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LETTER FROM THE EDITORS

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The manuscripts contained in this volume have been double blind refereed. The acceptance rate for manuscripts in this issue, 25%, conforms to our editorial policies.

Our editorial policy is to foster a supportive, mentoring effort on the part of the referees which will result in encouraging and supporting writers. We welcome different viewpoints because in differences we find learning; in differences we develop understanding; in differences we gain knowledge and in differences we develop the discipline into a more comprehensive, less esoteric, and dynamic metier.

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RELATIONSHIPS AMONG EXPORT, FDI AND GROWTH IN INDIA: AN APPLICATION OF AUTO REGRESSIVE DISTRIBUTED LAG (ARDL) BOUNDS TESTING APPROACH

Kishor K. Guru-Gharana, Texas A & M University-Commerce

ABSTRACT

Most of the study of causal relationship of GDP or growth with Trade and Foreign Direct Investment in the context of India rely on cross country comparisons, or simple correlations/regressions disregarding nonstationarity properties. Some papers which consider time series properties depend on VAR or VECM or Johansen-Juselius cointegration technique which is shown to suffer from potential pretest biases, influence of nuisance parameters and asymptotic unreliability. The pitfalls of these techniques especially considering the uncertainty in ascertaining the order of cointegration of the variables in the system have been well documented in the literature and also briefly mentioned in this paper. Therefore, this study employs the more recent and robust ARDL bound testing approach suggested by Pesaran et al. (2001) to study the long-run and short-run relationships among these three time series. This technique has been shown to have good small sample properties and provide more robust and asymptotically reliable results under wide variety of situations regarding the cointegration relationships among the time series. This study also focuses on the post liberalization period and clearly shows that the post- liberalization period significantly differs from the pre-liberalization period in the GDP-Export-FDI nexus. This study finds strong support for Export-led growth hypothesis only in the post liberalization period.

INTRODUCTION

India is an interesting and increasingly important case for the study of relationship among growth, Trade and Foreign Direct Investment. India is the second largest country in the world, with a population of over 1.123 billion (in 2007) which is more than one-sixth of all the people in the world. The output of India accounts for almost 8% of global GDP when measured appropriately. In particular, when National Income is measured using PPP (purchasing power parity) reflecting the actual purchasing power of a country's currency, India is fourth after the US, China, and Japan (with PPP GNI \$3078.7 billion compared to only 2782.7 billion for Germany in the fifth position and \$4,420.6 for Japan in the third position in 2007: see World Development Report 2009). Moreover, India alone has accounted for roughly one fifth of global

GDP growth in the last five years. During the period between 2000 and 2007, the growth rate of Indian Economy was an impressive 7.8% per year compared to only 3.2% for the world, only 2.4% for High Income, only 4.3% for upper middle Income, and only 5.6% for low Income countries (World Development Report, 2009). India is fast catching up in overall growth with the champions, the East Asia and Pacific region countries, which have so far been ahead and above (8.9% during this period).

Relatively low wages and vast reservoir of trained manpower make India a natural destination for foreign direct investment (FDI). Until recently, however, India has attracted only a small share of global FDI, primarily due to government restrictions on foreign involvement in the economy. But beginning in 1991 and accelerating rapidly since 2000, India has liberalized its investment regulations and actively encouraged new foreign investment: a sharp reversal from decades of discouraging economic integration with the global economy. India's recent liberalizations and foreign investment de-regulations have generated strong interest by foreign investors, turning India into one of the fastest growing destinations for global foreign direct investment (FDI) inflows. Foreign firms are setting up joint ventures and wholly owned enterprises in various services and manufacturing sectors. Net foreign direct investment (FDI) flows into India reached \$22.8 billion in 2007, more than five times the \$4.0 billion recorded during 2001. In 2008 it is recorded to jump to \$34.4 billion. India has emerged as the second most attractive destination for FDI after China and ahead of the US, Russia and Brazil. According to the News report published in October 2009 by the Trade Council of Denmark, India achieved a stunning 85.1% increase in foreign direct investment flows in 2008, the highest increase across all countries, even as global flows declined by 14.5%, says the findings (quoting a recent UNCTAD study — Assessing the impact of the current financial and economic crisis on global FDI flows). Similarly, export volume has increased from a mere \$16.6 billion in 1990 to \$ 163.1 billion in 2008 (an increase of over 1000 % in 18 years!). Policy makers and Research scholars have been touting this impressive export and FDI growth in recent decades as the vehicles for India's accelerated growth in the recent years and possibly in decades to come.

In the last two decades there have been several studies on such relationships investigating Export led or Foreign Investment led growth in India, but all suffer from methodological issues. Most studies ignore the time series nonstationarity properties of these macro variables which can lead to spurious Regressions and Correlations. Some do investigate the nonstationarity properties but then perform the Granger Causality Tests using simple VAR or VECM or Johansen-Juselius cointegration procedures with the exception of Shirazi and Abdul-Manap (2005), which does not include FDI. But Toda and Phillips (1993) have provided evidence that the Granger causality tests in error correction Models (ECMs) still contain the possibility of incorrect inference and suffer from nuisance parameter dependency asymptotically (Lutkepohl 2004, p. 148). The underlying assumption of these studies that all variables in the system are integrated of the same order (usually order 1) makes their subsequent results doubtful, because there are several evidences that all macro variables included in the system may not be of the same order. In the

present study too, we find that the variables in the system may not be of the same order of integration. It is also evident from studying the estimation results of the previous studies, because they assume arbitrarily that all variables are integrated of order I(1) so as to be able to apply the cointegration technique, even after their own tests show that some of the variables may be I(0) or I(2). Another problem with previous studies is that they have studied such relationships in bivariate contexts. However, in time series multivariate relationships may be quite different from bivariate relationship (Love & Chandra 2005a and 2005b).

Therefore, in the present study we employ the more robust technique developed by Pesaran and Shin (1995 and 1998), and Pesaran et al. (2001), and apply multivariate framework by including GDP, Export and FDI. These state-of-the-art techniques have not been employed in the Indian context to study the relationships among these variables. The rest of the paper is organized as follows: in section 2 we briefly outline the theoretical framework and the literature linking Exports and FDI to Growth; in section 3 we briefly mention the relevant empirical literature; in section 4 we describe the Econometric Methodology; in section 5 we discuss the data and the results of estimation and hypotheses testing; and in the final section we conclude with the main findings of this study.

THEORETICAL FRAMWWORK

Export Led Growth (ELG)

The notion that export leads economic growth has been subject to considerable debate in the development and growth literature for many decades (Keesing, 1967 and Krueger, 1995). Broadly, the focus of the Export led Growth (ELG) debate is on whether a country is better served by orienting trade policies to export promotion or to import substitution. The neoclassical view has been that growth can be achieved by ELG. The growth records of Asian newly industrializing countries (NICs), mainly, Hong Kong, Singapore, Korea and Taiwan, and second-generation NICs (Malaysia and Thailand) - are cited as such examples (compared to other developing regions). Over the last four decades these NICs have approximately doubled their standards of living in every successive decade. China is the newest and now the most dominant member of this group. China's experience since the 1980s tends to support the argument that trade openness is a mechanism for achieving more rapid and efficient growth and better distribution of domestic resources (Findlay and Watson, 1996, p.4). Some authors (e.g., Krueger, 1995) identify trade policy as the crucial element of economic policy.

Some of the reasons cited in support of the ELG proposition are: (a) export growth represents an increase in demand for the country's output; (b) exports promote specialization in the production of export products, which in turn may boost the productivity level and the general level of skills and result in a more efficient reallocation of resources; (c) the outward oriented trade policy may also give better access to advanced technologies, learning by doing gains, and

better management practices (Ben-David & Loewy, 1998) that may result in further efficiency gains; (d) exports may loosen a foreign exchange constraint (Chenery & Strout, 1966), which makes it easier to import inputs to meet domestic demand, and so enable output expansion; (e) some authors argue (Lal & Rajapatirana, 1987) that an outward-oriented strategy of development may provide greater opportunities and rewards for entrepreneurial activity, the key to extended growth. However, the support for ELG is not universal. Critics point out that the experiences in the East and Southeast Asian countries are unique in many ways and not necessarily replicable in other countries (Buffie, 1992). Other researchers question whether a reliance on exports to lead the economy will result in sustained long-term economic growth in LDCs due to the volatility and unpredictability in the world market (Jaffee, 1985). There is also a potential for no causal relationship between exports and economic growth when the time paths of the two series are determined by other, unrelated variables (e.g., investment) in the economic system (Pack, 1988). Eventually, effectiveness of export promotion is an empirical issue. Over the last two decades or so there has been a plethora of such investigations, using a number of statistical techniques, from very simple to very complex. But the results have been mixed.

Foreign Direct Investment Led Growth (FDI-LG)

It is a general belief among policy makers and academicians that foreign direct investment (FDI) can be a source of valuable technology and know-how in addition to increased capital. Some of the popularly cited potential benefits of FDI are: (a) backward and forward linkages with the rest of the economy; (b) enhanced access to advanced technologies; (c) learning of improved management practices; (d) expansion and diversification of the production capacity of an economy; (e) transfer of best practices in corporate governance and accounting practices; (f) integration of the domestic economy with the global economy and infusion of competition in the domestic economy; and (g) relatively more stability than other forms of international capital flows because of longer-term perspective.

Both trade and FDI are also associated with growth, though their multichannel causal links remain largely unexplored especially in the case of India. Notwithstanding the strong conceptual case for a positive relationship between economic growth and FDI, the empirical evidence has been mixed (Blomström & Kokko (1998), Gorg & Greenaway (2004), and Alfaro & Rodriguez-Clare (2004)).

It has been recognized and well documented in the literature that there is possibility of two-way feedbacks between FDI and economic growth along with their long-run and short-run dynamics. Empirical investigations in the context of the Indian economy have generally failed to provide any conclusive evidence in support of such two-way feedback effects; causality between FDI and economic growth is either found neutral for India, or to run mainly from economic growth to FDI. Earlier studies, however, have several limitations in common. First, the period of observation is typically too short in the post-liberalization period to capture the effects of

economic reforms and the subsequent boom in FDI. In the present study we show that this factor has significant influence on the results. Second, the econometric techniques employed (even in those studies which take into account the nonstationarity properties) are highly dependent on the results of testing for the cointegration relationships (Basu, et al, 2003). Third, only bivariate relationship is studied in most of the previous studies, which may involve biases (see Love and Chandra 2005b). In this paper we avoid these methodological problems.

