. One particular group of studies which can be found in the literature has focused on three different aspects of price-volume relation in speculative markets. Two of these can be linked to the well-publicized Wall Street beliefs. The Reilly and Norton investment textbook (2003) for example, notes that, "Therefore the technician looks for a price increase on heavy volume relative to the stocks' normal trading volume as an indication of bullish activity. Conversely, a price decline with heavy volume is bearish." Stickel and Verrecchia (1994) refer to one of the more frequently quoted saying that, "volume is the fuel for stock prices." These and similar commonly mentioned postulates provide motivation for the studies which attempt to evaluate the empirical support for these postulates. However, for the most part, the empirical studies have focused on the developed markets. There are only a handful of published studies of

price-volume relation in the developing markets. This fact provides further impetus for the present study.

The objective of this paper is to empirically examine the causal relation between the daily returns on the equity market indices and the accompanying trading volumes in six Asian markets during the most recent 34-month period ending in October 2005. The stock market indices of Hong Kong, Indonesia, Malaysia, Singapore, South Korea, and Taiwan are the focus of this investigation. While all six of these markets are considered to be developing or emerging markets, the Hong Kong market is generally viewed to be the most developed stock market and is often studied along with the developed markets of U.S. and Japan. (Chen, et. al, 2001). The specific goals of this study of six Asian markets are:

1.   To ascertain if the rising markets are accompanied by rising volumes and if falling markets are accompanied by falling volumes, and to ascertain if there is evidence of asymmetric relation with respect to positive and negative returns;
2.   To ascertain if the evidence supports the notion that it takes trading volume to make the market indices move; and
3.   To test for the Granger causality between daily index returns and volumes to ascertain if the causality runs from volume to returns or from returns to volume or in both directions.

In the next section, the relevant literature is briefly reviewed. The data, the definitions, and the methodology adopted in this study are outlined in the following section. The empirical findings of this study are discussed in the fourth section. A summary of the paper are contained in the last section.

RESEARCH ON THE STOCK PRICE CHANGES—VOLUME RELATION

The literature on the price changes-volume relation in speculative markets is considerable. In one of the earliest studies, Ying (1966) had discovered that volume led price changes by about four days. Gordon (1968) had also attested to the fact that peak trading volume had not accompanied the peak index price in the U.S. stock market. However, Gordon found that the volume had led the price by several months. Karpoff's articles (1986, 1987) presented the theories, the primary reasons for studying this important relation and a survey of pioneering literature on the subject at hand. According to Karpoff, first and foremost, the relation in question can provide insight into the structure of financial markets. Secondly, the event study methodology based investigations which utilize the price and volume data to reach conclusions would benefit from studying the price-volume relation. Third, Karpoff argued that the relation in question is " – critical

to the debate over the empirical distribution of speculative prices." Finally, the P-V relation could be of crucial importance to the studies of futures markets.

Some of the most cited as well as influential works are by Crouch (1970), Clark (1973), Granger and Morgenstern (1963), Morgan (1976), Copeland (1974), Epps and Epps (1976), Galant, et. al (1992), Rogalski (1978), Smirlock and Starks (1985, 1988), Westerfield (1977) and Tauchen and Pitts (1983). For both, market indices as well as individual stocks, Crouch (1970) found a positive correlation between absolute values of price changes and volumes. Westerfield (1977), Rogalski (1978) and, Tauchen and Pitts (1983) found a positive relation between price changes and volumes. Stickel and Verrecchia (1994) examined the return-volume relation on the U.S. exchanges at earnings announcements. They found that large price changes with weak volume support tend to reverse but large prices increases with strong volume support are likely to be followed by more price increases. The four theoretical rationales of the positive correlation between the absolute price changes and trading volume are explained by Chen, et. al (2001). The four models are: the SAI model (sequential arrival of information), the MD model (mixture of distributions), the REAP model (rational expectation asset pricing), and the DO model (differences of opinion).

To investigate the causal relation between price and volume, numerous studies have utilized the Granger causality method (Granger, 1969). Examples of such studies are by Rogalski (1978), Jain and Joh (1988), Campbell, et. al (1993), Martikainen, et. al (1994), Hiemstra and Jones (1995), Saatcioglu and Starks (1998), Chen, et. al (2001) and, Kamath, et. al (2005), among others. Martikainen, et. al (1994) found evidence of bi-directional feedback between stock returns and volumes on the Finnish stock market. Using monthly data, Saatcioglu and Starks (1998) investigated the P-V relation in six Latin American markets. They reported evidence of a positive relation between volume and price changes as well as between volume and the magnitude of price changes. In four of the six markets, they found that volume led the returns. Chen, et. al (2001) examined the price-volume relation in nine national markets, including the U.S., Japan, U.K., and Hong Kong. For all nine markets, they found a positive relation between volume and the magnitude of price changes. In reporting the results of the Granger causality tests, they noted that returns generally caused volumes and to a much smaller extent, volumes caused returns. For their study of hourly returns and volumes on the NYSE, Jain and Joh (1988) reported significant positive correlation between volume and absolute returns. However, they found significant differences in this relation for positive and negative returns.

Kamath, et. al (2005) investigated the return-volume relation on the primary stock market indices of Indonesia, Malaysia, South Korea, and Thailand during the entire decade of the 1990s. In all four emerging markets, they found significantly positive correlations between volumes and magnitudes of returns. In Malaysia, South Korea, and Thailand, they also found significantly positive correlations between volumes and returns. In South Korea and Thailand, the causality was found to run only from returns to volumes. In Indonesia and Malaysia on the other hand, they uncovered strong evidence of causality running in both directions. Of the six Asian markets

investigated in this paper, three markets, namely, the Indonesian, the Malaysian, and the South Korean markets were also studied by Kamath, et. al (2005), though for a different period.

DATA AND METHODOLOGY

To meet the objectives of this empirical study, we rely on the daily observations of the stock market index values and the associated trading volumes of the six Asian equity markets. The period under consideration is the 34 month period between January 2003 and October 2005. Thus, for each index, our data stream includes about 700 pairs of observations. The six Asian equity markets studied are from Hong Kong, Indonesia, Malaysia, Singapore, South Korea, and Taiwan. The basic information on each of the six market indices and the raw trading volumes are presented in Table 1. From the raw data of each index, we computed the daily rates of return and the volume measures. In this paper, the three primary variables of interest are denoted by R, V, and AR, respectively, and they are calculated with the following three equations.

$$R = ((P_t / P_{t-1}) - 1) \times 100 \qquad (1)$$
$$V = ((V_t / V_{t-1}) - 1) \times 100 \qquad (2)$$
$$AR = Absolute\ value\ of\ R \qquad (3)$$

Table 1: Information on the Asian Market Indices, January 2003 - October 2005						
Stock Market Index	Hong Kong	Indonesia	Malaysia	Singapore	South Korea	Taiwan
Beginning Index Value*	9583.85	409.12	632.43	1335.98	635.17	4524.87
Closing Index Value	14386.37	1066.22	910.76	2216.77	1158.11	5764.30
Highest Close	15466.06	1192.20	952.59	2377.13	1244.27	7034.10
Lowest Close	8409.01	379.35	619.22	1213.82	515.24	4139.50
Average Minimum in Mill. Shares	302.33	116.72	70.70	152.66	459.42	382.14
Largest Volume in Mill. Shares	1664.41	1448.65	268.09	667.27	1076.20	1155.82
Smallest Volume in Mill. Shares	102.24	10.94	14.22	27.22	221.40	131.40

In these definitions, P_t and V_t are the closing market index prices and the market volumes on day t, respectively. As equation (2) shows, we have adopted a definition of the volume variable

which is identical to the return calculation. Accordingly, both, returns and volumes are % functions and therefore, both variables can take on positive as well as negative values. Previous studies have utilized different conventions to measure both variables, particularly the volume variable. Jain and Joh (1988) for example, have relied on the raw values of trading volume, while Martikainen, et. al (1994) have utilized natural logarithm of raw volume. The volume measure in the Saatcioglu and Starks (1998) paper is a ratio of raw volume to the market capitalization. In all these cases, the volume variable definitions lead to regressions in which one variable can assume positive as well as negative values (returns) while the other can assume only positive values (volumes). Our method of computing the volume variable overcomes this drawback while retaining the essence of the properties needed for testing the primary postulates.

The first objective of the paper involves econometric testing to evaluate if the rising markets are accompanied by correspondingly rising volumes and if the declining markets are accompanied by declining volumes in the six developing markets. Thus, equation (4) is adopted to ascertain if the correlation between volume and returns is in fact positive and statistically significant.

$$V = C + D(R) \hspace{3cm} (4)$$

The second objective of the paper involves econometric testing to ascertain if it takes volume to make the six sample Asian stock markets move. Accordingly, we utilize the absolute returns in place of the actual returns to determine if large volumes accompany large absolute values of returns and vice versa. Equation (5) is used for this purpose.

$$V = L + M(AR) \hspace{3cm} (5)$$

In equations (4) and (5), the estimated constant terms are denoted by C and L, respectively, and the estimated coefficients of independent variables R and AR are denoted by D and M, respectively. Equations (4) and (5) test for the contemporaneous relations between volume and returns, and volume and absolute returns, respectively. In any market, if we find D to be significantly positive, it would imply that returns contemporaneously cause volumes in that market. Conversely, in any market, if we find M to be significantly positive, it would imply that volumes contemporaneously cause returns in that market.

The third objective of the paper directs us to test for the causality between returns and volumes as per the Granger methodology. This methodology assists in determining if the changes in the first variable, such as the returns, cause the second variable, such as the volume, to change even after controlling for the past changes in the second variable (volume) (Granger, 1969). The null hypotheses tested in this paper are described in equations (6) and (7). We utilize lags of up to 5 business days in our estimations of Granger Causality. Equations (8) and (9) show the full expressions to test the null hypotheses (6) and (7), respectively.

$$R \text{ does not Granger cause } V \qquad\qquad (6)$$
$$V \text{ does not Granger cause } R \qquad\qquad (7)$$
$$V_t = G_0 + \sum G_i V_{t-i} + \sum H_j R_{t-j} \quad i, j = 1...5 \qquad\qquad (8)$$
$$R_t = S_0 + \sum S_i R_{t-i} + \sum Q_j V_{t-j} \qquad i,j = 1...5 \qquad\qquad (9)$$

For any market, if we find H_j coefficients to be statistically significant, then we would have to conclude that the inclusion of the past 5 values of daily returns along with the past 5 values of daily volumes provide a better prediction of future daily volume than the inclusion of just the past 5 values of daily volume. Accordingly, we would conclude that daily returns Granger cause daily volumes in that market. However, if the F-test fails to reject the hypothesis that $H_1, H_2, H_3, H_4, H_5 = 0$, our conclusion would be that returns do not Granger cause volumes in this market. Similarly, if the F-test fails to reject the hypothesis that $Q_1, Q_2, Q_3, Q_4, Q_5 = 0$ in any market, we would have to conclude that volumes do not Granger cause returns in that market.

FINDINGS

The statistical attributes of daily rates of return and daily volumes of the six Asian stock markets are displayed in Table 2. In all six markets, both, the mean as well as the median returns are found to be positive during the study period. The coefficients of variation of returns (standard deviation/mean return) which measure the risk per unit of return can be computed from the given information. The coefficients of variation of returns are 14.66, 8.60, 12.33, 11.79, 14.92, and 29.58 in the stock markets of Hong Kong, Indonesia, Malaysia, Singapore, South Korea, and Taiwan, respectively. As noted earlier, three of these six markets, namely, Indonesia, Malaysia, and South Korea, were also studied by Kamath, et.al (2005) during the 10-year period of the 1990s. The coefficients of variation of daily returns of the three overlapping markets were 47.14, 61.02, and 9.37, respectively during the 1990's. Kamath, et. al had described the high volatility in the returns as the "roller coaster rides" witnessed by many of the Asian stock markets during that decade. The table shows that the return distributions are positively skewed only in case of Hong Kong and Malaysia. In this respect, the findings for the market indices of Hong Kong and Malaysia are similar to those reported for 5 of the 6 Latin American markets by Saatcioglu and Starks (1998). The negative skewness of the return distributions exhibited by the indices of Indonesia, Singapore, South Korea and Taiwan are similar to those reported by Chen, et. al (2001) for the nine national markets, including Hong Kong during the pre-2001 period. The Table 2 data provides evidence of peaked and fat tailed return distributions in all six Asian markets as indicated by the kurtosis values of greater than 3.0. This evidence is very much comparable to the evidence reported for the stock markets all over the world, whether developed or developing. The statistical attributes of the volume

distributions indicate high standard deviations, large and positive skewness and very large kurtosis in all six markets.

Table 2: Statistical Attributes of Daily Returns and Volumes, January 2003 – October 2005												
Stock Market Index	Hong Kong		Indonesia		Malaysia		Singapore		South Korea		Taiwan	
Variable	Return	Volume	Return	Volume	Return	Volume	Return	Volume	Return	Volume	Return	Volume
Mean	0.066	6.395	0.146	13.11	0.054	5.159	0.075	7.104	0.096	1.374	0.043	2.627
Mdn	0.043	-1.699	0.133	0.000	0.048	-0.717	0.088	-0.400	0.156	-1.541	0.020	-0.836
Max	3.665	543.6	4.627	1809.6	2.655	246.75	3.511	329.71	4.998	98.27	5.568	351.29
Min	-4.097	-78.09	-7.504	-89.31	-2.625	-70.21	-3.839	-83.56	-5.730	-41.49	-6.679	-66.82
S D.	0.968	43.78	1.255	98.29	0.666	35.35	0.884	43.15	1.432	18.26	1.272	26.16
Skew-ness	0.012	4.446	-0.258	11.80	0.307	1.664	-0.110	2.333	-0.204	1.36	-0.191	3.953
Kur-tosis	4.407	46.55	6.109	191.5	4.463	8.582	4.680	13.33	4.289	7.18	6.215	47.83
Jarque-Bera	57.81	57702	286.4	102510	73.33	2108.8	85.52	3829.5	53.38	726.8	306.2	60513
# of Obser-vations	701	701	692	692	699	699	715	715	701	701	701	701

Our results of regressions expressed in equation (4) to ascertain the statistical relationship between returns and volumes are summarized in Table 3. Of the six Asian markets, only the Jakarta Composite Index (JKSE) of Indonesia exhibits a negative correlation between returns and volumes, though statistically insignificant. This finding for the Indonesian market index during the recent 34 months is comparable to that reported by Kamath, et. al (2005) for the same index during the decade of the 1990's. Of the remaining five markets, Malaysia, Singapore, South Korea, and Taiwan display significantly positive relationship between returns and volumes. Thus, in these four markets, we have evidence of rising market indices being accompanied by rising volumes, and vice versa. To further evaluate the robustness of this finding, the relation in equation (4) was separately tested for the positive returns and the negative returns. Our findings (not tabulated) show that in all six markets, the said relation was significantly positive for the days when markets recorded gains. For the days when markets recorded losses, the said relation was found to be significantly negative in all markets except one. In the Indonesian market also, the relation in question was found to be negative, though, not significant.

Table 3: Contemporaneous Relationship Between Volume and Return											
Equation 4 V = C + D (R)											
Stock Market Index	Hong Kong		Indonesia		Malaysia		Singapore		South Korea		Taiwan	
Variable	C	D	C	D	C	D	C	D	C	D	C	D
Coefficient	6.211	2.794	13.770	-4.459	4.352	15.398	6.665	5.872	1.201	1.806	2.415	4.964
t-statistic	(3.75)	(1.64)	(3.36)	(-1.49)	(3.36)	(7.97)	(4.14)	(3.24)	(1.75)	(3.78)	(2.52)	(6.58)
Probability	0.000	0.102	0.000	0.136	0.001	0.000	0.000	0.001	0.08	0.000	0.012	0.000
Adjusted R Sq.	0.002		0.002		0.084		0.013		0.019		0.057	
Log Likelihood	-3641.9		-4095.0		-3393.3		-3700.5		-3023.4		-3261.4	
F Statistic	2.675		2.232		63.517		10.481		14.294		43.247	
Prob. F	0.102		0.136		0.000		0.001		0.000		0.00	

Our findings of contemporaneous relationship between absolute returns and volumes in the six Asian markets are presented in Table 4. In 5 of the 6 markets, namely, in Hong Kong, Malaysia, Singapore, South Korea, and Taiwan, the correlation between volumes and absolute returns is found to be significantly positive. Hence, in these five markets, we find convincing support for the contention that market movements are fueled by volumes. In the remaining market, the observed relationship is statistically insignificant. Combining the empirical results of Tables 3 and 4 indicates that only in Indonesia, we could not detect a statistically significant relation between volume and either returns or absolute returns. In Hong Kong, we found evidence of a significant positive relationship only between volumes and absolute returns. In Malaysia, Singapore, South Korea, and Taiwan, our findings suggest that returns cause volumes and volumes cause returns in a contemporaneous setting.

The findings concerning the existence of and the direction of Granger causality between returns and volumes of six Asian market indices are summarized in Table 5. For reasons of space, instead of tabulating coefficients of all ten variables on the right hand side of equations (8) and (9) and their significance, we provide the summary F-statistics to test the null hypotheses. The F-statistics reported in the upper half of Table 5 indicate that for five of the six Asian markets studied here, we can not reject the null hypothesis. Only in case of the Korean Stock Price Index (KOSPI)

of South Korea, our findings indicate that returns Granger cause volumes. The F-statistics tabulated in the lower half of Table 5 suggest that the null hypothesis can not be rejected in five of the six Asian markets. In these 5 markets, volumes do not Granger cause returns. In Taiwan's market index however, there is evidence of Granger causality running from volumes to returns.

Table 4: Contemporaneous Relationship Between Volume and Absolute Return											
Equation 4 V = L + M (AR)											
Stock Market Index	Hong Kong		Indonesia		Malaysia		Singapore		South Korea		Taiwan	
Variable	L	M	L	M	L	M	L	M	L	M	L	M
Coefficient	-12.623	26.843	8.148	5.311	-11.654	33.563	-3.118	15.534	-1.539	2.724	-5.636	9.181
t-statistic	(-5.69)	(11.74)	(1.46)	(1.21)	(-6.33)	(12.23)	(-1.33)	(5.86)	(-1.57)	(3.77)	(-4.24)	(8.79)
Probability	0.000	0.000	0.144	0.227	0.000	0.000	0.186	0.000	0.132	0.000	0.000	0.000
Adjusted R Sq.	0.163		0.001		0.178		0.045		0.186		0.098	
Log Likelihood	-3580.3		-4095.4		-3355.9		-3688.9		-3023.4		-3245.6	
F Statistic	137.7		1.463		149.5		34.29		14.249		77.332	
Prob. F	0.000		0.227		0.000		0.000		0.000		0.000	

Table 5: Summary of Granger Causality Test Results						
Stock Market Index of	Hong Kong	Indonesia	Malaysia	Singapore	South Korea	Taiwan
Null Hypothesis: Returns do not Granger Cause Volumes						
F – Statistic (Probability)	0.507 (0.771)	0.662 (0.653)	1.507 (0.185)	0.582 (0.714)	3.440 (0.004)	0.854 (0.512)
Null Hypothesis: Volumes do not Granger Cause Returns						
F – Statistic (Probability)	1.386 (0.227)	0.103 (0.992)	1.478 (0.195)	1.781 (0.115)	0.324 (0.899)	2.990 (0.011)

SUMMARY

In this paper, we empirically investigated the relation between stock market index returns and volumes of six developing equity markets of Asia. The stock markets of Hong Kong, Indonesia, Malaysia, Singapore, South Korea, and Taiwan were studied with the help of the daily data for the recent 34-month period from January 2003 and October 2005. As compared to the turbulent stock market conditions of the 1990's in most of Asia, the stock markets studied in this paper were relatively calm during the period of investigation. All six markets recorded gains during the study period. Moreover, the trading volume of shares also increased steadily in all six markets. Except for the Taiwan market, the coefficient of variation of daily returns was found to be less than 15.00. In Malaysia, Singapore, South Korea, and Taiwan, we found evidence of statistically significant positive relation between volume and returns. Thus, in these four markets, the evidence indicated that the rising markets were accompanied by rising volumes and falling markets were accompanied by falling volumes. Moreover, this study also found robust evidence to support notions that the correlation between volume and positive returns to be positive and the correlation between volume and negative returns to be negative.

In all developing markets studied in this investigation except the Indonesian market, we found statistically significant positive correlation between volume and absolute returns. Thus, in five of the six markets, our evidence supported the contention that it takes volume to make the markets move. Only on the Jakarta Stock Exchange of Indonesia, we found insignificant contemporaneous relation between both, volumes and returns as well as between volumes and the magnitudes of returns. The evidence uncovered for the other five developing markets supports the first three empirical propositions outlined by Karpoff (1987) for the volume-return relation.

The Granger causality tests were utilized to detect the existence of and the direction of causality between market index returns and volumes with lags of up to five business days. In Hong Kong, Indonesia, Malaysia, and Singapore, the evidence indicated an absence of causality between returns and volumes in both directions. While in the South Korean market, we found returns Granger causing volumes, in the Taiwanese market, we found volumes Granger causing returns. In the case of the South Korean market, our causality findings for the recent 34-month period are in agreement with the findings reported for the 1990's. However, the causality findings of this study for Indonesia and Malaysia are at odds with the reported findings of bi-directional feedback in these two markets during the decade of the 1990's.

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CULTURE-BASED EXTREME RESPONSE BIAS IN SURVEYS EMPLOYING VARIABLE RESPONSE ITEMS: AN INVESTIGATION OF RESPONSE TENDENCY AMONG HISPANIC-AMERICANS

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ABSTRACT

Survey response biases can render results from a number of statistical tests completely spurious, especially those from analyses based on survey data employing Likert-type items. This problem is particularly endemic to international studies and multiple studies over the years have suggested that cultural traits in a society lead to response bias. There is some evidence that response bias is a problem in Latin cultures, such as that dominant in Mexico. Thus far there has been very little work examining whether Hispanics in the United States are subject to survey response bias. This study used a sample of 316 university students, roughly half of whom identified themselves has Hispanic, to test whether extreme response tendency and/or midpoint bias could be shown in that American subpopulation. Results of a Multivariate Analysis of Variance procedure showed that compared to non-Hispanics, Hispanic respondents exhibited not only extreme response bias (the tendency to use "1"s and "7"s more often on a seven-point scale) but also used significantly fewer midpoints on the scale.

LITERATURE REVIEW

Empirical work in the field of International Business must often bridge a large cultural chasm that raises a number of methodological difficulties. One of the most formidable is the pervasive use of Likert-type and semantic differential rating scales and their long-recognized susceptibility to culture-related response bias ENRf8(Adler, Campbell, & Laurent, 1989; Jaccard & Wan, 1986; Leung & Bond, 1989; Mullen, 1995; Zax & Takashi, 1967). The implications of ignoring response tendency differences can be profound, leading to major inferential errors in cross-cultural research ENRf8(Chun, Campbell, & Yoo, 1974; Cronbach, 1946; Singh, 1995).

For example, Adler and colleagues ENRf8(1989) encountered such unusual response distributions for Likert-type items among P.R.C. managers in their study that they abandoned substantive inquiry addressing U.S.-P.R.C. differences in managerial attitudes altogether and analyzed instead methodological barriers to cross-cultural research. Unfortunately, the literature

addressing cultural differences in response tendencies is relatively undeveloped, in part because cross-cultural studies often ignore this problem, and indeed measurement concerns altogether ENRf8(Singh, 1995). This is despite major inferential limitations and distortions that are operant, whether acknowledged or not. If present, cultural response bias distorts statistical analysis by : (1) rendering group mean differences uninterpretable, (2) spuriously raising or lowering indexes of a measure's internal consistency, (3) spuriously affecting correlations between variables and related techniques such as regression, and (4) affecting the results of methods assessing underlying dimensions, such as factor analysis ENRf8(Chun et al., 1974).

Many subfields within the field of International Business make heavy use of survey methodology. Surveys are typically distributed to respondents in more than one country, very often including the US, for comparison purposes. These surveys are commonly used to determine how those from other cultures differ from Americans on one or more behavioral dimensions. The surveys may be given in English to English-speaking foreigners or translated into native languages. Regardless of which form the survey may take, response data from more than one country are often not directly comparable due to the problem of response bias.

Response bias refers to the fact that survey-takers have been observed to respond to typical Likert-type or semantic differential scale items (items that employ multiple-response scales; e.g., "I am satisfied with my job" - respondent chooses "1" = strongly disagree, "2" = moderately disagree, etc.) in very different ways based on their cultural background. For example, Americans are thought to exhibit a "midpoint bias" when confronted with a statement with which one must indicate some measure of agreement or disagreement on five-point or seven-point scale, they will tend to circle middling responses around the neutral point on the scale. By contrast, respondents from cultures in Asia Pacific countries such as China are thought by some to exhibit an extreme response style, picking numbers toward either extreme of the scale. This affects the measurement of the construct a researcher is trying to assess, such as individual levels of job satisfaction or organizational commitment.

This measurement distortion – if unrecognized- leads to a number of other methodological problems such as (1) failure to capture variable relationships assessed with correlational techniques such as regression, (2) false positive or false negative results in difference tests comparing cultures on some attribute, and (3) the distortion of factor-analytic results used to examine the reliability and validity of scales that are used. In other words, cross-cultural work that takes no cognizance of potential response bias runs the risk of obtaining completely spurious findings. For example, we have encountered studies comparing survey responses from Americans on a large number of variables with responses from one of the East Asian countries which found the other country's means to be higher on every single variable. Findings were reported as completely substantive with no mention of the possibility of extreme response tendency on the part of the other country's respondents. This is despite the fact that the East Asian countries are thought prone to this form of response bias.

Although investigations of cultural response style have been conducted in a variety of countries, deeper focus on particular countries has been lacking. Given the large volume of trade with Mexico, greatly increased since the implementation of the NAFTA agreement, knowledge about the effects of response bias on survey methodology is particularly deficient. In addition, the number of people within the United States comprising the Mexican-American subculture is increasing rapidly. What little work that has been done so far has indicated that response bias, specifically extreme response tendency, may be a problem in Latin-American samples ENRf8(Stening & Everett, 1984).

Information about whether Hispanics are also characterized by some form of survey response bias would be valuable first because it, by extension, gives us some idea of the nature of response bias in Latin cultures outside the U.S. This evidence also has obvious importance for any research involving populations within the U.S. employing survey-based data because a sample that includes a relatively large proportion of Latinos, when compared to a sample with a much smaller proportion, would yield spurious results. This is because there would be significant differences in responses between the two samples based merely on the response style artifact, even if there were in fact no substantive differences between the two samples on the variables being studied.

Some previous work suggests that survey response bias among Hispanic-Americans make take the form of *extreme response* tendency ENRf8(Hui & Triandis, 1989). If this is in fact the case, then regardless of a survey's substantive focus, Hispanics would tend to choose "1"s and "7"s on a seven-point Likert-type scale significantly more often than do non-Hispanic Americans. Or similarly, they might choose "1"s and "5"s more often when presented with a five-point scale. Unfortunately, the paucity of work in this area is insufficient to provide any confidence that this response bias is indeed characteristic of Hispanics. Additionally, very little is known about other demographic variables that may be a factor, such as age and education.

The Triandis study used a very small sample of 59 Hispanics and 60 non-Hispanics and did find evidence for extreme response tendency among Hispanics, although this was limited to item stems using five-point variable response scales. When the same item stems were employed with ten-point response scales there was no statistical significant difference in the number of scale endpoints chosen by the two groups. Another study also provided some evidence for extreme response bias on the part of Hispanics when compared with non-Hispanics (Martinez & Johnston, 1992) but there was very little information given as to the nature of the scales, item content, and item format. The paucity of work done in this area means that the existence of extreme response style among Hispanics in the United States is still very much an open question.

In addition, there has been no study of whether non-Hispanic Americans may display a midpoint bias when compared with Hispanic Americans. It stands to reason that if Hispanics favor scale endpoints, then midrange responses will be chosen less frequently. Non-Hispanic Americans would then tend to exhibit, relative to Hispanics, a midpoint bias. There is some evidence that Americans are prone to choosing scale midpoints when compared with East Asians, e.g. the Chinese,

but this American response tendency has never been explored in relation to Hispanic-American subpopulations.