SELECTED EMPIRICAL LITERATURE REVIEW

The empirical literature separates into three or four groups: the first group uses cross-country correlation coefficients to test the ELG hypothesis; the second group uses regression models (typically least squares based) that are again usually cross-country predicated; the third, recent group of studies applies various time series techniques to examine the exports-growth or FDI-growth nexus and the fourth group applies panel data and panel cointegration techniques. The group of cross-section research looks at rank correlation coefficients or simple OLS regressions between exports and output or FDI and output (or their growth) across a number of countries. The ELG or FDI led Growth hypotheses are supported when a positive and statistically significant correlation is observed. One issue arising from this body of work is that some of the results may involve a spurious correlation due to exports and FDI themselves being part of national product or all of them being influenced by some other variables.

Potential problems with the later time series studies are also well documented in the literature. Jung and Marshall (1985), Greenaway & Sapsford (1994), Riezman et al. (1996), and Dhananjayan & Devi (1997) provide surveys on the earlier ELG works. For a more recent and an extensive survey of empirical works on export led growth see Giles and Williams (2000a and 2000b).

Nandi & Biswas (1991) and Bhat (1995) found support for ELG hypothesis in the case of India, while Xu (1996) contradicts this finding. Similarly, Ahmed, Butt & Alam (2000), using trivariate causality framework, rejected the ELG hypothesis for all but one (Bangladesh) of the countries they studied. A recent study by Kalirajan et al. (2009) employs Multivariate VAR analysis using the VECM procedure to study relationships among FDI, Exports and Economic Growth in South Asia and selected emerging countries and find evidence in support of ELG hypothesis. Duttaray, et al. (2008) studied the role of FDI in less developed countries. Thangavelu & Rajaguru (2004) compared the roles of exports and imports on productivity growth in rapidly developing Asian countries. Makki & Somwaru (2004) studied the impact of FDI and trade on economic growth in some selected developing countries. Chandra (2003) followed and updated Dhawan & Biswal (1999) to test the export-led growth hypothesis in India in a multivariate framework but used the cointegration technique discussed above to test for causality. Moreover, this study uses data mostly overlapping with the pre-liberalization period (1950-1996) and the results may also suffer from pretesting bias as mentioned above. There have

been several other empirical studies conducted for India but all are dominated by pre liberalization data.

Shirazi & Abdul-Manap (2005) examine the ELG hypothesis for five South Asian Countries through cointegration and multivariate Granger causality tests. No causality among exports, imports and output was found for Sri Lanka and India, although for India GDP and exports did induce imports. This study employs the relatively robust Toda & Yamamoto (1995) approach to testing Granger causality in the ELG context but does not include FDI, which is a significant omission considering the recent boom in this variable in India. Including Import instead of FDI does not seem to be appropriate in our view because of the extremely high interdependence and correlation between Exports and Imports. In simple words, Imports add little to what the Exports reveal, whereas FDI would be a significant largely independent addition to the model. Another limitation of this study is that the data for India are quite dated (only up to 2002) considering the very recent boom in Exports, FDI and Growth in India. Thus the post liberalization period is quite underrepresented while the data is dominated by periods of import-substituting-inward-looking policy regimes since 1960. Shirazi & Abdul-Manap (2005) do not even perform the subperiod analysis. Therefore, their conclusions (finding non-causality) are biased because of merging different policy regimes as if nothing important has happened in India in the 1990's onwards. This seems to be a general problem of cross country studies which lose focus on country specific events and unique characteristics. Because of this deficiency, it is now recognized that 'tests of the export-led model, must intrinsically involve country case studies' (Medina-Smith, 2001). As we have found in our own empirical results discussed below, the characteristics of Indian economy, especially in the context of Export-FDI-Growth nexus seem to have undergone significant changes following the watershed liberalization which started in the early 1990's and has become more vigorous in the last decade or so. Rahman (2009) has applied the ARDL methodology to study the effects of exports, FDI and expatriates' remittances on real GDP of Bangladesh, India, Pakistan and Sri Lanka. The results reveal close similarities of long-run and the short-run dynamics of the variables between Bangladesh and India. The same applies to Pakistan and Sri Lanka in terms of their short-run dynamics with no significant long-run causal flows.

Finally, Guru-Gharana & Adhikari (2010) apply the Toda-Yamamoto-Dolado-Lutkepohl methodology to study the Granger Causality relationships among Growth, FDI and Exports in the case of China. The present study employs the alternative ARDL bounds testing methodology in the case of India.

THE ECONOMETRIC METHODOLOGY

The autoregressive distributed lag (ARDL) models were popular in energy analysis until the introduction of unit root tests and cointegration techniques which showed that the Least Squares methods could lead to spurious regressions in the presence of nonstationarity in the time

series. This led to the band wagon effect of almost dismissing all methods based on OLS techniques, including ARDL and universally employing the popular Johansen-Juselius maximum likelihood techniques for studying long-run relationships and error correction models for studying Granger causality. Then came the criticisms of these methods (Toda & Phillips, 1993 and 1994, Toda & Yamamoto, 1995, and Zapata & Rambaldi, 1997) which showed that these methods also suffer from pre-testing biases, the low power of unit root tests, dependency on the accuracy of the assumed cointegration relationships, unsuitability for small samples, influences of nuisance parameters, and the need for the rank conditions to be satisfied for the validity of the results. There are added problems when the time series are of different order of integration. Parallel to these developments, there was a revival of ARDL methods in the late 1990s by a series of works, in particular, Pesaran & Shin (1999), and Pesaran, Shin & Smith (2001). Especially after Pesaran et al. (2001), the ARDL bounds testing approach has become the state-of-the-art technique for studying long-run and short-run relationships among time series variables and also for examining Granger causality. This approach is called the bounds testing approach because it involves testing whether the calculated F statistics are within or outside two bounds: the lower bound for I(0) and the upper bound for I(1).

The bounds testing approach has certain econometric advantages in comparison to the cointegration procedures of Engle & Granger (1987), Johansen (1988), Johansen & Juselius (1990), and the full Information Maximum Likelihood procedure of Johansen (1996). First, the endogeneity problems and inability to test hypotheses on the estimated coefficients in the long-run associated with the Engle-Granger methods are avoided. Second, the long-run and the short-run parameters of the model are estimated simultaneously. Third, the econometric methodology is relieved of the burden of establishing the order of integration amongst the variables and of pre-testing for unit roots, because the ARDL approach to testing the existence of long-run relationship is applicable irrespective of whether the underlying regressors are purely I(0), purely I(1) or fractionally integrated. Pre-testing is problematic in the unit-root-cointegration literature where the power of unit root tests are low and there is a switch in the distribution function of the test statistics as one or more roots of the x_t process approaches unity (Pesaran and Pesaran, 1997).

Finally, the small sample properties of the bounds testing approach are superior to that of multivariate cointegration (see Mah, 2000, Narayan, 2005). The bounds testing approach modifies the ARDL framework while overcoming the inadequacies associated with the presence of a mixture of I(0) and I(1) regressors in a Johansen-Juselius type framework. There are, however, some caveats. The ARDL bounds testing of Pesaran et al. (2001) is valid only for order of integration up to 1, that is, between I(0) and I(1) inclusive. If the time series involves integration of higher order, say, I(2) then the results are not valid. Therefore, at the very outset, the unit root tests are performed (although not essential for ARDL per se) in order to establish the suitability of this approach. Moreover, there is a possibility that the results turn out to be inconclusive (when the test statistics fall within the two critical value bounds), in which case

recourse to other methods of testing is required. The ARDL bounds testing approach in the context of Export-FDI-Growth nexus is outlined below.

Step1. The Examination of Lon-run Cointegration

After determining the suitability of the ARDL approach through unit root tests, a system of Unrestricted Error correction Model (UCEM) is estimated. The UCEM is a system of equations using each variable in turn as the dependent variable. Following Jayaraman and Singh (2007) the UCEM for this study can be represented (representing log of GDP as G, log of Export as E, and log of FDI as F) as the following:

$$\Delta G_t = \alpha_{gt} + \sum_{i=1}^p \beta_{gg,i} \Delta G_{t-i} + \sum_{i=0}^p \beta_{ge,i} \Delta E_{t-i} + \sum_{i=0}^p \beta_{gf,i} \Delta F_{t-i} + \lambda_{gg} G_{t-1} + \lambda_{ge} E_{t-1} + \lambda_{gf} F_{t-1} + \varepsilon_{gt} \quad (1)$$

$$\Delta E_t = \alpha_{et} + \sum_{i=0}^p \beta_{eg,i} \Delta G_{t-i} + \sum_{i=1}^p \beta_{ee,i} \Delta E_{t-i} + \sum_{i=0}^p \beta_{ef,i} \Delta F_{t-i} + \lambda_{eg} G_{t-1} + \lambda_{ee} E_{t-1} + \lambda_{ef} F_{t-1} + \varepsilon_{et} \quad (2)$$

$$\Delta F_t = \alpha_{ft} + \sum_{i=0}^p \beta_{fg,i} \Delta G_{t-i} + \sum_{i=0}^p \beta_{fe,i} \Delta E_{t-i} + \sum_{i=1}^p \beta_{ff,i} \Delta F_{t-i} + \lambda_{fg} G_{t-1} + \lambda_{fe} E_{t-1} + \lambda_{ff} F_{t-1} + \varepsilon_{ft} \quad (3)$$

Here, the λ 's are the long run multipliers, α 's are the drift terms, β 's are the short term dynamic coefficients, Δ is the difference operator and p is the optimal lag length selected by some suitable criteria(on), and ε 's are white noise error terms, that is, i. i. d. with zero mean, Homoscedasticity and no autocorrelation. The optimal order of the lags on the first-difference variables in equations (1) to (3) can be obtained from unrestricted vector autoregression (UVAR) by means of Akaike and/or Schwarz criteria. Bahmani-Oskooee & Bohl (2000) and Bahmani-Oskooee and Ng (2002) have, however, shown that the results of this stage are sensitive to the order of VAR. We allow maximum lag order of 3 considering that our model consist of annual data. The Wald (F) test is performed to determine whether along run relationship exists between the variables through testing the joint significance of the lagged levels of the variables. The log-run relationship test is equivalent to the cointegration test. The Null Hypotheses for No Cointegration are:

$$H_0: \lambda_{gg} = \lambda_{ge} = \lambda_{gf} = 0, \text{ against } H_1: \lambda_{gg} \neq 0, \lambda_{ge} \neq 0, \lambda_{gf} \neq 0 \text{ denoted as } F_g(G | E, F) \text{ in equation (1)} \dots \dots (h1)$$

$$H_0: \lambda_{eg} = \lambda_{ee} = \lambda_{ef} = 0, \text{ against } H_1: \lambda_{eg} \neq 0, \lambda_{ee} \neq 0, \lambda_{ef} \neq 0 \text{ denoted as } F_e(E | G, F) \text{ in equation (2)} \dots \dots (h2)$$

$$H_0: \lambda_{fg} = \lambda_{fe} = \lambda_{ff} = 0, \text{ against } H_1: \lambda_{fg} \neq 0, \lambda_{fe} \neq 0, \lambda_{ff} \neq 0 \text{ denoted as } F_f(F | G, E) \text{ in equation (3)} \dots \dots (h3)$$

The F test has a nonstandard distribution which depends upon: (i) whether variables included in the ARDL model are I(0) or I(1); (ii) the number of regressors; (iii) whether the ARDL model contains an intercept and/or a trend; and (iv) the sample size. Two sets of critical values (CVs) or asymptotic critical value bounds assuming that the independent variables are I(d) (where $0 \leq d \leq 1$, that is integrated of order 1 or less) are reported in Pesaran et al. (2001) and Narayan (2005) for various sample sizes. The upper bounds are derived assuming all variables to be I(1) and the lower bounds are derived assuming all variables to be I(0). Given the relatively small sample size in the present study (up to 38 observations), we extract appropriate CVs from

Narayan (2005) instead of using the tables reported in Pesaran et al. (2001), because the latter correspond to much larger sample sizes. If the calculated F statistics fall outside the two bounds a conclusive inference can be drawn. If the calculated value exceeds the upper bound of the CV then the Null hypothesis of no cointegrating relationship is rejected. If the calculated values fall below the lower bound of the CV then the null hypothesis of no cointegration cannot be rejected. If, however, the calculated F falls within the two bounds then the test is inconclusive and further examination of the accurate order of cointegration has to be performed.

Step 2: Estimation of the Long-run ARDL (p, q, r) Model

If cointegration is established in the above step, then the next step is to estimate the conditional ARDL (p, q, r) long-run model. Treating GDP as the Dependent Variable in accordance with prevalent growth theory, this can be shown as the following:

$$G_t = \gamma + \sum_{i=1}^p \lambda_{g,i} G_{t-i} + \sum_{i=0}^q \lambda_{e,i} E_{t-i} + \sum_{i=0}^r \lambda_{f,i} F_{t-i} + \eta_t \quad (4)$$

where all variables are previously defined, γ is the constant term and η_t is a white noise error term. This step involves selecting the orders of the ARDL (p,q,r) model in the three variables using Akaike or Schwarz criteria before the model is estimated using Ordinary Least Squares Technique. Pesaran and Shin (1999) have shown that valid asymptotic inferences on short-run and long-run parameters can be made under least squares estimates of an ARDL model, provided the order of the ARDL model is appropriately augmented to allow for contemporaneous correlations between the stochastic components of the data-generating processes included in the estimation (Narayan, 2004). Pesaran and Shin (1999) demonstrate that the Schwarz criterion is superior over Akaike in the context of ARDL model. With the use of annual data they recommend choosing a maximum of two lags. This involves trials and experiments with all possible combinations of the lag orders for the variables in the system. The vector of lag orders which minimizes the Akaike or Schwarz statistic is selected.

Step 3: The Short-run Dynamics and the Granger Causality

In the third and the final step, we obtain the short-run dynamic parameters by estimating an error correction model associated with the long-run estimates. Moreover, this equation can also be used for testing short-run and long-run Granger causality. This model is specified as follows:

$$\Delta G_t = \mu + \sum_{i=1}^p \beta_{g,i} \Delta G_{t-i} + \sum_{i=0}^q \beta_{e,i} \Delta E_{t-i} + \sum_{i=0}^r \beta_{f,i} \Delta F_{t-i} + \sigma ECT_{t-1} + \xi_t \quad (5)$$

The error correction term is derived as: $ECT_t = G_t - [\gamma + \sum_{i=1}^p \lambda_{gg,i} G_{t-i} + \sum_{i=0}^q \lambda_{ge,i} E_{t-i} + \sum_{i=0}^r \lambda_{gf,i} F_{t-i}]$ after estimating equation (4). The coefficient of the lagged error correction term, σ is the speed of adjustment, and the β 's are the short-run dynamic coefficients of the model's convergence to equilibrium. A joint hypothesis testing of the β 's can be used for short-run Granger causality test for each regressor in turn. The significance of the coefficient of the error correction term (σ) can be used for testing Long-run Granger causality. A combined hypothesis test for the β 's and σ can be used for strong form of Granger causality test. It has also become customary to test the stability of the model through recursive regression residuals using the Brown et al. (1975) technique, also known as the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests. If the plots of these statistics fall inside the critical bounds of 5% significance then we assume that the coefficients of a given regression are stable.

EMPIRICAL RESULTS

Data and Econometric software

Annual time series data for Export and FDI from 1971 to 2008 were collected from Handbook of Statistics of Reserve Bank of India. The GDP data were collected from the latest issue of World Development Indicators of the World Development Report. The econometric software used is the EVIEWS 7 version

Unit Root Test for the Integration Properties of the Data Series

In stationary time series, shocks will be temporary and over the time their effects will decay as the series revert to their long run mean values. Nonstationary series will contain permanent components and may show false relationships. Granger and Newbold (1974) and Phillips (1986) have demonstrated that high R^2 and low DW are typical characteristics of spurious regressions. It has been well demonstrated that most of the economic variables are found to be nonstationary. The present study employs the Augmented Dickey –Fuller (ADF) Test for test of presence of unit roots (that is nonstationarity) of the individual series. The ADF Test includes extra lagged terms of the dependent variables in order to eliminate autocorrelation. The lag length on these extract term is determined by the Akaike Information Criterion (AIC). The ADF Test results are shown in the following table, where the results clearly indicate that GDP and Export series are nonstationary when the variables are defined at levels with or without constant and trend. Looking at the Table the FDI series appears to be trend stationary in both levels and first difference. The two series, GDP and Export are clearly stationary in the first difference of their logarithms. Thus we conclude that the maximum order of integration of the series in the system is $I(1)$, that is, the time series of the system under study are integrated of order d such that $0 \leq d \leq 1$, although they may not be of the same order of integration (FDI is

likely $I(0)$). This provides further justification for the use of the bounds testing ARDL approach in this study.

Variable	No Intercept or Trend	Intercept	Intercept and Trend
Log(GDP)	5.845 (1.000)	-0.006 (0.952)	-1.307 (0.871)
Log(Export)	7.168 (1.000)	0.779 (0.992)	-0.511 (0.979)
Log(FDI)	-1.772* (0.073)	-1.638 (0.453)	-4.083** (0.015)
Δ Log(GDP)	-2.884*** (0.005)	-4.467*** (0.001)	-4.400*** (0.007)
Δ Log(Export)	-1.728* (0.080)	-3.623*** (0.010)	-3.619** (0.042)
Δ Log(FDI)	-0.242 (0.589)	-3.538** (0.015)	-3.686** (0.042)
Test critical values 1%	-2.629	-3.621	-4.227
5%	-1.950	-2.943	-3.537
10%	-1.611	-2.610	-3.200

MacKinnon (1996) one-sided p-values are shown inside parentheses. Values are rounded to three decimal places. Significance at 10% if one *, significance at 5% if two **, and significance at 1% if three ***

Determination of the optimal Lag order in the UECM

Before estimating equations (1) to (3) we determined the optimal order of lag for the first-differenced variables using all popular criteria allowing maximum lag length of 3. The results are shown in Table 2 below.

Lag	LR ¹	FPE ²	AIC ³	SC ⁴	HQ ⁵
0	NA	6.30e-05	-1.162752	-0.624036*	-0.979034
1	18.81314*	5.40e-05*	-1.330123*	-0.387371	-1.008617*
2	7.684302	6.90e-05	-1.120890	0.225898	-0.661597
3	10.32361	7.68e-05	-1.083079	0.667746	-0.485998

*indicates lag order selected by the criterion
 1. LR: sequential modified LR test statistic (each test at 5% level)
 2. FPE: Final Prediction Error
 3. AIC: Akaike Information Criterion
 4. SC: Schwarz Information Criterion
 5. Hannan-Quinn Information Criterion

Thus lag order 1 is selected by all criteria except Schwarz Information criterion. We accept the verdict of the overwhelming majority and determine the optimal lag length as $p=1$ for equations (1) to (3)

The Results of Bound tests of Wald (F) Statistics

Using lag order of one for the first differenced variables, equations (1) to (3) were estimated using OLS and Wald (F) test was performed for the set of hypotheses (h1) to (h3) for the entire sample period of 1971-2008 as well as for the subperiod 1991-2008. The results are shown in Tables 3 below.

Hypotheses	Calculated F (1971-2008)	Calculated F (1991-2008)
$F_g(G E, F)$	2.3304	8.3804*
$F_c(E G, F)$	1.3340	3.6769
$F_f(F G, E)$	2.7703	3.9559

Critical values are calculated by Narayan and Smith (2004), Table 2, using stochastic simulations for $T=40$ and two regressors based on 40,000 replications. They are [2.835 3.585] for 10% and [3.435 4.260] for 5%. But Narayan and Smith (2005) Table 4 calculate with $T=34$ and 40,000 replications as [3.990 4.538] for 5% and [4.943 6.128] for 1%. The first values inside brackets are for $I(0)$ and the second for $I(1)$. Corresponding values in Pesaran, et al (2001) Table CI (iii), Case III are very slightly different from these values. Considering our small sample size we will use the values reported by Narayan and Smith (2004 and 2005). 3.478 and 4.335 for 5%?