Finally, what little work has been done suggests that, among demographic variables, age, education levels, and the degree of acculturation are related to the tendency of Hispanics to employ an extreme response style. Specifically, those Hispanics who are older, less educated, or have undergone acculturation to the broader American culture may display a greater extreme response tendency than those who are younger, more educated, and/or more acculturated. Whether Hispanics and non-Hispanics of roughly the same age and education level would differ in their survey response patterns has been scarcely addressed.

With the above questions in mind, we sought to examine in this study whether Hispanic survey respondents exhibit extreme response bias compared to non-Hispanic respondents - reflected in atypically extreme responses for survey items using a multiple-response format (e.g., marking a "1" or "7" on a seven-point scale). We also investigated whether the two groups differed significantly in their preference for the scale midpoint. Finally, whether any extreme response tendency that might be shown varied as a function of demographic variables.

DATA ANALYSIS

A total of 33 items stem were used in this study (see Appendix). Nine of the items were taken from taken from two scales common in the comparative management area of cross-cultural research, one measuring locus of control and the other, collectivism. Also included were items taken from scales included in a cross-cultural study investigating American, Korean, and Chinese samples (Chen, Lee, & Stevenson, 1995). Semantic anchors for the variable response scale associated with each item stem were "1" completely disagree, "2" moderately disagree, "3" slightly disagree, "4" neither agree or disagree (neutral), "5" slightly agree, "6" moderately agree, and "7" completely agree. All survey items and instructions were translated by a bilingual Mexican studying in the United States. Back-translation ENRf8(Brislin, 1970) into English was carried out by two bilingual Americans. Survey respondents were given a choice of English versus Spanish surveys, but none opted for the Spanish-language survey. This may be construed as an indicator that the Hispanics in our study were fairly well acculturated to the broader American culture, at least with respect to their English skills.

The sample was comprised of 316 college juniors, seniors and MBA students enrolled at two universities in the Southwest. The average age was 26.74. The sample was split almost exactly between males and females (51 and 49% respectively) and between Hispanics and non-Hispanics (50% each). Forty percent were employed full time.

Initially, we tabulated frequency distributions of response choices for each country group by item and these suggested that substantial differences in response patterns existed. Next, an "extreme response" score was calculated for each respondent indicating the number of times a "1"

or "7" response was chosen and a "midpoint response" score computed for the number of "4"s selected. The count of extreme scores and midpoint scores for each respondent was cumulative across all items.

Next, response patterns were compared by cultural group to assess whether Hispanic subjects assigned extreme and midpoint scores differently than non-Hispanic subjects. A Multivariate analyses of variance (MANOVA) procedure was conducted to control Type I error while analyzing between-group mean differences in extreme and midpoint response scores. The MANOVA was used because the chance of observing a significant difference between groups for multiple dependent variables using difference tests for each outcome, assuming no true population differences, increases according to the number of tests performed. MANOVA controls Type I error by testing all dependent variables simultaneously for significant differences across independent variable categories. While comparisons between groups were limited to two, use of the MANOVA represented a more conservative test than mere computing difference tests, such as T-tests. The two dependent variables were extreme and midpoint frequency scores for the total pool of scale items. Cultural group served as the independent variable. The Wilks-Lambda test provided an index of whether culture groups differed in relation to both dependent variables combined. Univariate F-tests computed in connection with MANOVA determined whether extreme and midpoint scores differed across culture groups.

Table 1: Intercorrelations Among Study Variables							
	Mean	S.D.	(1)	(2)	(3)	(4)	(5)
(1) Extreme response score	4.32	3.17					
(2) Midpoint response score	1.82	1.88	-.33**				
(3) Hispanic ethnicity	1.51	.50	.12*	-.14*			
(4) Age	26.74	5.95	-.11*	-.03	.14*		
(5) Sex	1.46	.50	.11	-.09	.11*	-.06	
(6) Dependents	58	1.02	-.10	.00	.01	.62**	-.06
** Correlation is significant at the 0.01 level (2-tailed test). * Correlation is significant at the 0.05 level (2-tailed test).							

RESULTS

MANOVA indicated overall differences (Wilks-Lambda test = $p < .01$, Table 2) between Hispanic and non-Hispanic respondents for extreme and midpoint response scores analyzed in combination. Consistent with expectations, F-tests ($p < .05$) performed in connection with the MANOVA procedure indicated that Hispanic respondents selected extreme response categories ("1"

or "7") more frequently than did non-Hispanics. Interestingly, non-Hispanics chose the midpoint significantly more frequently ($p < .05$) than did Hispanics. Intercorrelations among study variables revealed that of the three demographic variables, age, sex, and number of family dependents, only age was significantly correlated with one of the response score variables, and this was a negative relationship with extreme response score. In other words, older subjects were significantly more likely to exhibit extreme response bias.

Table 2: MANOVA results Compaing Response Tendencies of Hispanics and Non-Hispanics							
	Hispanics			Non-Hispanics			
	Mean	S.D.		Mean	S.D.	Index	Sig.
Multivariate GLM model						9.75 [1]	.019
Extreme response scores	4.73	2.72	>	3.96	3.45	4.93 [2]	.028
Midpoint response scores	1.58	1.53	<	2.09	2.17	5.96 [2]	.015
Note: MANOVA assessed differences between cultural groups for the number of extreme (1,7) and midpoint response (4) scores given by each respondent. [1] Wilk's Lambda value for the full model [2] F value for respective difference tests.							

DISCUSSION

This study represented an exploratory foray into the poorly understood area of culture-based response bias among Latin cultures in general and Hispanics in the United States in particular. This line of research is still embryonic and even the most basic principles have yet to be established. Two such principles that may well be established eventually are that survey respondents in Latin cultures are prone to extreme response bias and that this extends to Latino subcultures in the United States. The findings of this study provide indirect evidence that the former principle is true, and direct evidence that the latter is true. Specifically, our results indicate that in the United States, those identifying themselves as Hispanic respond to Likert-type survey items in a way that is substantially different than American non-Hispanics.

The implications of such a difference in survey response patterns are potentially far reaching. The number of studies in business-related fields that survey American samples with Likert-type variable-response format items is quite large, not to mention the number that would apply for all academic fields combined. A substantial portion of such studies is likely, given the considerable and ever-increasing number of Hispanics in the United States, to include large numbers of this groups in sample populations under study. These studies run a significant risk of obtaining spurious

findings when correlational techniques are used, and this usage use is quite common. Correlational techniques distorted by response bias would include commonly used procedures such as ordinary least squares regression, logistic regression, and structural equation modeling. Scale development studies employing exploratory or confirmatory analysis would bee affected as would be all studies that employ coefficient alpha tests of scale reliability. In addition, studies that compare more than one sample to another run a sizeable risk of obtaining significant differences between the samples, even given no actual substantive differences, based on extreme or midpoint response effects that arises when one sample has substantially higher proportion of Hispanics.

There have been no studies as of yet indicating that Americans from the broader "Anglo" culture exhibit a midpoint response compared to those from the Latino subculture. Neither have there been studies showing that this is the case for other countries in the Anglo group, such as Great Britain, Canada, Australia, and New Zealand. This is undoubtedly due to the fact that research focused on culture-based response bias is still in its early stages. Our study indicated such a pattern and this has many of the same implications for spurious research findings as those for extreme response bias. It should be pointed out that finding an Anglo midpoint response bias vis-à-vis Latino response patterns is not the converse of finding a Latino extreme response bias when compared with Anglo responses.

Age was significantly correlated with extreme response scores for the sample. This is in line with results from studies employing Latin and Asian samples. The reason for the correlation between age and extreme response is still largely unknown although there has been speculation that older members of cultural groups are more culture bound. The thinking is that in societies that are gradually undergoing social and cultural change, it is naturally the youngest members who diverge most from traditional norms and cultural orientation.

Our findings underscore the need for more understanding of culture-related response bias. In addition, they point out the need for researchers to be aware of the existence and potential distorting effects of response bias in certain cultures that research increasingly indicates are so disposed, such as Latin cultures and Asian cultures such as those found in China, Korea, and Taiwan. Our results point out the need to be cautious in employing surveys that may contain large proportions of Hispanics. Statistical comparisons of American samples should take into account the relative percentage of Hispanics in each sample. In cases, where extreme response is shown, corrective measures - such as normalizing the data through Z scores - should be taken.

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APPENDIX
Locus of control items
1. Getting the job you want is mostly a matter of luck.
2. Making money is primarily a matter of good fortune.
3. In order to have a good job, you have to have family members or friends in high places.
4. To make a lot of money, you have to know the right people.
5. It takes a lot of luck to be an outstanding employee on most jobs.
Collectivism items
6. Employees like to work in a group rather than by themselves.
7. If a group is slowing down, it is better to leave it and work alone.
8. One does better working alone than in a group.
9. Problem-solving by groups gives better results than problem-solving by individuals.
10. An employee should accept the group's decision, even when personally he or she has a different opinion.
Items from Chen et al. (1995) study
11. It is very important to me that I go to college.
12. It is important to my parents that I get good grades.
13. It is important to my parents that I be good at sports.
14. It is important to me that I have many friends.
15. I am good at math.
16. I am good at science.
17. I am above average at athletic ability.
18. I worry about keeping up with my schoolwork.
19. I get nervous when taking a test.
20. I am doing as well in school as I want to.
21. Generally, I am satisfied with myself.

CONVERGENCE IN MAJOR EURO-ZONE STOCK MARKETS: EVIDENCE FROM MONTHLY DATA

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ABSTRACT

This paper investigates whether the introduction of the euro as a common currency promotes integration among the major Euro-zone stock markets. To carry out this investigation, the dynamics of the stock markets of Germany, France and Italy are studied. Monthly data on stock returns from February 1994 through December 2003 are employed. There is some evidence of increasing integration among these markets. Presumably, the post-euro sub-sample period may be too short to reveal the true extent of enhancing market integration.

INTRODUCTION

Eleven European countries introduced a common currency (euro) since January 1, 1999 replacing their own national currencies. They gave up their monetary authority to create the European Central Bank (ECB) that issues the euro and implements a common monetary policy for them. Adoption of the euro makes it easier for multinational corporations to design plans, pricing policies and invoicing. It eliminates exchange rate risk and facilitates the comparability of cross-border prices.

Reduced risk and lower cross-border currency conversion costs promote the flows of trade and investments among member countries and should bring about greater integration of Europe's capital, labor and commodity markets. Consequently, a more efficient allocation of resources is also induced within the region as a whole. Increased trade, in turn, has intensified Europe-wide competition in goods and services inspiring a wave of corporate restructurings including transnational mergers and acquisitions. The euro is thus expected to initiate necessary restructurings of the Euro-zone economy making it flexible, dynamic, productive, and better able to rival the mega U.S. economy.

Currently, governments of twelve Euro-zone countries can also issue bonds in euros, just as individual American states can issue dollar bonds. Likewise, Euro-zone corporations can issue

stocks and bonds including other financial assets in euros. As a result, the euro is expected to enhance capital market convergence among the twelve Euro-zone countries. Although the full impact of Euro is yet to unfold, its effects have already been discernible.

The focus of this paper is the major Euro-zone equity markets and the issue of convergence using monthly data for the pre-and post- euro sub-periods. Since there is not a single European stock market, the main objectives of this paper are to determine if the euro introduction affects the integration of the above markets, and to determine if the integration has increased during the post-euro sub-period relative to the pre-euro sub-period.

BRIEF SURVEY OF RELATED LITERATURE

Many studies (theoretical and empirical) analyze the linkages among many national stock indices. If national stock markets were integrated, the lags of the price adjustments in these stock markets would be reduced (Koch and Koch, 1991). The empirical results usually depict significant correlation between markets in near geographic areas. The relaxation of controls on capital movements and foreign exchange transactions, improvements in computer and communication technology, expansion in multinational operations of major corporations, and above all globalization of financial transactions make stock markets increasingly synchronized and shorten the adjustment delays in international prices [Gelos and Sahay (2000), Jeon and Chiang (1991)].

There have been several studies about linkages and dynamic interactions among international stock markets with conflicting evidence. The results vary depending upon the choice of markets, the sample period, the frequency of observations (daily, weekly or monthly) and the different methodologies employed. Jafe and Westerfield (1985), Schollhammer and Sand (1985), and Arshanapalli and Doukas (1993) find substantial increases in the degree of international co-movements among stock price indices of the U.S., U.K., France and Germany excepting Japan. Hamao et al. (1997), Susmel and Engle (1994), and Booth et al. (1997) using ARCH models find linkages and spillovers in stock markets. Ayuso and Blanco (2000) using GARCH methodology discover increased linkages during 1995-1999 as compared to 1990-94 among the stock markets of the USA, Japan, U.K., France, Italy, Spain and Germany. Moreno and Olmeda (2002) conclude that the European stock markets became more integrated during 1999-2001; and the German market has increased its leadership into the euro-area because of its dominant role in the European monetary policy. In contrast, Roll (1988), Dwyer and Hafer (1988), Maldonado and Saunders (1981), Chan et al. (1992), De Miguel et al. (1998), and Moreno and Olmeda (2002) find evidence against stock market linkages for several countries.

EMPIRICAL METHODOLOGY

The methodology involved in this empirical study is outlined as follows: First, the nature of the data distribution of each variable is examined by using the standard descriptive statistics (mean, median, standard deviation, skewness and kurtosis). Second, a correlogram of the yearly averages of the explanatory variables is computed to identify the extent of their bilateral linear relationship and the existence of multicollinearity including its severity. Third, the time series property of each variable is investigated in terms of the ADF (Augmented Dickey-Fuller) test for unit root (nonstationarity) following [Dickey and Fuller (1981), and Fuller (1996)].

The simple ADF test, as outlined in (Dickey and Fuller, 1981), is implemented by using the following regression models:

$$\Delta Y_t = \alpha + \beta_0\, Y_{t-1} + \sum_{i=1}^{L} \beta_i \Delta Y_{t-i} + U_t \tag{1}$$

$$\Delta X_t = \alpha' + \beta'_0\, X_{t-1} + \sum_{i=1}^{L} \beta'_i \Delta X_{t-i} + U'_t \tag{2}$$

$$\Delta Z_t = \alpha'' + \beta''_0\, Z_{t-1} + \sum_{i=1}^{L} \beta''_i \Delta Z_{t-i} + U''_t \tag{3}$$

where:

Y = percentage change of German stock index (DAX)
X = percentage change of French stock index (CAC 4016)
Z = percentage change of Italian stock index (MIBTEL)
Δ = first difference operator
L = number of optimum lags
t = time subscript
U = random disturbance term

All these stock indices are in U.S. dollar terms. The aforementioned major stock indices have been selected because of their high market capitalizations, vibrancy and dominance in the Euro-zone. Moreover, Germany, France and Italy have comparable developed, maturing and sophisticated stock markets within the Euro-zone.