Table 3 shows some interesting results. If we consider the entire sample period, the calculated F values for all equations fall below the lower bounds of critical values indicating lack of cointegrating or long-run relationship in all cases regardless of which variable is treated as the dependent variable. On the other hand, if we focus only on the subperiod 1991-2008, that is the post liberalization period, the F value with log of GDP as the dependent variable is well above the upper bound even for 1% level test. The very large value of calculated F leaves no doubt that there is strong evidence of long-run relationship if the post-liberalization period is considered and GDP is treated as the dependent variable. However, in the case of Export and FDI as the dependent variables, the calculated F exceeds the upper bound only at 10% level even during the post-liberalization period. Thus, there is some evidence of long-run cointegrating relation with Export or FDI as the dependent variable, but it is not highly significant according to the bounds test. In short, we conclude from this step of the ARDL bounds testing methodology that there is strong evidence of long-run equilibrating relationship between GDP as the dependent variable and Exports and FDI as the regressors, after the avalanche of the liberalization efforts in India. Therefore, in our subsequent analysis we will focus on the 1991-2008 period and treat GDP (or

its logarithm) as the dependent variable. The existence of a cointegrating relationship suggests that there must be Granger causality in at least one direction, but it does not clearly specify the direction of temporal causality (although from the results so far it seems very plausible to expect it from Exports and FDI towards GDP).

Estimation of the ARDL (p, q, r) Model- the Log-run and the Short-run Dynamics

For the long-run ARDL(p,q,r) model we estimated 18 equations with all possible combinations of the lag orders up to order 2 following the recommendation of Pesaran et al. (2001) for annual data. Akaike criterion selected ARDL (2, 2, 0), while Schwarz criterion selected ARDL (1, 0, 0). Following the recommendation of Pesaran et al. (2001) on this point and considering the small sample size during the post-liberalization period, we accepted ARDL (1, 0, 0) for estimating equation (4). The results were used to calculate the error correction term (ECT) to be used in the estimation of equation (5) for the short-run dynamics. We applied the Schwarz criterion again to establish the optimal lag order for Equation (5) with the lagged error correction term. This time the selected model was ARDL (1,1,1) and the results are shown in Table 4 below.

Table 4: Dependent Variable $\Delta G(1,1,1)$; Sample (1991-2008)			
Variable	coefficient	t-statistic	Prob.
C	0.0086	0.3786	0.7129
$\Delta G(-1)$	0.6474	2.0946	0.0626
ΔE	0.7249	3.2731	0.0084
$\Delta E(-1)$	-0.3575	-2.1069	0.0614
ΔF	0.0237	0.5608	0.5873
$\Delta F(-1)$	-0.0740	-1.6966	0.1206
$ECT(-1)$	-2.0592	-4.5821	0.0010
R-squared	0.788410	Mean dependent var	0.089138
Adjusted R-squared	0.661457	S.D. dependent var	0.077306
S.E. of regression	0.044980	Akaike info criterion	-3.072287
Sum squared resid	0.020232	Schwarz criterion	-2.729200
Log likelihood	33.11444	Hannan-Quinn criter.	-3.038184
F-statistic	6.210218	Durbin-Watson stat	2.110210
Prob(F-statistic)	0.006050		

The very high significance of the error correction term clearly shows long-term Granger causality (Bannerjee, et al. 1998). The sign is correct showing movement towards equilibrium following shocks and the speed of adjustment is very high, showing a very fast adjustment (within a fraction of a year towards equilibrium). Export is a highly significant positive determinant of GDP. The F-tests on the joint deletion of the corresponding coefficients show strong evidences of short-run Granger causality from Export towards GDP, but fail to show the same from FDI towards GDP. The FDI does not seem to have significant short-run impact on GDP. The model passes all the usual diagnostic tests, which are not reported here. We will however, discuss the tests of stability of the parameters in the next subsection.

Examination Of Parameter Constancy Of the Cointegration Space

In order to test for the stability of the estimated parameters, Pesaran and Pesaran (1997) suggest applying the cumulative sum of recursive residuals (CUSUM) and the CUSUM of squared residuals (CUSUMSQ) proposed by Brown et al. (1975). The results displayed in Diagrams 1 and 2 below indicate no instability in the coefficients as the plot of CUSUM and CUSUMSQ are confined well within the 5% bounds of parameter stability.

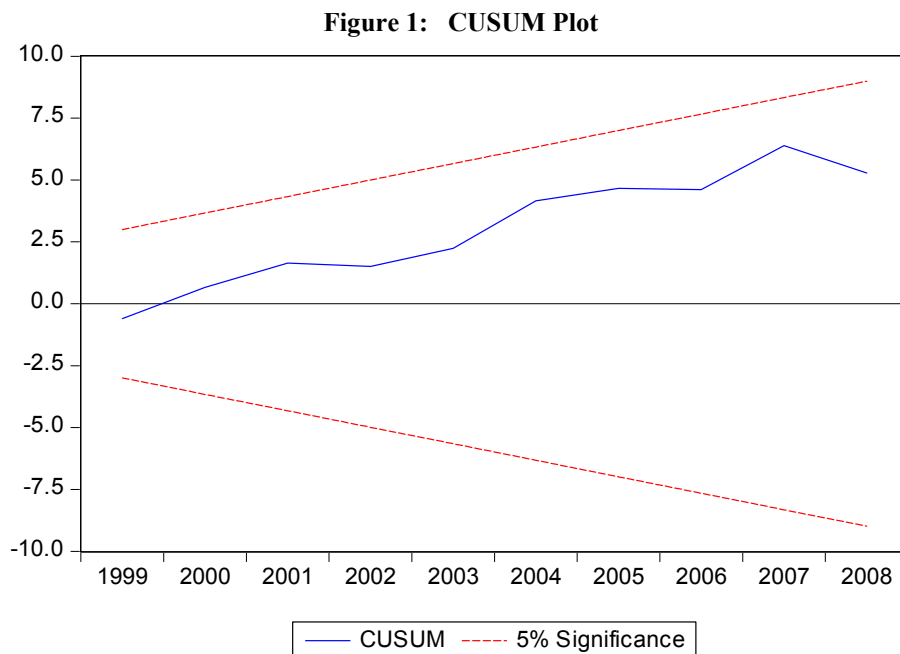
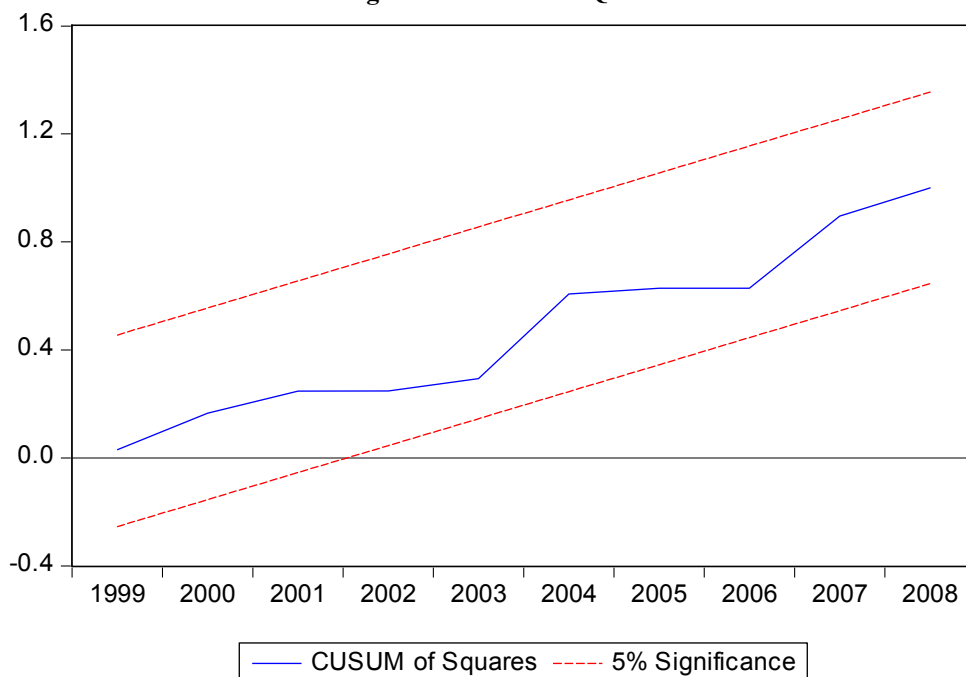


Diagram 2: CUSUMSQ Plot



CONCLUSIONS

Using the recently introduced and more suitable ARDL bounds testing approach this study finds that the post liberalization period in India exhibits significantly different characteristics than the pre- liberalization period. If both periods are combined, there is lack of evidence for long-run cointegration. In the post liberalization period, however, there is strong evidence of long-run relationship with GDP as the dependent variable. The analysis of error correction model shows that Export is a highly significant determining factor for explaining changes in GDP. Moreover Export has short-run as well as long run Granger causality towards GDP. In contrast FDI does not show short-run Granger causality towards GDP.

Thus there is strong support for Export-led-Growth hypothesis in the post-liberalization India, while the inclusion of pre-liberalization period weakens this evidence. Several earlier studies claim lack of evidence to support ELG hypothesis. The conclusion of this paper is that those earlier findings may be the results of pretest biases introduced by the methodologies used and/or the underrepresentation of the post-liberalization period in the sample. Finally it is also found that the speed of adjustment following a shock is very fast.

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EMPIRICAL STUDY ON AFRICAN ENERGY RESOURCES AND CHINA'S OUTFLOW FOREIGN DIRECT INVESTMENT

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ABSTRACT

Despite much research regarding Chinese involvement in African energy resources, there has been a lack of empirical evidence to support the claim. This paper conducts an empirical study to investigate the key determinants of China's outward foreign direct investment (OFDI): OFDI flow and OFDI stock to African countries in aspects of types of energy resources. The paper tests hypotheses and builds models using official data collected from U.S. Government Energy Information Administration (EIA) and the Chinese Ministry of Foreign Commerce (MOFCOM). The findings suggest that China's OFDI flow to Africa is driven by oil resources in recipient countries. In the linear multiple regression model, oil supply is identified as the primary determinants of China's OFDI flow to African countries among all the other types of energy resources. Neither oil supply, nor natural gas, nor coal can be identified as major determinants of China's OFDI stock in the study though they are the factors that affect the amount of China's OFDI stock to certain extent. The paper concludes that China's OFDI to Africa are significantly related with a range of factors of energy resources, especially oil supply. The implication of research results is also discussed.