The ADF test is performed to accept or reject the null hypothesis of unit root in the following test:

$$H_0\colon b_0 = 0 \ \ (\text{or } b_0' = 0 \text{ or } b_0'' = 0)$$

$$H_a: b_0 < 0 \quad (\text{or } b_0' < 0 \text{ or } b_0'' < 0).$$

Some definitive inferences on the stationarity/nonstationarity property for each variable of interest are drawn to determine the appropriate estimating statistical procedure

In view of the evidence of stationarity in each variable, it is appropriate to implement the Vector Autoregressive (VAR) model, which is augmented by the inclusion of a dummy variable. The estimating models are specified as follows:

$$y_t = \alpha + \sum_{i=1}^{k} \beta y_{t-i} + \sum_{t=1}^{l} \phi x_{t-i} + \sum_{i=1}^{m} \psi z_{t-i} + \theta D_t + u_t \tag{4}$$

$$x_t = \alpha' + \sum_{i=1}^{l} \phi' x_{t-i} + \sum_{i=1}^{k} \beta' y_{t-i} + \sum_{i=1}^{m} \psi' z_{t-i} + \theta' D_t + u'_t \tag{5}$$

$$z_t = \alpha'' + \sum_{i=1}^{m} \psi'' z_{t-i} + \sum_{i=1}^{k} \beta'' y_{t-i} + \sum_{i=1}^{l} \phi'' x_{t-i} + \theta'' D_t + u''_t \tag{6}$$

The dummy variable D is included to capture the effects of qualitative variables and major policy changes. For the post-euro sub-period, D = 1; otherwise D = 0.

The appropriate lag-structures k, l, and m are determined by the Akaike (1969) information criterion. The VAR models without a dummy variable are also separately estimated for the pre-euro (March, 1994 through December, 1998) and post -euro (January, 1999 through December, 2003) sub-periods. The objective is to identify whether the lagged delay has decayed during the post-euro sub-period as compared to the pre-euro sub-period. Monthly data on the stock indices from February 1994 through December 2003 are employed. The data have been obtained from www.Datastream.com.

RESULTS

Table 1 provides the mean, median, standard deviation, skewness and kurtosis for the monthly market returns in each country.

As observed in Table 1, the data distribution of each variable is near-symmetric. The stock market rates of return in Germany, France and Italy are significantly positively correlated as shown in Table 2.

The pair-wise simple correlation coefficients vary from 0.657 to 0.858 indicating a high degree of market integration. The German and French stock markets have a relatively higher degree of integration when compared to that of the Italian stock market.

Next, the time series property of each variable is examined invoking the simple ADF (Augmented Dickey-Fuller) test for unit root (nonstationarity). The ADF unit root test results are reported in Table 3.

Table 1: Descriptive Statistics			
Descriptors	Germany	France	Italy
Mean	0.774	0.656	0.986
Median	1.112	0.671	0.071
Std.Dev	6.746	6.151	6.940
Skewness	-0.271	-0.054	0.303
Kurtosis	4.337	3.120	3.031

Table 2: Correlogram			
	Germany	France	Italy
Germany	1,000	0.858	0.657
France	0.858	1.000	0.675
Italy	0.657	0.675	1.000

Table 3: ADF Unit Root Test			
Variable	ADF Statistic	ADF Critical Values	Level of significance
Y	-11.430	-3.486	1%
X	-11.832	-2.886	5%
Z	-11.409	-2.580	10%

As depicted in Table 3, the calculated ADF value of each variable is much larger than the critical values at 1 percent and higher levels of significance. Their comparison clearly rejects the null hypothesis of unit root (nonstationarity). On the evidence of data stationarity, Vector Autoregressive (VAR) models (4), (5) and (6) are estimated with a dummy variable to capture the structural changes during the post-euro sub-period. The estimates of VAR model (4) are shown in Table 4.

Table 4 shows that the numerical coefficient of the dummy variable is quite low and statistically insignificant indicating a lack of discernible convergence. However, the lagged delays seem to have reduced over time. This is somewhat in contrast with the empirical evidence on the dummy variable.

Table 4: Estimates of Model (4)			
Variable	Coefficient	t-Statistic	Prob.
D_1	-0.612	-0.949	0.345
Y_{t-1}	-0.119-1.263	0.209	
Y_{t-2}	0.050	0.522	0.603
Z_t	0.158	2.482	0.015
Z_{t-1}	0.122	1.895	0.061
Z_{t-2}	-0.024	-0.382	0.703
X_t	0.825	11.697	0.000
X_{t-1}	0.036	0.343	0.732
X_{t-2}	-0.026	-0.240	0.811
Adjusted R^2 = 0.747, F = 39.454, DW = 2.011, n = 118			

The estimates of VAR model (5) are shown in Table 5.

Table 5: Estimates of Model (5)			
Variable	Coefficient	t-Statistic	Prob.
D_t	0.465	0.794	0.429
X_{t-1}	-0.129	-1.353	0.179
X_{t-2}	-0.086	-0.895	0.373
Z_t	0.165	2.883	0.005
Z_{t-1}	-0.058	-0.982	0.328
Z_{t-2}	0.018	0.314	0.754
Y_t	0.678	11.697	0.000
Y_{t-1}	0.124	1.451	0.150
Y_{t-2}	0.040	0.462	0.645
Adjusted R^2 = 0.751, F = 40.222, DW = 2.004, n = 118			

As shown in Table 5, the coefficient of the dummy variable is not significant. Thus, there is no evidence of increasing market convergence during the post-euro sub-period. However, the lagged delays of other variables decayed over time indicating increasing convergence among German, French and Italian stock markets.

The estimates of VAR model (6) are reported in Table 6.

Table 6 Estimates of Model (6)			
Variable	Coefficient	t-Statistic	Prob.
D_1	-0.726	-0.767	0.445
Z_{t-1}	-0.155	-1.634	0.105
Z_{t-2}	-0.050	-0.537	0.592
X_t	0.341	2.482	0.015
X_{t-1}	-0.032	-0.227	0.821
X_{t-2}	-0.216	-1.564	0.121
Y_t	0.433	2.883	0.005
Y_{t-1}	0.212	1.372	0.173
Y_{t-2}	0.295	1.920	0.058
Adjusted R^2 = 0.471, F = 12.596, DW = 2.032, n = 118			

The evidence with regard to the dummy variable is almost identical to that in the preceding cases. There is evidence of decaying lagged delays suggesting market convergence. However, the results are not statistically significant in most cases. The estimates of models (4) through (6) reveal the dominance of the German stock market as expected.

VAR model (4) is estimated with an exclusion of the dummy variable for pre-euro and post-euro sub-periods. The estimates are provided in Tables 7, 8, and 9.

The estimates in Table 7 confirm some increase in market convergence as reflected through an improvement in the numerical coefficients and the associated t-values during the post-euro sub-period. Similar conclusions can be drawn when comparing the numerical values of the adjusted R^2 and F-statistic for the pre-and post-euro sub-periods.

Table 7: Pre-and Post-Euro Comparisons (Dependent Variable: Y)				
	Pre-Euro Sub-period		Post-Euro Sub-period	
Variable	Coefficient	t-Statistic	Coefficient	t-Statistic
Y_{t-1}	-0.296	-2.126	0.084	0.596
Y_{t-2}	0.048	0.342	0.040	0.282
Zt	0.111	1.581	0.146	1.163
Z_{t-}	0.156	2.520	0.054	0.421
Z_{t-3}	-0.025	-0.360	0.0002	0.001
Xt	0.637	6.830	0.999	8.378
X_{t-1}	0.059	0.450	-0.081	-0.447
X_{t-2}	-0.003	-0.024	-0.093	-0.524
Adjusted R^2 = 0.610, F = 12.129, DW =2.045, n = 58; Adjusted R^2 = 0.844, F = 40.871, DW =2.010, n = 60				

Table 8: Pre-and Post-Euro Comparisons (Dependent Variable: X)				
Variable	Coefficient	t-Statistic	Coefficient	t-Statistic
X_{t-1}	-0.227	-1.627	0.089	0.646
X_{t-2}	-0.130	-0.955	-0.030	-0.217
Z_t	0.116	1.502	0.293	3.341
Z_{t-1}	-0.101	-1.282	0.018	0.183
Z_{t-2}	-0.004	-0.056	0.021	0.226
Y_t	0.765	6.830	0.580	8.378
Y_{t-1}	0.362	2.398	-0.145	-1.377
Y_{t-2}	0.005	0.030	0.044	0.411
Adjusted R^2 =0.609, F = 12.080, DW =2.000, n = 58; Adjusted R^2=0.870, F =50.644, DW =2.002, n = 60				

Table 8 shows the same results in terms of the numerical coefficients of the relevant variables with the associated t-values, adjusted R^2, and the F-statistic. Again, the German stock market seems to dominate other markets within the region.

Table 9: Pre-and Post-Euro Comparisons (Dependent Variable: Z)				
	Pre-Euro Sub-period		Post-Euro Sub-period	
Variable	Coefficient	t-Statistic	Coefficient	t-Statistic
Z_{t-1}	-0.153	-1.069	-0.193	-1.397
Z_{t-2}	-0.015	-0.105	-0.074	-0.541
Y_t	0.437	1.581	0.177	1.623
Y_{t-1}	-0.191	-0.666	0.206	1.354
Y_{t-2}	-0.373	-1.362	-0.142	-0.913
X_t	0.379	1.502	0.613	3.341
X_{t-1}	0.382	1.505	-0.042	-0.208
X_{t-2}	0.368	1.518	0.218	1.222
Adjusted R^2= 0.239, F = 3.238, DW =2.027, n = 58; Adjusted R^2=0.704, F = 18.558, DW =2.049, n = 60				

A comparison of the estimates in Table 9 reveals increasing convergence in the stock markets of Germany, France and Italy.

CONCLUSIONS

The data on stock returns for Germany, France and Italy are stationary. The dummy variable approach sheds no additional light on convergence of the stock markets in Germany, France and Italy. However, there is evidence on decaying lagged delays indicating increasing market convergence. The estimates of the VAR models (4) through (6) without a dummy variable for pre-euro and post-euro sub-periods imply similar conclusions. In closing, the post-euro sub-sample period is possibly too short to divulge the true extent of market integration.

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AN OVERVIEW OF FORECASTING ERROR AMONG INTERNATIONAL MANUFACTURERS

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ABSTRACT

This article summarizes the most recent survey results in regard to forecasting practices and forecasting error of sales for Global Manufacturing Research Group (GMRG) participants. GMRG includes over 200 manufacturing companies from Hungary, Lebanon, Italy, Taiwan, and the United States. Participants in GMRG reported average forecast errors for sales of around 20%. A number of findings concerning use of forecasts, methods of forecasting, factors considered in the sales forecast, primary authority for the forecast, and variation in forecasting error by country are detailed. The practices of GMRG participants may be of interest to forecasters in like-minded companies.

INTRODUCTION

The Global Manufacturing Research Group (GMRG) is an organization of academic researchers interested in international manufacturing research. GMRG has administered surveys of manufacturing practices to companies worldwide; this paper summarizes results of the third survey, collected in 2003-2004, that pertain to forecasting accuracy, including methods of forecasting used, who is responsible for the forecast function, factors considered in the sales forecast, and how the forecasts are used. The international comparisons of forecast error and reliance on various forecasting techniques are of particular interest.

Companies that participated in the survey were located in Italy, Lebanon, Hungary, Taiwan, and the northwestern United States, and included firms from the following manufacturing industries: electronics, machinery, cables, plastic furniture, plastic containers, plastic packaging, food products, textiles and building materials. The companies and countries were not randomly selected for inclusion but participated based on location, availability of management information, willingness to participate and products manufactured.

The 235 companies in the sample ranged in size from 6 employees to 9,500 employees, with a median of 142 employees, and with sales ranging from $50,000 to $16.3 billion and a median of $29 million in sales. Many, but not all, companies reported exporting their products; on average, they reported that about 45% of their sales were exports. The companies were also mainly domestically owned (78% of ownership, on average, was domestic).

The companies in this sample relied to a greater degree on management opinion than on quantitative (e.g. regression) or qualitative (e.g. survey) techniques in forming their forecasts. "Forecasts" refer to total sales of the company. The variable of interest is the average percent forecast error over the past two years.

SUMMARY OF PREVIOUS WORK

Wacker and Sprague (1995; 1998) used previous GRMG survey results to examine forecasting accuracy. They first used a sample of UK manufacturers to investigate the effects of institutional factors, such as technology culture and forecasting methods used, on forecast accuracy (1995). They found that companies with newer technology tended to have lower forecast error, and companies that measured forecast error had more accurate forecasts. Companies that had high forecast error modified their forecasts more frequently. In addition, companies for which sales planning was the primary purpose of the forecast tended to have more accurate forecasts. Companies in which top management was involved in the forecasting procedure had lower forecast accuracy.

A subsequent study by Wacker and Sprague (1998) used GMRG survey results from seven countries, including Germany, Japan, Mexico, New Zealand, Spain, Sweden, and the United States, to compare the relative effectiveness of management behaviors that affect forecast accuracy. This study found country differences in forecasting that were partially explained by Hofstede's cultural values dimensions. For example, companies in countries with high individualism tended to be more technology oriented and top management less involved in forecast development than companies in collectivism countries. The use of quantitative techniques did not improve forecast accuracy, which confirmed results of their previous study.

Sanders and Manrodt (1994) surveyed U.S. firms to see if quantitative techniques were being more widely used than in the past, and to see what role judgment played in the forecasts. They found that companies continued to rely more heavily on judgmental methods than on quantitative methods, even though respondents were familiar with all of the quantitative techniques except Box-Jenkins. Furthermore, they found that large companies were more likely to use quantitative methods than were small companies, a result previously reported by Dalrymple (1987).

A recent study of sales forecasting investigated whether management judgment provides the most accurate forecasts, and whether such forecasts are unbiased and efficient (Lawrence, O'Connor & Edmundson, 2000). They found that these judgmental forecasts were not, in most cases, more accurate than the naïve forecast, and the forecasts suffered from both inefficiency and bias. The authors listed a number of reasons why contextual information failed to improve forecast accuracy, including recent random movements being misinterpreted as true changes in the series, and having forecasts serve as targets; that is, managers who are rewarded for exceeding the sales target may favor low forecasts. Wacker and Sprague (1998) found that the use of subjective external factors

caused forecasts to be less accurate, while the use of subjective internal factors improved forecast accuracy.