Keywords: Foreign direct investment, Africa, China and Economics

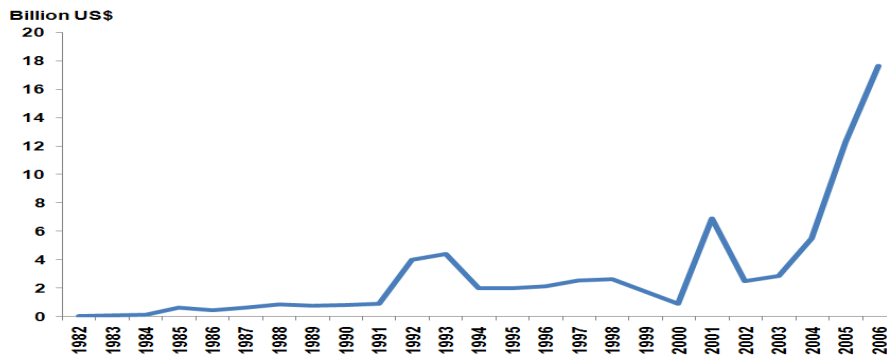
INTRODUCTION

The recent research indicates that China's OFDI is rapidly becoming an important source of OFDI to Sub-Saharan Africa. Starting from virtually no OFDI in 1979, China has accumulated over US\$ 90 billion of OFDI in 2007 (UNECA, 2007). The cumulative value of China's OFDI to Africa was estimated to be US\$847 million between 1991-2003, 19.5% of total outward OFDI flows (Goldstein 2006), with much of the OFDI is in the energy resource sector (Broadman and Isik, 2007). The cumulative value of foreign direct investment (FDI) to Africa was estimated to be US\$ 28 Billion (\$28,780,900,000) between 2003 -2007. China's OFDI flow and stock now stand as the 4th and 6th largest, respectively, among developing countries. Most of the increase in China's OFDI flow to Africa has taken place since 2002 (See Figure 1).

The increasingly significant role of China's outward foreign direct investment (OFDI) to African countries has created much research interest among scholars. The literature indicates that

China's OFDI flow and stock to Africa are driven by energy resources and the economy of the African recipient countries. But most recent research revealed that one of the main motives for Chinese enterprises to invest in Africa is resource-seeking (OECD Report, 2008). China's OFDI to Africa are significantly and positively correlated with a range of factors of energy resources, but not GDP growth (Asiedu 2002, 2004, 2005; Buckley, et al., 2007; Dupasquier and Osakwe, 2006; Kandiero and Chitiga, 2006; and Lydon and Williams, 2005).

Figure 1 China's OFDI in Africa – Flow: 1982-2006
Million Dollars



Source: OECD 2008 Investment Policy Review of China

This paper conducts an empirical study to investigate the key determinants of China's OFDI flow and OFDI stock to Sub-Saharan African countries in aspects of types of energy resources from 2002 to 2007. The paper is organized as follows. Section 2 presents the background of the study. Section 3 presents the research design, models and hypotheses that are developed to investigate the key determinants of China's OFDI flow and OFDI stock to African countries in aspects of types of energy resources. Model 1 tests whether Chinese OFDI flow to Africa is determined by types of energy resources of the African recipient countries based on three hypotheses. Model 2 tests whether Chinese OFDI stock to Africa is determined by types of energy resources of the African receipt countries the other three hypotheses. Section 4 provides the research methodology and data collection. The Section 5 details the data analysis and findings of the hypotheses and multiple regression models. The last section concludes the research findings and the implications of results.

BACKGROUND

Outward foreign direct investment (OFDI) is investment made in the business interests of the investor in a company, in a different nation distinct from the investor's country of origin. Foreign direct investment reflects the objective of obtaining a lasting interest by a resident entity

in one economy (“direct investor”) in an entity resident in an economy other than that of the investor (“direct investment enterprise”). The lasting interest implies the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence on the management of the enterprise. Direct investment involves both the initial transaction between the two entities and all subsequent capital transactions between them and among affiliated enterprises, both incorporated and unincorporated.

There are different ways to measure OFDI: either net OFDI flow or OFDI stocks. In the studies focusing on OFDI, scholars used different measurements and obtained varying statistical results. The earliest debate about OFDI measurement is Firebaugh (1992)'s argument against Bornschier and Chase-Dunn's methodology to put flow of OFDI and OFDI stock in a same equation. He showed that different methodologies could lead to completely different results. The difference between OFDI flow and OFDI stock is that OFDI flow is generally volatile and measures the short-term, while OFDI stocks is generally more reliable and measures the long term (Sun 2008).

FDI flows consist of the net sales of shares and loans including non-cash acquisitions made against equipment, manufacturing rights, etc. to the investment enterprise in another economy attributable to a parent enterprise resident in the economy. OFDI stock is the value of the share of capital and reserves (including retained profits) attributable to the investment enterprise in another economy attributable to a parent enterprise resident in the economy. This paper investigates the key determinants of China’s OFDI flow and stock to Sub-Saharan African countries separately based on the definition of measurements.

HYPOTHESES

Based on the results of the literature review, six hypotheses have been developed to test two research models. Two research models were specified with the predictions on how China’s OFDI Flow and stock will be affected African energy supplies.

RESEARCH DESIGN

Hypothesis I, Hypothesis II, Hypothesis III and Model 1 are proposed since it is generally predicted that China’s OFDI flow is affected by energy resources of the African recipient countries.

Hypothesis I: As the amount of oil supply of an African recipient country increases, the China’s OFDI flow will increase.

Hypothesis II: As the amount of natural gas supply of an African recipient country increases, the China’s OFDI flow will increase.

Hypothesis III: As the amount of coal supply of an African recipient country increases, the China's OFDI flow will increase.

Model 1 is generated from hypothesis I, hypothesis II and hypothesis III. Model 1 proposes that the amount of oil, natural gas and coal supply of African recipient countries determines the amount of China's OFDI Flow. The population partial regression coefficients are indicated with the Greek letter β .

$$\text{Model 1 China's OFDI Flow} = \beta_0 + \beta_1(\text{Oil}) + \beta_2(\text{Natural Gas}) + \beta_3(\text{Coal})$$

It is also generally predicted that China's OFDI stock is affected by energy resources and economic growth of the African recipient countries. Thus, Hypothesis IV Hypothesis V, Hypothesis VI, and Model 2 are proposed:

Hypothesis IV: As the amount of Oil supply of an African recipient country increases, the China's OFDI stock will increase.

Hypothesis V: As the amount of natural gas supply of an African recipient country increases, the China's OFDI stock will increase.

Hypothesis VI: As the amount of coal supply of an African recipient country increases, the China's OFDI stock will increase.

Model 2 is generated from hypothesis IV, hypothesis V and hypothesis VI. Model 2 proposes that the amount of oil, natural gas and coal supply of African recipient countries determines the amount of China's OFDI stock.

$$\text{Model 2 China's OFDI stock} = \beta_0 + \beta_1(\text{Oil}) + \beta_2(\text{Natural Gas}) + \beta_3(\text{Coal})$$

RESEARCH METHODOLOGY

Statistical linear multiple regression method is utilized to test the hypotheses and specifies Model 1 and Model 2. Correlation analysis is utilized to investigate the relationships between China's OFDI flow and energy resources of African countries and the relationships between China's OFDI stock and energy resources of African countries.

DATA COLLECTION

Data of African energy resources 56 countries from 2002 to 2007 were collected from U.S. Government Energy Information Administration (EIA). China's OFDI flow and stock data 2003-2007 for 45 countries were collected from the official statistical bulletin released from the

Chinese Ministry of Foreign Commerce (MOFCOM). The scope of the study is only limited to 5 years because China's OFDI data that was officially released by MOFCOM is restricted from 2003-2007.

Dependent variables

China's OFDI flow to Africa is defined as a dependent variable which means that China's OFDI flow increases when the value of independent variable increases. China's OFDI flow to Africa is measured in millions of U.S. dollars

China's OFDI stock to Africa is defined as a dependent variable which means that China's OFDI stock increases when the value of independent variable increases. China's OFDI stock to Africa is measured in millions of U.S. dollars

Independent variables

Data on oil supply are defined as independent variable. Oil supply data were taken from the U.S. Government Energy Information Administration official statistics. Oil supply is measured in thousands of barrels per day.

Data on gross natural gas supply are defined as independent variable. Natural gas supply data were taken from the U.S. Government Energy Information Administration official statistics. Natural gas is measured in billions of cubic feet.

Data on coal supply are defined as independent variable. Primary coal data were taken from the U.S. Government Energy Information Administration official statistics. Coal supply is measured in thousands of short tons.

DATA ANALYSIS AND RESULTS

This section presents data analysis and discusses the findings of the research models. Model 1 generated from Hypothesis I, Hypothesis II and Hypothesis III was tested using a multiple regression statistical method reflecting the increasing Chinese OFDI flow to Africa. Model 2 generated from Hypothesis IV, Hypothesis V and Hypothesis VI was tested using a multiple regression statistical method reflecting the increasing Chinese OFDI stock to Africa. Pearson correlation analysis was used to investigate the relationship between Chinese OFDI flow and stock. Descriptive statistics was utilized to generate graphs to visually demonstrate the research results.

DATA ANALYSIS

The regression model fits well ($R=1$). R is the correlation coefficient between the observed value of the dependent variable and the predicted value based on the regression model. For Model 1, $R = .79$ indicates the dependent variable can be predicted from the independent variables. R Square = .623 indicates that 62.3% of the observed variability in China's OFDI flow to African countries is explained by the three independent variables. The analysis-of-variance shows there is a linear relationship between the dependent variable and independent variables in the population since the observed significance level is less than 0.0005. Thus, the Null hypothesis that there is no linear relationship between China's OFDI flow and the three independent variables is rejected. The estimated regression equation Model 1 is built as follows.

$$\text{Model 1: China's OFDI Flow} = 4.84 + .028(\text{Oil}) + 0.002(\text{Natural Gas}) + 0.001(\text{Coal})$$

In response to Hypothesis 1, the regression coefficient is used to test whether the China's OFDI flow amount will increase as the amount of oil supply of an African recipient country increases. Hypothesis 1 is kept since the t value for the oil coefficient is significant. The coefficient for oil supply indicates that predicted China's OFDI flow increases by .028 for a change of 1 in the value of the oil variable. Oil is a relative larger predictor for China's OFDI flow comparing to gas and coal in Model 1.

In response to Hypothesis II, the regression coefficient is used to test whether the China's OFDI flow amount will increase as the amount of natural gas supply of an African recipient country increases. Hypothesis II is rejected since the gas coefficient is not significant.

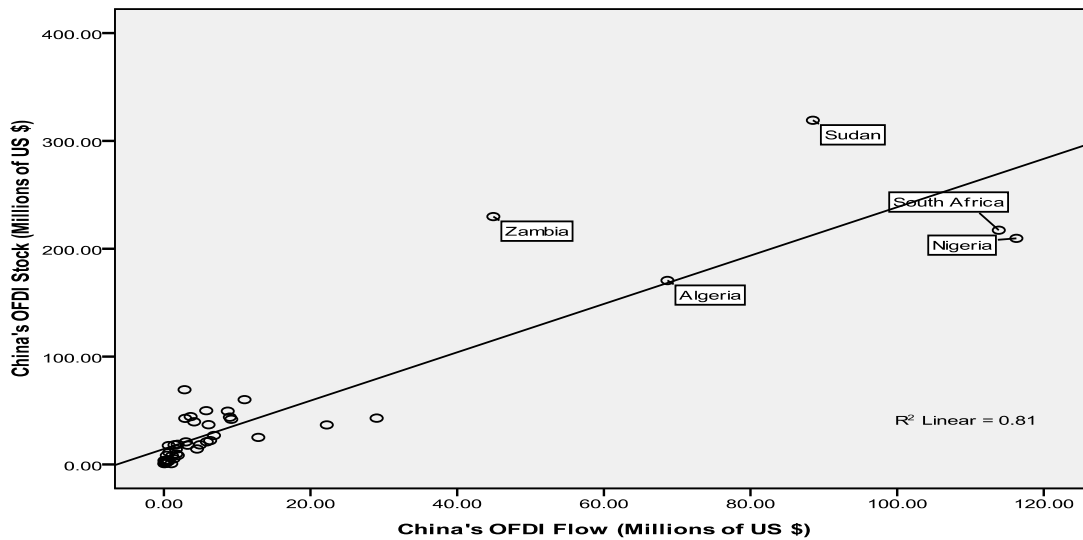
In response to Hypothesis III, the regression coefficient is used to test whether the China's OFDI amount will increase as the amount of coal supply of an African recipient country increases. Hypothesis III is kept since the coal coefficient is significant.

For Model 2, $R=.575$ indicates the dependent variable can be moderately predicted from the independent variables. The R Square = .331 indicates that 33.1% of the observed variability in China's OFDI stock to African countries is explained by the three independent variables. The analysis-of-variance is used to test whether there is a linear relationship in the population between dependent variable and independent variables. The Null hypothesis that there is no linear relationship between China's OFDI stock and the three dependent variables is kept since the observed significance level is greater than 0.0005. Hypothesis IV, Hypothesis V and Hypothesis VI are all rejected since the three t statistic independent variable coefficients (oil, gas and coal) are not significant.

The Pearson correlation analysis shows there is a positive correlation ($r = 0.9$) between China's FDI flow and stock at the significant level ($p < .0001$). Figure 2 shows a large amount of Chinese OFDI flow and stock has been invested to some top 10 African oil supply countries such as Nigeria, Algeria, Sudan and South Africa. These countries are top African oil exporters to

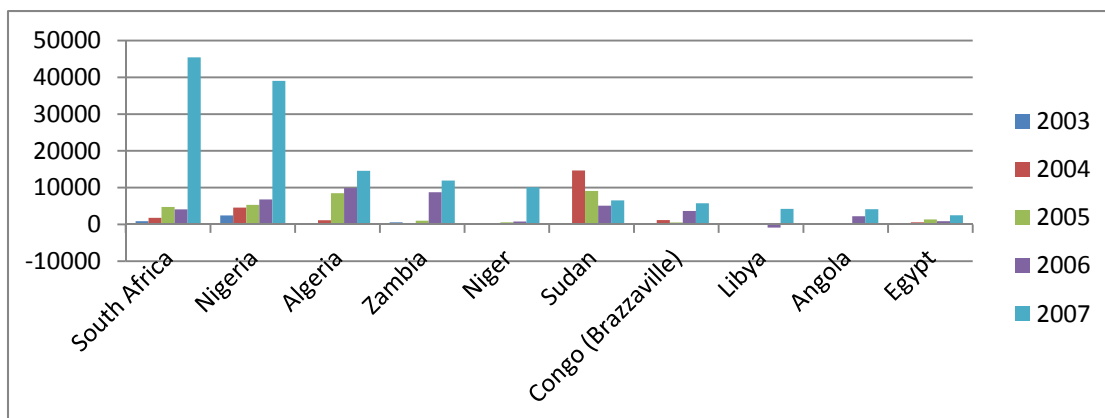
China. Zambia is not in the top 10 oil supply countries. The reason for Zambia to receive a large amount of Chinese OFDI flow and stock is unclear.

Figure 2 China's OFDI Flow and Stock Invested to Top African Oil Supply Countries (N=45)



The following Figure 3 shows increasing Chinese OFDI flow to African recipient countries with rich oil supply from 2003-2007. Sudan is an exception because of the political reason.

Figure 3 Increasing Chinese OFDI flow to African countries with rich oil supply from 2003-2007



CONCLUSION

The results of the study provide evidence to support the previous research that China's OFDI to Africa are significantly related with a range of energy resource factors. China's OFDI flow to African countries can be predicted by oil, gas and coal supply. The finding is that Chinese OFDI flow to African countries with rich oil supply has been increasing from 2003-2007. Although oil supply has been identified as the primary determinant of China's OFDI flow to African countries, further study still needs to be done to identify other key determinants of China's OFDI flow.

Neither oil supply, nor natural gas, nor coal are identified as major determinants of China's OFDI stock in the study though they are the factors that affect the amount of China's OFDI stock to certain extent. Further study also needs to be done to identify the key determinants of China's OFDI stock.

There is a strong relationship between the amount of China's OFDI flow and stock. The finding indicates that a large amount of both China's OFDI flow and OFDI stock has been invested to African top oil countries such as Nigeria, Algeria, Sudan and South Africa as shown in Figure 2. These African countries with strong oil trade links with China are also recipients of China's OFDI projects and infrastructure projects carried out by Chinese constructors. The expanding demand for oil and other energy resources are essential to sustain China's economic growth. Nearly a third of China's oil imports come from Africa.

Both multiple regression analysis and correlation analysis are conducted on the same 45 African countries based on the OFDI data (2003-2007) released from Chinese MOFCOM. For the rest of 11 out of 56 African countries that don't have Chinese OFDI, 10 out of 11 countries don't have any of the three energy resources (oil, gas and coal) according to the data released from U.S. government EIA. These 10 countries are Faso, Burundi, Central African Republic, Comoros, Guinea-Bissau, Reunion, Saint Helena, Sao Tome and Principe, Somalia and Western Sahara. However, China does provide about 5% OFDI flow and 7.8% OFDI stock to the 15 out of 45 African recipient countries which don't have any of the 3 energy resources (oil, gas and coal). These countries are Cape Verde, Djibouti, Eritrea, Gambia, Guinea, Lesotho, Liberia, Malawi, Mali, Mauritius, Namibia, Rwanda, Togo and Uganda. Further study need to be done to identify the driven factors of China's OFDI to these countries.

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THE EFFECT OF INVESTING IN HIRING, HUMAN RESOURCE PLANNING, AND EMPLOYEE DEVELOPMENT ON LABOR PRODUCTIVITY: CASE OF LEBANON

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ABSTRACT

Purpose: This paper examines the factors that contribute towards enhancing Labor productivity. The importance of this study is that it covers a significant number of Lebanese Economic sectors with multiple explanatory variables.

Design/Methodology/Approach: Three main areas are studied, namely investing in human resources hiring, human resource planning, and employee development. Responses were received from 527 human resource managers or small businesses managers.

Findings: Results showed that there is a positive relationship between formal HR planning, formal evaluation of hiring policies, succession plans and labor productivity. However, results showed a negative relationship between formal planning, career path and labor productivity. On the other hand, there seems to be a negative relationship between skills selection test and aptitude selection test with labor productivity. Moreover, the number of candidates interviewed in a hiring process, is the most significant variable, whereas search firms are the least significant. The study found a positive relationship between promotion from within and labor productivity. On the other hand, there seems to be a negative relationship between training of employees and labor productivity. Moreover, the only significant result among the above three variables is promotion from within. After testing for each variable alone, testing for the overall significance proved that there is a positive relationship between some of the independent variables in the model with labor productivity.

Research Limitations/Implications: This is an exploratory study, and some of the Lebanese Economic sectors were poorly represented in the sample.

Practical Implications: This study helps Human resource managers make the right decisions in their businesses, because this study helps them know the factors that affect labor productivity.

Keywords: Labor Productivity, Human Resources, Hiring, Planning, Employee Development, Capital Intensity, Lebanon

Research type: Research paper.

INTRODUCTION

The organizational factor that is most likely to provide potential competitive advantage is human resources and how these resources are managed. The most effective organizations find unique ways to attract retain and motivate employees, a strategy that is hard to imitate. The success of an organization comes from managing people effectively and providing them with a safe working environment, the best opportunities and paths to advance. Human resource management is the utilization of individuals to achieve organizational objectives. Consequently, managers at every level must be concerned with human resource management. Five functional areas are associated with effective human resource management: Staffing, human resource development, compensation and benefits, safety and health, and employee and labor relations.