Lawrence and O'Connor (2000) tested the accuracy, bias and efficiency of judgmental sales forecasts made by 10 manufacturers to see if forecast revisions would improve forecast performance. Even though a significant amount of forecast revision took place, it appeared to be of little value in improving the forecasts. In fact, the problem appeared to be excessive revision of forecasts, which led to overshooting.

Other studies that have examined forecast accuracy of subjective methods include Fildes (1991) and Goodwin and Fildes (1999). In general, they found the judgmental forecasts to be less than optimal. However, when it comes to quantitative forecasts, Barnett, Starbuck and Pant (2003) state that simple models tend to forecast more accurately than complex ones. Their own study of Moore's Law found that forecasts were more accurate when they covered shorter periods and industries were more concentrated.

This paper will now examine the results of the 2003-2004 GMRG survey, including the magnitude of forecast error, the methods used in forecasting, who is responsible for the forecasts, and how the forecasts are used.

MAGNITUDE OF FORECASTING ERROR

The companies were asked questions about the methods used to forecast sales, including both formal and informal practices. The average forecasting error of the 218 companies that responded to the question, "What has been the approximate average percent forecast error over the past two years?" was 22.3%. Most of the companies reported forecast error of 50% or less with the exception of a few outliers; almost half of the sample reported forecast errors between 15 and 30%. There was no apparent relationship between the size of the company, either by sales or number of employees, and size of forecast error. The correlation coefficient, r, for sales and forecast error was -.04, and for employees and forecast error was -.07. A summary of forecast error by country is shown in Table 1.

Table 1: Forecast Error (%) by Country, GMRG Participants, 2004		
Country	Sample size	% Forecast Error
Hungary	65	19.0
Italy	32	18.5
Lebanon	20	22.8
Taiwan	60	30.0
United States	41	19.2
Total	218	22.3

The percentage forecast error is fairly consistent across countries at about 20%, with the exception of Taiwan, which reported an average forecasting error of 30%. Wacker and Sprague (1995) reported an average percentage error of 28% in their sample of UK manufacturers.

RELIANCE ON VARIOUS FORECASTING TECHNIQUES

Respondents were asked to estimate their reliance on various methods of forecasting, including quantitative methods (e.g., regression), qualitative methods (e.g., surveys), and management opinion, by rating on a scale of 1 (not at all) to 7 (to a great extent). These companies relied most on management opinion, with an average rating of 5.3, and used quantitative and qualitative methods to a lesser degree (average of 3.6 and 3.9, respectively). This is consistent with the findings of Sanders and Manrodt (1994). The use of quantitative and qualitative techniques was related; companies that used quantitative techniques to a great extent also tended to use qualitative techniques to a great extent as well (r = .34). The use of quantitative or qualitative techniques appeared to be independent of whether the companies relied heavily on management opinion or not.

There was no relationship between the degree to which each method of forecasting was used and the measure of forecast error, i.e., whether a company used quantitative methods very little or to a great degree did not seem to affect the size of forecast error they reported. The correlation coefficient, r, between use of quantitative methods and forecast error was .06; between use of qualitative methods and forecast error was -.06; and between use of management opinion and forecast error was 0. This result agrees with Wacker and Sprague (1998), who found that the use of quantitative techniques in forecasting did not improve accuracy.

A summary of reliance on various forecasting techniques by country is shown in Table 2. Companies in Lebanon relied on quantitative methods to a greater degree than companies in the other four countries, with U.S. companies reporting the lowest reliance on such methods. Taiwanese companies rated qualitative methods the highest of the group, while management opinion had the highest weight in Italy (5.8 out of 7). American companies also relied on management opinion to a large degree.

Table 2: Techniques Used to Forecast Sales, by Country, on a Scale of 1 (not at all) to 7 (to a great extent)			
Country	Quantitative Methods	Qualitative Methods	Management Opinion
Hungary	3.1	4.1	4.7
Italy	3.1	2.7	5.8
Lebanon	5.1	4.7	5.2
Taiwan	4.2	4.8	5.4
USA	2.9	3.2	5.7
Total	3.6	3.9	5.3

Not surprisingly, there was a weak but positive correlation ($r = .27$) between use of qualitative methods (e.g., surveys) and size of company, with larger companies tending to make more use of surveys. Otherwise, there was no relationship between size of company and use of quantitative methods or management opinion. This is different than the results of Manrodt and Sanders (1994), who found that companies with high sales used various quantitative techniques to a much greater degree than small firms, a result also found by Dalrymple (1987).

PRIMARY AUTHORITY FOR FORECASTING

The companies were asked to identify the position of the person who had primary authority for producing the company's sales forecasts. A summary is shown in Table 3.

Table 3: Primary Authority for Producing Forecast and Average Percentage Error, By Position		
Position	Number	% Forecast Error
President/CEO/Managing Director	79	21.3
Department/Division Head	51	21.8
Vice President/Director	74	24.6
Group/Section Manager	13	18.4

Most companies (about 70% of the sample) identified either a president or vice president as being the primary authority for producing the sales forecast, with about 24% reporting a department or division head and 6% reporting a group or section manager as primary authority. Forecast error did not vary much by who was reported as the position responsible for the forecast. Wacker and Sprague (1995) found that the involvement of top management tended to decrease forecast accuracy in their sample of British firms. Their later study (1998) found that involvement of top management had no effect on forecast accuracy. Here, having top management involved in the forecast did not significantly affect accuracy, although the lowest forecast error was reported by group or section managers.

The companies were also asked to identify the function of the person who had primary authority for producing the sales forecast; results are summarized in Table 4.

Forecasting error varied by function of who was primarily responsible for the sales forecast. Of the functions listed in Table 4, survey respondents listed "planning" most frequently as the position primarily responsible for the forecast, followed by "sales" and "administration." "Planning" had one of the highest average reported forecast errors; "production" and "engineering" had some of the lowest average forecast errors. "Finance" and "accounting" had the lowest and

highest reported errors, but there were too few survey respondents identifying with those functions to be meaningful.

The table above also shows that when "sales" was primarily responsible for developing the forecast, average percentage error was 19.3%, or about average for the entire sample. This is in concordance with previous findings of Wacker and Sprague (1998), who found that forecast accuracy is not necessarily improved when sales/marketing is primarily responsible for developing the forecast.

Table 4: Primary Authority for Producing Forecast and Average Percentage Error, By Function		
Function	Number	% Forecast Error
Administration	41	16.1
Production	8	10.4
Sales	52	19.3
Finance	2	10.0
Planning	78	30.6
Engineering	22	15.1
Marketing	11	25.0
Accounting	3	31.7

FACTORS CONSIDERED IN THE SALES FORECAST

Companies were asked to rate five factors in terms of how important they were considered in the sales forecast: current economic conditions, customer information, supplier information, results of market research, and current order backlog. The same scale that was used to evaluate the extent to which the companies used various forecasting techniques was used in rating these factors (1 = not at all, 7 = to a great extent). Table 5 summarizes the factors considered in the sales forecast by country.

For most of the countries, customer information was used extensively, with an average rating of 5.8 on a 7 point scale, with the exception of Lebanon, where current economic conditions counted most heavily (rated 6 on a 7 point scale). Results of market research had the lowest average rating (4.1), closely followed by supplier information (4.2). American companies in particular rated market research low (3.1) and customer information high (5.5). Taiwanese companies tended to rate all factors consistently high, in the range of 5.2 to 6.0.

Table 5: Factors Considered in the Sales Forecast (1 = not at all, 7 = to a great extent)					
Country	Current Economic Conditions	Customer Information	Supplier Information	Results of Market Research	Current Order Backlog
Hungary	4.2	6.0	4.0	4.1	5.6
Italy	5.0	5.6	3.5	3.3	4.1
Lebanon	6.0	5.3	4.8	4.8	4.1
Taiwan	5.5	6.0	5.2	5.2	5.2
USA	5.1	5.5	3.4	3.1	4.9
Overall	5.0	5.8	4.2	4.1	5.0

PURPOSE OF FORECAST

Wacker and Sprague (1995) found that forecast accuracy is enhanced when the forecast is used for sales planning; however, only 3% of the firms in their sample developed the forecast with that as its primary purpose. Respondents in the 2003-2004 GMRG survey were asked to evaluate how the forecast was used for planning, budgeting, and other decision making activities using the same 7-point scale described in Table 5. Results are detailed in Table 6.

Table 6: Extent to which the Company's Sales Forecast is Used For Planning and Decision Making (1 = not at all, 7 = to a great extent)						
Purpose	Hungary	Italy	Lebanon	Taiwan	USA	overall
Budget Preparation	5.7	5.0	6.0	5.4	5.3	5.5
Production Planning	5.8	5.0	6.1	5.6	5.5	5.6
Subcontracting Decisions	3.9	3.4	4.3	5.1	3.8	4.2
Material/Inventory Planning	5.3	4.3	5.5	5.7	4.8	5.2
Sales Planning	5.6	4.4	5.9	6.0	5.2	5.4
Human Resource Planning	5.1	4.2	5.0	5.5	4.3	4.9
New Product Development	4.1	4.0	5.0	5.7	3.9	4.6
Facilities Planning	3.8	4.2	4.4	5.5	4.3	4.5
Equipment Purchase Planning	4.6	4.1	5.2	5.2	4.5	4.7

How the forecast is used influences the level of aggregation of the forecast, among other things. Zotteri, Kalchschmidt, and Caniato (2005) explain that "for short-term production planning probably a very detailed demand forecast is required, while for plant design or budgeting a rather aggregate forecast will be used." In this GMRG sample, the most important use of the sales forecast was in production planning (5.6 on a 7-point scale), followed closely by budget preparation (5.5) and sales planning (5.4). In Taiwan especially, the forecast was important in sales planning (6.0), while in Lebanon, it was important in budgeting (6.0) and production planning (6.1). Subcontracting decisions had the least weight overall (4.2), especially in Hungary (3.9), Italy (3.4) and the U.S. (3.8). Once again, the Taiwanese companies rated all factors consistently high, ranging from 5.1 to 6.0.

TIME HORIZON OF FORECASTS

The average time horizon of the survey respondents was 8.4 months into the future; there did not appear to be any relationship between the time horizon of the forecast and the percentage of forecast error. Most of the companies (54%) used months as the smallest time period into which the forecast time horizon was divided, with the rest using days (9%), weeks (36%) or years (1%). Typically, the companies modified their forecasts about 3 to 4 times per year.

CONCLUSION

Participants in the Global Manufacturing Research Group (GMRG) averaged forecast errors of around 20%. The amount of forecast error was relatively consistent by position of primary authority for the forecast, but forecast error tended to be higher for primary authorities in planning or marketing, and lower for those in production and engineering. Survey respondents rated customer information as the most important factor in making a forecast, and this result was fairly consistent across the five countries in the sample. The most important use of the forecast was in production planning, and again, this result was consistent across the countries.

Management opinion was relied upon to a greater degree than quantitative or qualitative methods in forecasting, and was especially true for American and Italian companies. This result is consistent with other studies (Manrodt & Sanders, 1994; Dalrymple, 1987). This may be due to companies' perceptions and experience that quantitative techniques do not necessarily improve forecasting accuracy, even though some studies have found management opinion to be lacking in terms of bias and efficiency.

These results are not representative of all companies; however, the firms that participated in this survey are those that keep track of a wealth of information including forecasting accuracy, and their practices may be of interest to forecasters in like-minded companies.

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THAILAND: SOUTHEAST ASIAN TIGER OR HISTORICAL UNDERACHIEVER

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ABSTRACT

We examine the historical cultural development and work attitudes of the people of Thailand in order to understand the country's current competitive position. Specifically, Porter's (1990) framework of the Competitive Advantage of Nations (CAN) and Hofstede's (1983) cultural indices are integrated into an historical analysis. This study reveals that significant Thai cultural values, such as a less-competitive mindset, loosely structured social systems, and fatalism are key factors, which demonstrate the current absence of sustained competitive advantage in Thailand. For the nation to join the ranks of the Asian "tiger" economies of Japan, South Korea, Taiwan, and Singapore, the business leaders of Thailand must understand their cultural heritage and capitalize on the opportunities that will come to a people who proudly call their country the "Land of the Free."

INTRODUCTION

Analysts have recognized competitive differences among nations for hundreds of years; however, Michael Porter's (1990) work, "The Competitive Advantage of Nations (CAN)," highlighted the concept of competitive advantage among nations and expanded upon his earlier works, which recognized firm and industry level differences. Whereas Porter (1990) analyzed economic aspects of successful industrialized nations such as the United States, Japan, Germany, and Japan, he did not focus on the less successful nations, such as Thailand, Indonesia, and the Philippines. Additionally, like other macro economists, Porter (1990) overlooked the important element of human capital and failed to elaborate the historical and cultural contexts of nations as important factors giving rise to these competitive advantages.

While Porter (1990) did not focus on these cultural differences, Geert Hofstede did contribute not only to the field of international management, but also to an understanding of what constitutes differences in competitiveness among international firms (Hofstede, 1983, 1984, 1994). Continuing in this stream of study, using both Western and Eastern perspectives, Franke, Hofstede, and Bond (1991) collected survey data from 20 countries to analyze cultural values. Their findings support the thesis that differences in cultural values, rather than in material and structural conditions, are the ultimate determinants of human organization and behavior and, thus, economic growth.

Hill (1995) likewise considered cultural values and historical contexts in understanding a nation's competitive position. He explored informal constraint as an element of Japan's national uniqueness that gives Japanese manufacturing enterprises a competitive advantage in the global marketplace. Instead of analyzing the present characteristics of Japan's social and economic structures, Hill delved deeper into Japan's Tokugawa period (1603 – 1868). Thus, he successfully depicted the most important characteristics of the Japanese (i.e., collective responsibility, reciprocal obligations, and honesty), which gave rise to Japan's status as a leading industrial nation today (Hill, 1995).

According to Hill (1995), Hofstede (1983, 1984, & 1994), and Franke et al. (1991), an understanding of the cultural and historical development of nations is necessary to specify the roots of a nation's competitive advantage and, perhaps, to predict its economic future. The idea of "continued attempts to disclose the past to better understand the present" is consistent with what scholars in the field of management history have long suggested (Wren, 1994). As one scholar wrote "present management applications are quite literally what the past—as received and interpreted by the present—have made them" (Bedeian, 1998).

Whereas researchers have applied economic factors, cultural factors, and historical contexts to understanding differences in national competitiveness, no scholar has attempted to integrate these three important elements into a framework that portrays the current competitiveness of nations. (Figure 1 offers the analytical framework of competitive advantage of nations.) In this paper, we integrate theoretical contexts from Porter and Hofstede into concepts suggested by scholars in the history of management.

Figure 1: Analytical Framework of Competitive Advantage of Nations
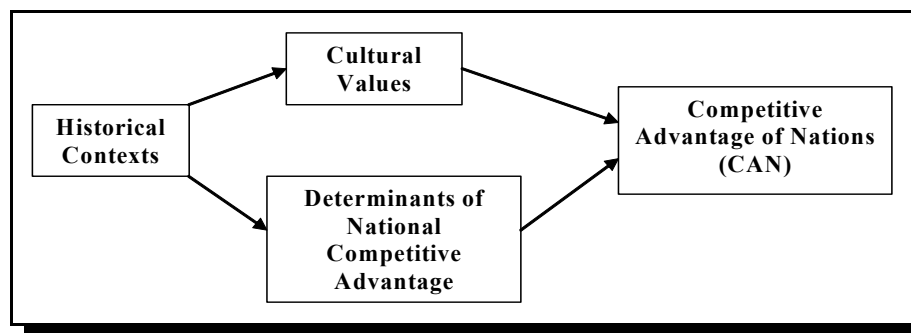
Specifically, this paper probes the development of the Thai people's cultural characteristics and indicates how and why such characteristics prevent or hinder the business development of the nation. While the importance of Thailand as a case study will be elaborated in the next section, the paper addresses the historical development of a culture and the work attitudes of a people as social

processes that may lead a nation to a less competitive position on the world's economic stage. See Appendix A for a map of Thailand and Southeast Asia.

THE SIGNIFICANCE OF DEVELOPING COUNTRIES AND THE CASE OF THAILAND

Appold, Siengthai and Kasarda (1998) claim: "The majority of the world's population lives in what are broadly termed the developing countries. By the end of this decade, nearly four-fifths of the world's population and approximately two-thirds of the world's nonagricultural labor will be in the developing countries." The fact that the majority of the world's population and its non-agricultural labor increasingly reside in developing countries is inconsistent with the small number of business studies that have been conducted in such areas. Most literature in management, for example, concentrates on analyzing the competitive advantages of successful nations such as the United States, Korea, Japan, and England (Francis, 1992; Hill, 1995; Kim, 1998), whereas the literature analyzing the competitive advantages of less successful developing countries such as Thailand, Indonesia, and the Philippines is sparse. In this study, thus, we are interested in understanding the competitive position of these less developed countries.

In choosing a research strategy, Yin (2003) recognizes the importance of three conditions: (1) the type of research question posed, (2) the amount of control a researcher exercises over behavioral events, and (3) whether the study focuses on historical or contemporary events. In order to examine the above competitive position of these less developed countries, we will employ a case study analysis. According to the author, a case study is "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 2003). Further, by studying processes and exploring meanings, case study research seeks to answer 'how' and 'why' questions. A case is a phenomenon of some sort occurring in a bounded context and is the unit of analysis (Patton, 2002). Cases may involve individuals, small groups, organizations, communities, or even nations. Finally, the case study is bounded by a specified time frame (Miles & Huberman, 1994).

We have selected Thailand as an example of a developing nation and the focal point of our study for several reasons. First, Thailand, originally known as Siam, has a long history, which can be traced back over a thousand years. For centuries, various groups migrated across the Southeast Asia region. The Thai peoples inhabited southern China in the first millennium A.D., but were forced south by the expansion of the Chinese empire (LePoer, 1987). Independent Thai states were established by the end of the thirteenth century and the capital city of Bangkok was founded in 1767. Secondly, the history of Thailand is unique. Unlike all of its surrounding neighbors—Myanmar, Cambodia, Malaysia, Vietnam, and Singapore—Thailand was never formally colonized by China or the European powers (Feeny, 1979). Therefore, Thailand's culture and national personality have developed within the nation and without direct foreign influences. Thirdly, there is rich

documentation, although mostly done by Western sociologists, which is available concerning Thailand's development since the early 1800s. The availability of such historical data suggests the need for a more accurate analysis of the economic development of Thailand.

Finally, the last and perhaps most interesting reason to study Thailand is the apparently unsustainable economic development and unstable competitive position of the country. Despite forty years of economic growth after the close of the Second World War, Thailand's financial breakdown in 1997 revealed the fragile economic structure of the nation. MacDonald (1998) blamed the Thai management characteristics of lack of transparency and disclosure in the financial sector as contributing factors to the crash in 1997. MacDonald (1988) posed two questions. First, why did the Thai management choose to get involved in such risky and unprofessional situations? Second, why did the Thai government, as a national regulator, allow such a dangerous system to persist for so long? Whereas, it is not a primary purpose of this paper to pinpoint what went wrong in the crash of 1997, we will focus on the historical and cultural contexts of the Thai people, which will illustrate some crucial human factors that will contribute to a further understanding of national business policies leading to a sustainable competitive advantage of nations.

UNSTABLE NATURE OF THE THAI ECONOMY

Like other Southeast Asian countries, Thailand started as an agrarian society with its economy depending mainly on rice production. According to the Western economist Ayal (1961), "Rice cultivation has provided the main staple food, the major single source of foreign exchange earnings, and the main source of employment." With this concentration in rice production, Thailand experienced a tremendous increase in production and twenty fold export growth from 1850 to 1940, becoming a major rice exporter by this time (Feeny, 1979).

Nevertheless, Thailand still could not leverage the terms of trade to development. Feeny (1979) attributed the causes of persistent underdevelopment to divergences between the goals of national security and economic development, as well as those between private interests of elite decision makers and the social interest. Ayal (1961) elaborated on the lack of social integration of the Thai people. He indicated that after the revolution of 1932, which replaced the absolute monarchy with a supposedly democratic system of government, a small new elite group emerged containing rival groups competing for power. The new elite, to secure and maintain its power, had to grant contracts and monopoly concessions without regard to experience and efficiency. The inconsistency of interest between the government and agricultural sectors contributed to the lack of investment in strengthening the comparative advantage of the Thai economy (Ayal, 1961).

LePoer (1987) agreed with this assessment, noting that a small group of Westernized military leaders and bureaucrats accomplished a bloodless coup in 1932 and forced a constitutional monarchy on King Prajadhipok. However, divisiveness within the group led to several decades of political upheaval, involving counter-coups and new constitutions. During this time of political instability

(1939), the nationalistic regime of Prime Minister Luang Pla Phibunsongkhram changed the name of the country from Siam to Thailand, which means "Land of the Free." Although the idea of freedom for the Thai people may not have been a reality in 1939, the strong expression of this sentiment is an important point to mark in our understanding of the nation.

Further, Feeney (1979) supported Ayal's (1961) argument regarding the lack of investment, stating that constraints on the supply of technical and institutional change were crucial to the persistence of underdevelopment. From the beginning, Thailand had plentiful resources and successfully exploited them as one of the world's largest rice exporters. The country, however, had internally political problems that prevented the development of the nation's economy.

During the latter half of the twentieth century, the political and business leaders of Thailand changed the country's economic structure from an agriculture-based economy to an industrial-based economy. The share of the agricultural sector in GDP, for example, has declined remarkably from almost 40% in the 1960s to approximately 10% in the late 1990s (Chairatana, & Tangchitpiboon, 2002). Two of the major reasons that the political and business leaders decided to change the country's economic structure were to capture the high values of the industrial products and to catch up with the more successful nations in Asia.

During the 1980s and 1990s, Thailand developed to the verge of becoming a fifth Asian 'tiger' (joining Japan, South Korea, Taiwan, and Singapore) with 12 percent (1987-1990) and 8 percent (1990 -1994) annual real growth in her gross domestic product (Appold, Siengthai, & Kasarda, 1998). However, in 1996, Thailand's export growth began to decline, lowering the country's GDP growth to 6 percent (King, 1997). Even this lower growth rate easily outpaced most of the Organization for Economic Cooperation Development (OECD) nations (MacDonald, 1998). King (1996) described the economic slowdown and the declining competitive position of Thailand. He regarded downward GDP growth rates, negative export growth rates, and high current account deficits as important indicators pointing to a low level of national competitive advantage. Interestingly, the author could predict that the intriguing growth rates just represented the symptom of the nation's bubble economy, the situation in which there is no real relationship between GDP growth rates and the real productivity of the nation.

Under the nation's bubble economy, the stock market crash of 1997 jolted Thailand and became the nightmare of the nation's economy. In June 1997, the Thai government shut down 58 finance companies due to their technically insolvent statuses. MacDonald (1998) indicated: "the closure of the finance companies had a further ripple effect in the Thai economy. Thai companies went from having too much credit available up to 1996 to no credit in mid-1997." The Thai economy has continued to struggle since 1997. In 2003, the Thai baht devalued from 25 baht per U.S. dollar (before 1997) to 40 baht per dollar. The stock exchange of Thailand (SET) index, more than 1600 points before the crisis, reached the bottom at about 300 points in 1997. The market has recovered somewhat, with the current SET index in 2005 at about 700 points.

In some regards, Thailand is still working to extricate itself from the disaster of 1997. Not only does the nation need to solve its own internal problems, but it also now faces the ominous task of combating an awakening giant in the "dragon" economy of China. Although Thailand and its neighbors—the Southeast Asian "tiger" economies of Singapore, Malaysia, and Indonesia—are known as cheap manufacturers, China is cheaper. Although analysts expect Thailand's growth to slow in 2005, direct foreign investment especially by car and chemical companies continues (Temple, 2004).

Additionally, some comparative statistics can help to explain the current economic situation in Thailand. As previously discussed, Franke, Hofstede, and Bond (1991) described a cause and effect relationship between a nation's culture and its wealth, as measured by GNP per capita. In the case of Thailand, statistics reveal a gap between the nation's potential and actual productivity. With a population of approximately 65.2 million people in 2005, Thailand ranked 19th among the nations of the world (CIA, 1999). However, as shown in Table 1, in the area of Gross Domestic Product (GDP) per capita, Thailand ranks only 67th in the world. Luxembourg ranks first in GDP per capita, closely followed by the United States. Among Thailand's Asian neighbors, Singapore (5th), Hong Kong (6th), and Japan (12th), are among the richest economy in the world. Meanwhile, Taiwan (33rd) and South Korea (40th) are well ahead of Thailand, but China (84th), Indonesia (91st), and Vietnam (104th) trail in GDP per capita.

Table 1: GDP Per Capita		
Rank	Nation	Amount in US Dollars
1	Luxembourg	32,700
2	United States	31,500
5	Singapore	26,300
6	Hong Kong	25,100
12	Japan	23,100
33	Taiwan	16,500
40	South Korea	12,600
67	Thailand	6,100
84	China	3,600
91	Indonesia	2,830
104	Vietnam	1,770
Data Source: 1999 CIA World Factbook		

THAILAND'S HISTORICAL CONTEXTS

Given the above description of Thailand's current economic status, we will now examine the historical conditions leading to this situation. Historians have traced the origin of the Thai people to the old kingdom of Nanchao in what is now Yunnan in China (Embree, 1950). Despite this origin, the Thai drew much of their cultural heritage in religion, literature, and art from India. Students of Thai history, for example, agree on the historic influences of Hindu culture in terms of the form of dress, Indian court terminology, and the Theravada Buddhism (Embree, 1950; Kirsch, 1977). The blend of Chinese and Indian heritages has produced the cultural uniqueness of the Thai nation. For example, although Thailand and Vietnam share a Chinese origin, Thai culture is markedly different from that of Vietnam, a region with long historical contact with China and under actual Chinese rule for many centuries. Because of its Indian influence, Thai culture is also different from the Islamic Malayan culture to the south of the peninsula and in Indonesia (Embree, 1950). We will now elaborate on the unique aspects of the Thai people and the nation's cultural development.

Less Competitive Mindset

Various scholars have conducted studies in the areas of social structures, political issues, and economic development of Thailand; however, few actually attempted to understand Thai attitudes and cultures as influential factors determining economic outcomes. Fogg (1953) examined the cultural values and personality of labor in Thailand. Consistent with other scholars, Fogg (1953) confirmed the importance of knowing history to understand the present. He wrote: "Understanding what is happening or is likely to happen in the development of a Thai labor movement must be based on knowledge of the peculiar historical and cultural influences on Thai labor." His study of labor issues offered an insightful perspective regarding the attitudes and values of the Thai people.

For centuries, Thai laborers have desired to be their own masters, under no compulsion in regard to working hours and place of employment (Fogg, 1953). The bounty of Thailand's tropical location, with abundant supplies of fish, fruit, and rice made this possible. The Thai people have always been conscious of the richness of their natural resources. For example, King Ram-kham-haeng (13th century) had the following well-known inscription engraved, "Siam [the former name of Thailand] is the land with rice in the fields and fish in the water" (Ayal, 1961). As a result of this traditional attitude toward natural prosperity, the Thai people have held a negative attitude toward working for others and thus rarely competed for wage jobs. Typically, unless they were desperate, Thais would not hire out their services. Even if they finally had to work for wages, they preferred agricultural piecework to be done in their own way and at their own good pleasure (Fogg, 1953). Although this negative attitude toward competing for wages has gradually changed due to economic

and industrial development, deep down inside the Thai people still place their faith in the richness of their nation's resources.

A Loosely Structured Social System

In the ancient period, the economy of Thailand was based on peasant production and an absolute monarch ruled the state. However, the Thai kings were benevolent to their people, acting in a paternal manner to their subjects. Of course, the word "Thai" means "freedom," reflecting the great flexibility of the people in their lives. The famous historical King Ram-kam-haeng inscription provided insight into the meaning of freedom in Thailand. This inscription indicated that every subject "was free to lead his cattle or ride his horse to engage in trade; whoever wants to trade in elephants, does so; whoever wants to trade in horses, does so; whoever wants to trade in gold and silver, does so" (Evers, Korff, & Pas-Ong, 1987). The relaxed ruling system and the Thai people's freedom to live and to do businesses in ancient times were similar to the concepts of "laissez-faire"—complete freedom for people, without much leader participation (Lewin, Lippitt, & White, 1939). With such a relaxed ruling system and the concept of Thai freedom, the Thai people developed a loosely structured social system within their community.