Staffing is the process through which an organization insures that it always has the proper number of employees with appropriate skills in the right jobs at the right time to achieve the organization's objectives. Staffing involves job analysis, human resource planning, recruitment and selection. All areas of staffing would be haphazard if the recruiter did not know the qualifications needed to perform the various jobs. Lacking up-to-date job descriptions and specifications, a firm would have to recruit and select employees for jobs without having clear guidelines; this practice could have disastrous consequences. Job analysis is conducted after the job has been designed, the worker has been trained and the job is being performed. Human resource planning involves matching the internal and external supply of people with job openings anticipated in the organization over a specified period of time. Because conditions in the external and internal environments can change quickly, the human resource planning process must be continuous. Changing conditions could affect the entire organization, thereby requiring extensive modification of forecasts. Planning, in general, enables managers to anticipate and prepare for changing conditions and human resource planning, in particular allows flexibility in the area of human resource management. Human Resource development is a major human resource management function that consists not only of training and development but also of individual career planning and development activities, organization development, and performance appraisal, an activity that emphasizes training and development needs. Training is designed to provide learners with the knowledge and skills needed for their present jobs. Development involves learning that goes beyond today's job; it has a more long term focus. Career planning is an ongoing process whereby an individual sets career goals and identifies the means to achieve them. This is a continuing and difficult process because the average person graduating from college today may face five to seven career changes in his working years. Career development: is a formal approach used by the organization to ensure that people with the proper qualifications and experiences are available when needed. Individual careers and organizational needs are not separate and distinct. Organizations should assist employees in career planning so the needs of both can be satisfied. Organization development is the planned process of improving an organization by developing its structures systems and processes to

improve effectiveness and achieving desired goals. Organizational development applies to an entire system such as a company or plant. Performance appraisal is a formal system or review and an evaluation of individual or team task performance. It affords employees the opportunity to capitalize on their strengths and overcome identified deficiencies, thereby helping them to become more satisfied and productive employees. Job specification information often proves beneficial in identifying training & development needs. If the specification suggests that the job requires a particular knowledge, skill or ability and the person filling the position does not possess all the qualifications required, training and development are probably in order. They should be directed at assisting workers in performing duties specified in their present job descriptions or preparing them for broader responsibilities. With regard to performance appraisal, employees should be evaluated in terms of how well they accomplish the duties specified in their job descriptions and any specific goals that may have been established. A manager who evaluated an employee on factors not clearly predetermined is left wide open to allegations of discrimination.

The question of what constitutes a fair days pay has plagued management, unions, and workers for a long time. A well-thought-out compensation system provides employees with adequate and equitable rewards for their contributions to meeting organizational goals. In the area of compensation, it is helpful to know the relative value of a particular job to the company before a dollar value is placed on it. From an internal perspective, the more significant its duties and responsibilities, the more the job is worth. Jobs that require greater knowledge, skills, and abilities should be worth more to the firm. For example, the relative value of a job calling for a master's degree normally would be higher than that of a job that requires a high school diploma.

Safety involves protecting employees from injuries caused by work-related accidents. Health refers to the employee's freedom from physical or emotional illness. These aspects of the job are important because employees who work in a safe environment and enjoy good health are more likely to be productive and yield long-term benefits to the organization. Information derived from job analysis is also valuable in identifying safety and health considerations. For example, employers are required to state whether a job is hazardous. The job description should reflect this condition. In addition, in certain hazardous jobs, workers may need specific information about the hazards in order to perform the jobs safely.

A business firm is required by law to recognize a union and bargain with it in a good faith if the firm's employees want the union to represent them. In the past, this relationship was an accepted way of life for many employers. But most firms today would like to have a union-free environment. When a labor union represents firm's employees, the human resource activity is often referred to as industrial relations which handle the job of collective bargaining.

Job analysis information is also important in employee and labor relations. When employees are considered for promotion, transfer, or demotion, the job description provides a standard for evaluation and comparison of talent. Regardless of whether the firm is unionized,

information obtained through job analysis can often lead to more objectives human resource decisions.

LITERATURE REVIEW

This paper tackles the way in which human resources function in organizational setting, and the effect of human resource functions on labor productivity. It is important to note that the study of the impact of human resource management on organizational performance contributed to a better understanding of human resource decisions in creating and sustaining organizational performance and a competitive advantage in order to demonstrate to senior managers that their human resource systems represent a largely untapped opportunity to improve firm performance. (Becker, Gerhart, 1996). The study was built upon a review of the cumulative literature of acute point estimates of the HR- firm performance. In studying the literature on this subject, it was noticed that HR decisions influence organizational performance in a way that they must either improve efficiency or contribute to revenue growth. However, the new interest in HR as a strategic lever that can have economically significant effects on a firm's bottom line aimed to shift the focus more toward value creation, which suggests that HR contributes directly to the implementation of firms' objectives. Still, the mechanisms by which HR decisions create and sustain value are not understood and complicated. In this respect, most studies suggest that an HR system can be a unique source of sustained competitive advantage especially when its components have high internal and external fit. These papers look directly at the impact of HR decisions on performance outcomes that have clear meaning and relevance to managers such as stock performance, productivity, profits, quality, and organizational survival. Finally, emphasis was placed on the fact that HR strategies that are deeply embedded in an organization are hard to imitate due to casual ambiguity and/or path dependency, policies are developed over time.

The study suggests that further work must be done regarding the relationship between a firm's HR system and the bottom line, since none of the studies thus far used business-unit-level outcomes indicating the difficulty of measuring performance at this level. It was also noted that a major disconnect exists between the literature review suggestions on what firms must do and what firms actually do. This can be explained by the fact that there should be a better communication between the academic and management communities so that research findings can have a greater influence on actual policy. Hence, since the choice of HR systems can have an economically significant effect on firm performance, HR managers must not ignore the importance of the strategic role of the HR function so that the function won't be left with traditional transaction and compliance activities and be forced to justify itself on a cost basis rather than being assessed based on value creation measurements, as the study concludes. Another study examined the role of strategic reference points in explaining the nature and consequences of human resource strategy (Bamberger, Fiegenbaum, 1996). This study examined how managers use strategic reference points or benchmarks to guide their strategic decision

making with regard to human resource issues and how these benchmarks can affect the performance-based consequences of such decisions. The study developed propositions regarding the likely configuration of such reference points and their impact on the nature of HR policies and practices, to explain how the management of strategic reference points fit and consensus can reduce the likelihood that HR policies and practices will have a negative effect on a firm's performance, and the implications of this issue organization wide. In this article, the theoretical underpinnings of benchmarking are explored by examining strategic reference points at both the organizational and sub organizational or system levels. Strategic reference points are the targets or benchmarks that managers use to evaluate choices, to make strategic decisions, and to signal to other key personnel their system wide or organizational priorities. The goal in this article is to show how the strategic reference point construct might allow researchers to integrate each of these elements into a comprehensive theory explaining managerial behavior and decision making in the development of HR systems and to use strategic reference point theory to enhance researchers' understanding of the occasionally contradictory findings regarding the link between HR policies and practices and a firm's performance. The paper begins by presenting a brief review of strategic reference points theory. Then, applying the concept at the system level, it discusses the nature and determination of the reference points relevant to the HR system, and it examines how the configuration of strategic reference points may influence HR managers' decisions to select more daring HR policies and practices over more conservative strategies, to finally describe how the management of strategic reference points fit and consensus can affect the likelihood that such strategies will have a negative effect on firm performance. The study found that in the context of strategic reference points theory, benchmarking in the HR system may be seen as much more than a new managerial tool. From an strategic reference point perspective, benchmarking is not so much an innovative managerial practice as it is a cognitive process underlying much of what researchers know about managerial strategic decision making, thus, managers are likely to adopt policies and practices that may be more daring or less daring in nature based on these benchmarks results; these policies and practices may, in turn, have a direct effect on a firm's overall performance. Under conditions of limited strategic reference points fit and consensus, the potential for the HR system to have a negative effect on a firm's performance may be heightened. Thus, by showing how managers establish system-level policies and practices on the basis of comparisons with internally, externally, and temporally based targets, the model provides a much needed link between strategy and policy at the firm level and implementation and practice at the system or sub organizational level. The study concludes that the HR strategic reference point model provides an additional means by which to move away from the more traditional, rational-economic foundations of HR management and toward a body of theory more solidly grounded on notions of cognition and micro-politics, and that a movement in this direction may help reduce the gap between HR theory and managerial practice. This article also reinforces recent efforts to move HR strategy research away from its prescriptive roots and toward description and analysis. Other studies showed the effect of human resource

management systems on economic performance and compared US and Japanese plants (Ichniowski, Shaw, 1999). The study elaborated on the effects of Japanese and U.S. human resource management practices on worker productivity, using personally collected data from 41 steel production lines, to develop models of the productivity of these lines; each line was toured by the experimenters with either an experienced engineer, area operations manager or superintendent. The study found that Japanese production lines employ a common system of HRM practices including: problem-solving teams, extensive orientation, training throughout employees' careers, extensive information sharing, rotation across jobs, employment security, and profit sharing. On the other hand, a majority of U.S. plants now have one or two features of this system of HRM practices, but only a minority has a comprehensive system of innovative work practices that parallels the full system of practices found among the Japanese manufacturers. In fact, the results revealed that the Japanese lines are significantly more productive than the U.S. lines. However, U.S. manufacturers that have adopted a full system of innovative HRM practices patterned after the Japanese system, achieve levels of productivity and quality equal to the performance of the Japanese manufacturers. This study's evidence helps reconcile conflicting views about the effectiveness of adopting Japanese-style worker involvement schemes in the United States. United States manufacturers that have adopted a definition of employee participation that extends only to problem-solving teams or information sharing do not see large improvements in productivity. However, U.S. manufacturers that adopt a broader definition of participation that mimics the full Japanese HRM system see substantial performance gains. Other studies examined two alternative views, universal and contingency views, of the human resources-performance relationship in manufacturing settings (Youndt, Snell, Dean, 1996). According to the contingency approach to strategic human resource management, if a firm's approach to competition depends on the talents or capabilities of employees, then HR practices would affect performance or else the connection between HR and performance would be minimal. On the other hand, the universal approach to strategic human resource management stated that human resource activities should have a high degree of internal consistency, such as having training and selection activities correlated with both productivity and firm performance. However, there are notable differences across the studies, as to what constitutes a "best practice". The study was based on data collected from a survey of 97 plants, the information was processed using regression analysis, studying the relationship between HR systems, manufacturing strategy, and multiple dimensions of operational performance such as customer alignment, machine efficiency and employee productivity. The analysis of results showed that the apparent main effect of human-capital-enhancing human resources on performance is a function of the performance obtained when firms link of human-capital-enhancing human resource systems with a quality manufacturing strategy as well as other manufacturing strategies that altogether moderated the HR-performance relationship.