Based on his own observations, Embree (1950), an American anthropologist, described a loosely structured social system in Thailand. Embree (1950) indicated that, at certain points, the Thai social structure might bear surface similarities to those of Japan or Vietnam; however, Embree (1950) found evidence that indicated a considerable variation in the structural rigidity of these different societies.

Further, Embree (1950) explained the differences between closely and loosely structured social systems. In a closely structured system, the behavior of the people must conform tightly to the formal social patterns of human relations. He indicated that in Japan, for example, it was difficult for an individual to deviate from his or her social roles. Reciprocal rights and duties were, therefore, clearly marked and carried out by social members in Japan. On the contrary, in a loosely structured social system, the responsibility and roles of the Thai people toward society were less clearly defined and less strictly enforced. Exchange systems in Thailand were less clear cut, contributing to mobility in the population and a lack of emphasis on long term obligations (Embree, 1950).

Individualistic Behaviors with Collective Values

An additional characteristic of the Thai people in comparison to Japanese and Americans was also explained by Embree (1950). The author wrote:

The first characteristic of Thai culture to strike an observer from the West, or from Japan or Vietnam, is the individualistic behavior of the people. The longer one resides in Thailand the more one is struck by the almost determined lack of regularity, discipline, and regimentation in Thai life. In contrast to Japan, Thailand lacks neatness and discipline; in contrast to Americans, the Thai lack respect for administrative regularity and have no industrial time sense.

Interestingly, Embree (1950) indicated that Thai people are individualists, but lack the counterbalancing good habits of discipline possessed by their Japanese and American counterparts. Moreover, because of the loose social structure, the Thai people have a great deal of latitude to improvise in their behavior.

Furthermore, this individualistic thinking has long been a part of the Thai culture. Returning to our discussion of historical origins, like the Japanese, Vietnamese, and Chinese, the majority of the Thai people were rice farmers in ancient times. Without advanced mechanical tools, all of these farmers needed as much help as they could get from their neighbors, especially during harvest seasons. Traditional Thai farmers took turns helping one another to accomplish agricultural labors. This reciprocal conduct in agricultural life is reflected today in cooperative activities and established collective values among the Thai people. The enforcement of collective values in Thailand, however, was much milder than that of Japan and Vietnam because the number of Thai farmers per square mile was not nearly as great as it was in neighboring countries. Additionally, Embree (1950) explained that the more dense population in Japan and Vietnam might enforce more carefully laid out modes of interpersonal conduct. As he wrote: "Group pressures and set patterns of behavior become more important for harmonious group life where many men live in little space." Therefore, together with Thai individualistic behavior within a loosely integrated social structure, there was an attitude of minding one's own business.

Flexible Attitude toward Nationalism

Embree (1950) also recognized a lack of an intense insular patriotism among the Thai. According to his observation, "Thai as a rule are not ethnocentric; they are not anxious to prove to themselves and to others that they and their country are superior. At the same time there does exist pride of race." This statement confirms the unique characteristics of the Thai people and acknowledges their loose social structure. Although closed social structures have an air of superiority, this loose social structure serves a social function for the Thai people. Because of the Thai's loose social structure, during the process of acculturation, fewer dysfunctional social situations are produced. Embree (1950) explained: "A loose structure such as the Thai may adjust to external cultural influences with less drastic overall changes than a more rigid structure such as the Japanese or Vietnamese." Accordingly, it was this flexible social structure that protected

Thailand from the encroachment of Western nations during the colonial period. In other words, the flexible structure allowed the Thai people to accept and to cooperate with Western nations diplomatically, rather than strictly refusing to cooperate, which led to military interventions in neighboring countries.

Thai and Thai-Chinese

The vast majority of people in Thailand is of Thai descent (approximately 85 percent) and speaks one of several Thai dialects. The largest minority groups are the Chinese (about 12 percent of the population) and the Malay-speaking Muslims of the South (3 percent) (Nation-by-Nation.com, 2005). While the sixth century migration of the Chinese into Thailand is a well established fact (Bun & Kiong, 1993; Coughlin, 1955; Gutztaff, 1833; Skinner, 1957), there is very little research concerning the ethnic differences between the Thai and the Thai-Chinese. However, one study compares the ethnicity and work culture of Thai and Thai-Chinese white-collar workers' attitudes and personality at work in Thailand (Deyo, 1975). Although the study is about 30 years old, the findings still arguably are valid. Deyo (1975) pointed out Thai-Chinese have traditionally been more diligent, ambitious, and materialistic than Thais.

Further, whereas loyal and disciplined within the bounds of kinship and other narrow primordial affiliations, Thai-Chinese could act amorally in economic and other dealings with persons outside their affiliate structures. Regarding the Thais, Deyo (1975) wrote: "By contrast, Thais were reputed to be more passive and fatalistic, less materialistic (in terms of behavior, not value), and less likely to manifest social discipline or sustain commitment to others, even within the family." Consistent with earlier observations by Embree (1950), Deyo's (1975) findings indicated that Thai interpersonal relationships were lacking in reliability or depth. His findings also concurred with the consensus in other studies indicating that Thais were fatalistic. Further, Deyo (1975) reports: "Thai villagers saw human events as largely unpredictable and independent of human volition and effort." Additionally, Deyo (1975) blamed the Thai Theravada Buddhist tradition as a primary source of these characteristics of Thai behavior and personality. Regarding the Theravada perspective, he wrote:

> First, wealth and secular status are viewed as the just rewards of merits earned in this and previous lives. Second, the view that wealth and high position are self-legitimating would support an expedient and opportunistic orientation toward gain. Third, the implicit fatalism in this tradition would encourage a short-run reward orientation. The Thai male desires higher status, but is not greatly dissatisfied to stay at his current rank, nor realistically anxious to 'change' his job in the direction of higher rank.

Concerning the discrepancy between Thai materialism at the level of values and a lack of hard work and sustained effort in behavior, Deyo (1975) argued that for Thai people material benefits might act as a satisfier, but not as a behavior motivator. In other words, although Thais would not mind (and would be very happy) receiving higher incomes or being promoted into higher statuses, they believed that working hard alone would only partially help them to achievement and rewards.

A Single "Melting Pot"

Furthermore, Deyo (1975) distinguishes traits of the Thai from the Thai-Chinese in terms of values and personalities. Deyo's (1975) assumption of racial separation was supported by a sociological study that observed social pluralism in Thailand before 1955. Here, Coughlin (1955) asserted that a functioning Chinese minority culture and society could definitely resist assimilation.

However, Skinner (1957) disagreed with such a pluralistic concept in the case of Thailand. He pointed out that assimilation between Thais and Chinese took place even before the nineteenth century. Skinner (1957) reasoned that numerous factors affected the assimilation rate. First, the Thai culture always had many points in common with that of the Southeastern Chinese. Second, the Thai commitment to Theravada Buddhism was no barrier to social intercourse or cultural rapprochement in view of the familiarity of the Chinese with Buddhism and their traditional tolerance and eclecticism in religious matters. Lastly, the differences in physical appearance between Chinese and Thai were relatively slight (Skinner, 1957).

Moreover, these factors, as asserted by Skinner (1957) were the fundamental reasons leading to three specific factors (intermarriage, education, and nationalism), which promoted the assimilation of the Chinese in Thailand. This assimilation was also consistent with the concepts Embree (1950) discussed earlier in terms of a social function served by a loosely structured social system of Thai people. Therefore, we acknowledge the blends of the racial identities, cultural values, and personality between the early Thai and Chinese.

CULTURAL INDICES OF THAILAND

The review of Thai history from the origin of the Thai people to the nation's economic crash in 1997 offered important perspectives for understanding what factors influence the nation's current economic situation. In a rare study of Thai business culture, Pornpitakpan (1999) researched the cultural affect on business relationships among Thais, Japanese and Americans. Pornpitakpan (1999) argued that the Thai and Japanese belonged to collectivistic cultures, which emphasize fitting in with others, social harmony, interpersonal sensitivity, conformity, and readiness to be influenced by others. In contrast, the Americans belonged to an individualistic culture, which emphasized

independence, lack of concern for other people, and behavior that was mainly based on one's own thoughts (Pornpitakpan, 1999).

Whereas previous research has found that Thailand and Japan share collectivistic cultures, and the U.S. has an individualistic culture; our study has raised the interesting questions regarding the contributions of these cultures to their economic situations. Regarding the cultural roots of economic development, Franke et al. (1991) examined several aspects of cultural values from different nations. They proposed a relationship between certain cultural traits and economic development. For example, they discussed a cause and effect relationship between a nation's culture and its wealth as measured by the Gross National Product (GNP) per capita. Research points to a causal relationship because of the stability of the cultural measures in relation to the level of per capita GNP (Franke, Hofstede, & Bond, 1991). According to Franke et al. (1991), understanding and explaining the current economic development or, perhaps, the present competitive advantage of nations, requires thorough examination and analysis of human values from different cultural roots (See Table 2 and Table 3 for more details of national cultural indices).

Table 2: Meanings of Cultural Values (Franke et al., 1991)	
Power Distance Index (PDI)	The extent to which people (especially, the lower level people in organizations) can accept and expect that power is distributed unequally among them. This represents inequality, but defined from below, not from above.
Individualism Index (IDV)	The tendency of individuals primarily to look after themselves and their immediate families. The opposite is collectivism, which is the extent that the people are integrated into strong, cohesive in-group, often extended families (with uncles, aunts, and grandparents), which continue protecting them in exchange for unquestioning loyalty.
Masculinity Index (MAS)	An assertive or competitive orientation, as well as a sex-role distinction and its inverse, are a more modest and caring attitude toward others.
Uncertainty Avoidance Index (UAI)	A feeling of discomfort in unstructured or unusual circumstances, while the inverse shows tolerance of new or ambiguous circumstances.
Integration Index (INTEG)	The degree of tolerance, harmony and friendship a society endorses at the expense of competitiveness.

Table -3 Comparative Important Cultural Roots Indices (Franke et al., 1991)				
Cultural Root Indices	**India**	**Thailand**	**Japan**	**U.S.A.**
Power Distance Index (PDI)	77	64	54	40
Individualism Index (IDV)	48	20	46	91
Uncertainty Avoidance Index (UAI)	40	64	92	46
Masculinity Index (MAS)	56	34	95	62
Integration Index (INTEG)	-0.72	-0.02	0.81	0.44

In 1991, Frank et al. conducted a survey using both Western and Eastern perspectives to understand the relationship between national cultural values and economic growth. Table 2 below depicts the results of the survey comparing four nations—India, Thailand, Japan, and the U.S.A.—with four cultural indices believed to be important traits in determining CAN. According to GNPs per capita, the authors categorized India and Thailand as poor [developing] nations, while Japan and the United States are considered to be rich [developed] countries.

From Table 2, workers in Japan and the United States scored lower on the Power Distance Index (PDI), but higher on the Individualism Index (IDV), Integration Index (INTEG), and Masculinity Index (MAS) than workers in Thailand. Here, Thailand's PDI, UAI, and INTEG fell between India and Japan, supporting the argument that Thailand has taken after and has been influenced by both Indian and Chinese cultural traits. Regarding the PDI, Thai people accepted the fact that power was distributed unequally among them, representing inequality in their society. This finding may be related to the tendency toward fatalism mentioned previously (Deyo, 1975). Thais did not want to fight for the inequality because they believed that their fights would never change the inequality.

In terms of the UAI index, Japanese respondents scored much higher than Thais, Indians, and Americans. According to this measure, Japanese feel uncomfortable in unstructured or unusual circumstances. Thai respondents fell into a middle range between the Japanese on the higher side and the Americans and Indians on the lower side. Concerning the scores on INTEG, Thai people had relative a low level of the degree of tolerance, harmony, and friendship endorsed by the society at the expenses of competitiveness when compared with groups of people from Japan and the U.S.A. Perhaps, because of Thailand's loosely structured social system and less competitive mindset, Thais prefer to live peacefully even in business environments.

Surprisingly, Thailand's IDV was the lowest of the four nations. This result comes in stark contrast with the high individualistic behaviors of Thai people observed by Embree (1950). Regarding this point, we offer two logical explanations. First, Thai people might have decreased their individualistic behaviors over time due to the assimilation of Chinese in Thailand. Second, Franke et al.'s (1991) individualistic index might be designed to capture only individualistic values, not individualistic behaviors. If the second explanation is correct, the finding is consistent with the previous notion that Thai people possessed individualistic behaviors with collective values. This second explanation also suggests that the behaviors and values of people are two different constructs. Although value and behavior may be positively correlated in several other nations, this is not the case for Thailand. The value of collectivism was fostered among Thais during the agrarian period of economic development. However, because of the nation's loosely structured social system, Thais rarely behaved according to their values. In Thailand, there was no rigid system of reinforcement as compared to the Japanese society, for instance.

Last, from Franke et al. (1991), we find that Thailand's masculinity index was the lowest among the four nations. We believe that this finding is related to the Thai's perception of bountiful

natural resources in the past. Because Thailand has provided easy access to fishing and rice cultivation, the Thai people perceive little reason to develop a competitive attitude. Additionally, because Thailand possesses a loosely structured social system, there is a lack of sexual discrimination. In Thailand, the roles or responsibilities of a social member are recognized, but individuals are not allowed to burden one another unduly (Embree, 1950). The roles of Thai men and Thai women have been well defined, but the Thais have never taken these roles seriously. Therefore, discrimination regarding gender issues is not a problem in Thailand. We can infer from the four indices presented in Franke et al.'s (1991) survey that Thailand has shared some common historic paths with both India and Japan [Chinese values]; however, the Thai culture is still obviously unique and different.

CURRENT COMPETITIVE ADVANTAGE IN THAILAND

Scholars in the strategic management field have attempted to understand what constitutes a competitive advantage among firms (Porter, 1980, 1985). Conventional thoughts emphasized the selection of a strategy that matches a firm's resource strength to the requirements for success in the prevailing market environment (Grant, 1991). Although the understanding of competitive advantage has gradually developed within the boundary of firms, scholars in management have expanded the scope of competitive advantage from the firm level to a national level (Porter, 1990).

According to Porter (1990), the essential defining qualities of the people of a nation give that country a unique character. Thus, a nation's uniqueness shapes the identity of its firms, the character of the top managers of those firms, and those managers' approach to strategy and organization. Additionally, a nation influences the availability and qualities of necessary resources. In essence, Porter (1990) argues that factor conditions, demand conditions, related and supporting industries, and firm strategy, structure, and rivalry are among the determinants of national competitive advantage. Additionally, the interplay of these four determinants—the national 'diamond'—is supported by industry clustering and geographical concentration of industry to determine the competitive advantage of a nation (CAN).

Although many researchers have praised Porter's CAN theory, the concept has received strong criticism as well (Davies & Ellis, 2000). Primarily, scholars have doubted the precision and determinacy of Porter's analyses (Grant, 1991). While Porter's (1990) framework appears plausible, the critics favor a more complicated analysis to understand the competitive advantage of nations. Instead of emphasizing only the four determinants—factor conditions, demand conditions, related and supported industries, and firm strategy, structure and rivalry— we concur with the critics and offer the analysis of the historical and cultural contexts of nations as another factor to understand the CAN. We propose that the inclusion of these contexts will supplement the understanding of Porter's analysis.

By exploring historical and contemporary issues, we have elaborated factors that have contributed to the development of the Thai culture. In this section, we will apply the findings from the previous sections—historical contexts and cultural values of the Thai people—to Porter's (1990) four determinants of CAN. According to Porter (1990), the first determinant is factor conditions, which include 'basic factors' (such as natural resources, climate, location, and demographics) and 'advanced factors' (such as communications infrastructure, sophisticated skills, and research facilities). While the abundant supply of basic factors could enhance a nation's competitive advantage, shortages and high costs for basic factors may produce a stimulating effect, forcing producers to actively develop new technology, in which they can become world leaders (Davies & Ellis, 2000).

As indicated earlier, Thailand has always been a country with plenty of natural resources (i.e., agricultural products). According to Porter (1990) and Grant (1991), basic factors can provide initial advantages which are subsequently extended and reinforced through more advanced factors. However, instead of leveraging their abundant supply of natural resources, the Thai people took them for granted and became careless in their lifestyles (Ayal, 1961). This promoted the less competitive mindset among the Thai people (Fogg, 1953). Although Thailand was a major rice producer in the world market, the nation still could not leverage this benefit into a competitive advantage (Feeny, 1979). The country enjoyed an initial advantage in abundant basic factors, but it has never converted these basic factors into advanced factors. According to the competitive advantage of nations theory, advanced factors provide the most enduring basis for competitive advantage because they are products of investment by individuals, companies, and governments (Porter, 1990). Therefore, because of a lack of advanced factors, Thailand is perpetually trying to catch up to other nations in terms of CAN.

The second determinant of CAN is demand conditions, which reflect the ability of a nation's firms to compete internationally. According to Porter (1990), it is not the size of a home market that is important, but the extent to which home demand encourages firms to innovate. Again, because of several characteristics of the early Thai people, the demand conditions in Thailand have never been strong enough to spur the competitiveness. The individualistic behaviors and flexible attitudes toward nationalism may be responsible for this insufficiency. As indicated earlier, the Thai people have not been ethnocentric and have shown little desire to prove their superiority over other nations (Embree, 1950). Accordingly, the loosely structured Thai social system has degraded competitiveness of the domestic market by diminishing the patronage relationships between Thai consumers and Thai producers.

Thirdly, the concept of 'related and supporting industries' reflects the clusters of industries or firms (both horizontally and vertically integrated) in home base economies that are linked as groups to promote spillover benefits among themselves (Porter, 1990). Basically, spillover benefits occur when a specific demand in the market triggers a focal firm and its suppliers to produce components of the products and to share the benefits of the demand. Concerning this point, the

Thai's lowest INTEG index in comparison to the Japanese and Americans indicates that Thai people and Thai firms are the least likely to cooperate with each other.

Additionally, Thailand's loose social structure is another barrier to fostering favorable related and supporting industries. Although Embree (1950) observed the loosely structured social system in Thai families and the social community, we generalize this concept into Thai business networks. This generalization is valid because all economic transactions are embedded in social relations (Granovetter, 1985) and we are claiming consistent behavior between family relations, community relations, and business relations. Just as the responsibilities and roles of Thai individuals were less clearly understood and less strictly enforced among members' families and the social community, these same actions are prevalent among Thai firms in their business networks. The loose responsibilities and roles reflect the lack of regularity, sincerity, and emphasis on long term obligation among firms within the same business networks (Embree, 1950). As a result, Thai firms seldom seriously depend on or engage in any professional or business associations unless the benefits are obvious and very short-term.

Lastly, the concept of "firm strategy, structure, and rivalry" concerns strategies and structures of domestic firms and the extent that there is rivalry among them (Davies & Ellis, 2000). Rivalry is critically important because it pressures firms to strive for efficiency and innovation. Porter (1990) suggests that domestic competition tends to be more intense than foreign competitions. Thus, firms that survive domestic competition will be more likely to be successful in the world market. According to Thai cultural values, however, the favorable conditions of firm strategy, structure, and rivalry are unlikely. The lack of competitive mindset among Thai manufacturers has prevented Thai firms from developing competitive and aggressive business strategies. Without a competitive mindset, for example, Thai manufacturers have seldom engaged in long-term investment projects and have not attempted to innovate or to improve the quality of their products. This argument is supported by the extremely low records of Thai R&D investments and the low numbers of Thai patents each year (Intarakumnerd et al., 2002).

Additionally, the fatalistic values among Thai entrepreneurs have been another barrier to success. Thai manufacturers, for example, might aim to be successful in their businesses, but were not greatly dissatisfied to just survive in the market. Based on fatalistic values, managers of Thai firms have believed in previous merits and destiny as much as they did in working hard to be successful and winning the markets (Deyo, 1975). These fatalistic values implicitly encouraged a short-run reward orientation as opposed to a sustainable long run process. As shown in Table 3, the Thai's high score on the power distance index compared to those of Japanese and Americans indicates the highest acceptance and expectation of inequality in the business environment (Franke et al., 1991). Like fatalistic values, the high power distance attitude has resulted in less rivalry among Thai firms. Managers in small and less successful Thai firms, for example, would believe that wealth and higher business positions in larger and more successful firms were the just reward of merits and were self-legitimating for those firms. Drawing from the high PDI, we conclude that
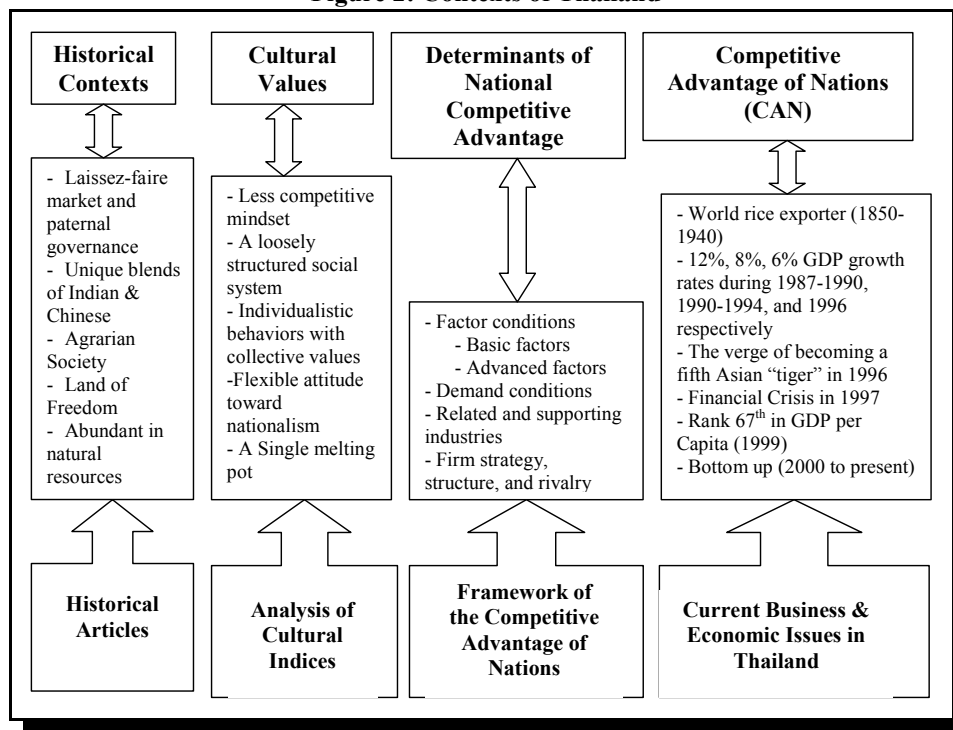
small and new Thai firms would rarely attempt to improve their business processes and products to compete with other large and more successful ones.

DISCUSSION AND CONCLUSION

Using Thailand as a case study, we have examined the cultural development and work attitudes of the Thai people so as to understand the historical roots of the country's current competitive position. Specifically, Porter's framework of the competitive advantage of nations (CAN) and several of Hofstede's cultural indices are integrated into a historical analysis. Figure 2 recaps the contexts within the analytical framework of Thailand in detail. Beginning with historical contexts, this paper has examined market and governance systems, the origin of the Thai people, and the unique characteristics of Thai society in terms of natural resources and the people's attitudes and behaviors of people. The historical contexts have provided insight concerning the current cultural values of the Thai people. This knowledge greatly enhances our understanding of Hoftstede's selected cultural indices in comparison with other countries, such as the United States, Japan, and India. Subsequently, we have applied the understandings of Thailand's historical context and cultural indices into the four determinants of Porter's national competitive advantage. We believe that our analytical framework explains Thailand's current competitive advantage or lack of competitive advantage.

Figure 2: Contexts of Thailand

Historical Contexts	Cultural Values	Determinants of National Competitive Advantage	Competitive Advantage of Nations (CAN)

- Laissez-faire market and paternal governance
- Unique blends of Indian & Chinese
- Agrarian Society
- Land of Freedom
- Abundant in natural resources
	- Less competitive mindset
	- A loosely structured social system
	- Individualistic behaviors with collective values
	-Flexible attitude toward nationalism
	- A Single melting pot
		- Factor conditions
		    - Basic factors
		    - Advanced factors
		- Demand conditions
		- Related and supporting industries
		- Firm strategy, structure, and rivalry
			- World rice exporter (1850-1940)
			- 12%, 8%, 6% GDP growth rates during 1987-1990, 1990-1994, and 1996 respectively
			- The verge of becoming a fifth Asian "tiger" in 1996
			- Financial Crisis in 1997
			- Rank 67th in GDP per Capita (1999)
			- Bottom up (2000 to present)

Historical Articles	**Analysis of Cultural Indices**	**Framework of the Competitive Advantage of Nations**	**Current Business & Economic Issues in Thailand**

Therefore, we have specifically explained why Thailand's economy is still behind developed nations (i.e., USA, Japan) in terms of competitive advantage. Further, we apply the following statement to Thailand's current state of management practice: "A management discipline that ignores the cumulative impact of past events on present events fails to fully exploit the explanatory and interpretive potential of understanding how and why 'present [theories and methods] have their particular nature by virtue of their past'" (Bedeian, 1998).

Interestingly, statements of historians concerning Thailand (Embree, 1950; Fogg, 1953; Ayal, 1961; Deyo, 1975; Feeney, 1979; LePoer, 1987) are in alignment with the results of Hoftstede's selected cultural indices (PDI, IDV, UAI, INTEG, and MAS). This historical knowledge of Thailand gives an explanation for the results of the cultural indices, placing the Thai people between the Japanese (i.e., Chinese) and Indian people. Compared to Japanese, Indian, and American people, Thai people are obviously different in terms of their perceptions and competitive behavior. Finally, in this paper, we have applied Thailand's historical and cultural perspectives to Porter's CAN. This analysis leads us to assert that Thai cultural values and historical contexts are among the primary reasons for the absence of sustainable competitive advantage for the nation.

Despite bountiful natural resources, Thailand could not leverage those benefits into sources of national competitiveness. Regarding the issue of success, Frederick Herzberg once stated during a conversation with William Dowling: "Throughout history, the great tragedies of cultures or organizations have not been in the failure to produce success, but in the failure to manage it once it's been achieved. Managing success needs a different managerial style than producing success" (Dowling, 1971). This paper applies the previous statement from an organizational level to a national level. In order to attain a sustainable competitive advantage, the Thai people need to change their business culture and management styles so that Porter's "national diamond" can be fully exploited and thus the CAN shall be achieved and maintained.

The prevalence of fatalistic values and individualistic behaviors has contributed to the poor strategic management in Thai firms. Such values and behaviors have led Thai management to focus too much on short-term profit activities and, thus, to invest excessively in non-productive activities including real estate and stock price speculations. Additionally, the loosely structured social system has worsened the Thai economic situation. For example, banks and financial institutions have sometimes ignored their professional roles and responsibility by loaning money to customers based on personal relationships, not financial standing. Obviously, such risky processes have increased the amount of bad loans in the Thai economy. Meanwhile, the Thai government, the supposed regulator in this loosely structured system, has contributed to the problem by not strictly enforcing standard rules and procedures for Thai banks and financial institutions. Perhaps, up to this point, our historical analysis could illustrate how and why Thailand's financial crisis occurred in 1997, spreading its impacts on other countries in the region (i.e., South Korea, the Philippines, and Indonesia)

Further, concerning the less-competitive mindset, the Thai people need to realize that their natural resources should not be taken for granted anymore. Currently, Thailand is depleting natural resources, which could reflect a competitive disadvantage in terms of basic factors. Now, Thailand needs to strive for success, not just survival in international business competition and to attain this success through stable and sustainable competitive advantages over other national competitors.

In closing, we have presented the case of Thailand as a developing nation in search of sustainable competitive advantage on the world stage. If the leaders of the country learn from their history and take corrective action, Thailand can join the ranks of the Asian "tigers" as a leader, not only in Asia, but throughout the world. Also, we have built on the foundations laid by Porter (1990) and Hofstede (1983, 1984, 1994) in our analysis and produced a synthesis through our focus on a single nation. We recognize the limits of a single case analysis, especially in the generalizability of our findings, and call for future research to explore the theory of the competitive advantage of nations. Finally, additional research concerning other developing nations would be especially valuable.

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APPENDIX A
A MAP of THAILAND AND HER REGION

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