However, the study could not conclude that there are strong universal or "best practice" approaches to human resource management. Instead, results were more supportive of a

contingency approach to human resource management. Further research examined the impact of workplace practices, information technology, and human capital investments on productivity, to get a better understanding of the effects of those variables on productivity (Black, Lynch, 2001). Using data from a unique nationally representative sample of businesses, they estimated an augmented Cobb-Douglas production function with both cross section and panel data covering the period of 1987-1993, using both within and GMM estimators. The study was able to examine these factors on a broader cross section of employees, unlike previous studies that have focused on one particular industry, product, or even firm. The study found that it is not whether an employer adopts a particular work practice or a TQM system per se that raises productivity, but rather how that work practice is actually implemented within the establishment that is associated with higher productivity. Results showed that unionized establishments that have adopted human resource practices that promote joint decision making coupled with incentive-based compensation have higher productivity than other similar nonunion plants, whereas unionized businesses that maintain more traditional labor management relations have lower productivity. Thus, allowing greater employee voice in decision making raises labor productivity. The results also showed that plant productivity is higher in businesses with more-educated workers or greater computer usage by non managerial employees and that having a profit sharing system also has a positive effect on productivity.

SAMPLING AND METHODOLOGY

The Sample

The sample consisted of 527 questionnaires which were circulated to different organizations in Lebanon across various regions, mainly to human resource managers or managers of small-sized firms that do not have a human resource department.

The questionnaire aimed at obtaining data related to year of establishment, legal form of the company, industry type, whether the business is a family business or not, job title of the person filling out the questionnaire, net sales, number of employees, employee productivity relative to competition, formal planning of the number and skills of employees, formal evaluation of hiring policies, existence of succession plans and career paths, number of candidates interviewed per position, sources of employment, selection tests used in recruitment, whether training programs exist and the number of trainings per year, whether the company invests in R&D, and the amount of the R&D expense, and the amount of total assets in the company.

Out of the 527 data sampled 280 (53 %) were family businesses, whereas 47 % were non-family businesses. Moreover, the legal forms of the companies are distributed as follows:

Legal Form	Number of Companies	% out of Total
Family Limited Partnership	35	6.64%
Holding	8	1.52%
No Answer	1	0.19%
Off-shore Company	7	1.33%
Other	26	4.93%
Partnership	25	4.74%
S.A.L.	149	28.27%
S.A.R.L.	174	33.02%
Sole Proprietorship	102	19.35%
TOTAL	527	100.00 %

The companies that were sampled ranged from very old to very recent. The following table gives a view of the years of establishment:

Year Established	Number of Companies	% out of Total
Before 1900	11	2.09%
Between 1901 and 1974	83	15.75%
Between 1975 and 1990	116	22.01%
Between 1991 and 2000	164	31.12%
2001 Until Current	126	23.91%
Not mentioned in the Survey	27	5.12%
TOTAL	527	100.00 %

As for the size of the companies in terms of the number of employees, the following table gives an insight about the data collected:

Range	Number of Employees	% out of Total
Less than 10	161	30.55%
Between 10 and 50	225	42.69%
Between 51 and 100	44	8.35%
Between 101 and 500	65	12.33%
Between 501 and 1000	16	3.04%
Above 1001	16	3.04%
TOTAL	527	100.00 %

The main aim of the study is to examine the factors that affect labor productivity. Investments in planning, hiring, and employee development are tested to measure their influence on labor productivity. The study was conducted by circulating questionnaires to firms in Lebanon. The data was collected by a team of graduate students at the Lebanese American University. The data was collected from different companies and firms belonging to diverse sectors in the Lebanese economy. According to the Lebanese Ministry of Economics and Trade, the breakdown of the GDP by sector is:

SECTOR	% of GDP
Agriculture	6.3
Energy and Water	1.5
Manufacturing	13.5
Construction	9.4
Transport and Communication	5.3
Housing	8.5
Market Services	22.6
Trade	21.3
Non-Market Services	11.6
TOTAL	100

In the questionnaire used in this study, the industry types were the following:

SECTOR
Agriculture
Construction
Finance
Insurance
Real estate
Manufacturing
Transportation and Communications
Wholesale and retail
Services
Other

In order to measure whether the sample of companies is a valid representation of the Lebanese Economy, the percentage per industry was measured and compared to the data provided by the Lebanese Ministry of Economy and Trade. However, the division of sectors was not all the same, therefore, a re-categorization of the sectors used in the questionnaire took place, in order to make them compatible with the data provided by the Lebanese Ministry of Economy and Trade. The re-categorizing is as follows:

SECTOR (AS PER QUESTIONNAIRE)	SECTOR (AS PER MINISTRY OF ECONOMY AND TRADE)
Agriculture	Agriculture
Construction	Construction
Finance	Trade
Services	Market Services
Real estate	Housing
Manufacturing	Manufacturing
Transportation and Communications	Transportation and Communications
Wholesale and retail	Trade
Insurance	Market Services
Other	Other

Accordingly, the following table shows the percentage distribution of the different sectors that the data collected represents versus the percentage of GDP:

SECTOR	DISTRIBUTION OF SAMPLE DATA	% DISTRIBUTION OF SAMPLE DATA	% of GDP
Agriculture	6	1.14	6.3
Energy and Water	0	0.00	1.5
Manufacturing	63	11.95	13.5
Construction	20	3.80	9.4
Transport and Communication	14	2.66	5.3
Housing	8	1.52	8.5
Market Services	194	36.81	22.6
Trade	195	37.00	21.3
Non-Market Services	0	0	11.6
Other	18	3.42	0
No Answer	9	1.71	0
TOTAL	527	100	100

First, the Agriculture sector of the data constitutes 1.14 % of the total sample collected. Whereby, the Lebanese Agriculture represents 6.3 % out of the total economy. This could be due to the fact that the data collection covered mainly the geographical areas of Mount Lebanon and few areas of Beirut; while the main agricultural firms are in the Bekaa region. Second, the energy

and water sector is not represented at all in this study. However, this is a relatively minor sector, only 1.5 % of the GDP. Third, manufacturing is very well represented in the data sample since it comprises 11.95 % of the data collected, whereby it also represents 13.5 % of the Lebanese Economy. Fourth, both construction and transportation and communication sectors were represented in the sample data, with a percentage almost half of that of the Lebanese Economy. Fifth, the housing sector represents 1.52 % of the data versus 8.5 % of the GDP. So, this sector is not very well represented in the sample. Sixth, both market services and trade form the heart of the sample data collected since they accumulate to 74 % of the total firms that filled out the questionnaire. These sectors are considerably the largest as well in the Lebanese Economy, with a cumulative percentage of 44 % out of the total GDP.

In general, the allocation of the data collected in the Lebanese Sectors of Economy are well distributed and not clustered in specific industry types.

Statistical Model and Definition of the Variables

The statistical tool used in this study is the SPSS version 15.0, based on the 95% confidence interval with $\alpha = 5\%$ being our tolerance level of type I error. A linear regression model is constructed whereby the dependent variable is Labor Productivity (measured by the total output “average net sales” divided by the total input “number of employees”), and the main explanatory variables in the model are: HR investment in planning, hiring, and development. However, each of these three independent variables is explained by more than one variable, as in the table below.

The main equation of the model constructed in the study is:

$$\text{Labor Productivity} = \beta_0 + \beta_i(\text{Investment in Planning}) + \beta_j(\text{Investment in Hiring}) + \beta_k(\text{Investment in Employee Development})$$

Substituting the labels of the above table in the model equation would yield:

$$\text{Labor Productivity} = \beta_0 + \beta_1*A.1 + \beta_2*A.2 + \beta_3*A.3 + \beta_4*A.4 + \beta_5*A.5 + \beta_6*B.1 + \beta_7*B.2 + \beta_8*B.3 + \beta_9*B.4 + \beta_{10}*B.5 + \beta_{11}*B.6 + \beta_{12}*B.7 + \beta_{13}*B.8 + \beta_{14}*B.9 + \beta_{15}*B.10 + \beta_{16}*B.11 + \beta_{17}*B.12 + \beta_{18}*C.1 + \beta_{19}*C.2 + \beta_{20}*C.3$$

	Independent Variable	Label
Investment in Planning	Formal planning for number of employees	A.1
	Formal planning of skills	A.2
	Formal Evaluation of hiring policies	A.3
	Succession plans	A.4
	Career path	A.5
Investment in Hiring	Number of candidates interviewed	B.1
	Recruitment Source: Employee Referrals (<i>Labeled as S1</i>)	B.2
	Recruitment Source: Graduate and undergraduate institutions (<i>Labeled as S2</i>)	B.3
	Recruitment Source: Search firms (<i>Labeled as S3</i>)	B.4
	Recruitment Source: Private and governmental employment agencies (<i>Labeled as S4</i>)	B.5
	Recruitment Source: Walk-ins (<i>Labeled as S5</i>)	B.6
	Recruitment Source: Newspaper advertisements (<i>Labeled as S6</i>)	B.7
	Recruitment Source: Internet advertisements (<i>Labeled as S7</i>)	B.8
	Selection Test: Skills	B.9
	Selection Test: Aptitude	B.10
	Selection Test: Behavioral	B.11
	Selection Test: Medical	B.12
Investment in Employee Development	Offer training for employees	C.1
	Promotion from within	C.2
	Number of annual formal training programs	C.3

Three different regression models are tested:

- 1) In the first model, the objective is to test the individual effect of **investment in planning** on **labor productivity**.
- 2) In the second model, the objective is to test the individual effect of **investment in hiring** on **labor productivity**.
- 3) In the second model, the objective is to test the individual effect of **investment in employee development** on **labor productivity**.

Measurements and Estimation Technique

Measurements for each of Labor Productivity, Investment in Planning, Investment in Hiring, and Investment in Employee Development are based on a number of factors. For instance concerning labor productivity, the measurement was done based on the company's net sales and the company's number of employees and whether the company's employee rate high as compared to competition. Concerning investment in planning, five distinct bases of investment in planning were used in this study. Whether the business unit formally plans for the number of

workers needed to run the business in the future, or whether the business formally plans for the skills needed to run the business in the future, or whether the human resource department formally evaluates its hiring policies on a regular basis and whether the company has succession plans, and is able to replace any individual worker when necessary, and whether the company provides its employees with a clear career path. Concerning investment in hiring, three distinct bases of investment in hiring were used in this study. The number of candidates interviewed on average for every employee hired, the recruitment source, and the selection tests. Three distinct bases show the indicators that measured Investment in Employee Development, and they are whether the company offers training to its employees, whether the company utilizes promotion from within as a primary method for filling vacancies, and whether the company offers formal training to employees.

This study uses a linear regression model to analyze the data. The data were transformed from the questionnaire to the SPSS by substituting the value “1” for “YES” and “2” for “NO”, whereby “0” was used to indicate “No answer”.

RESULTS

Descriptive Statistics

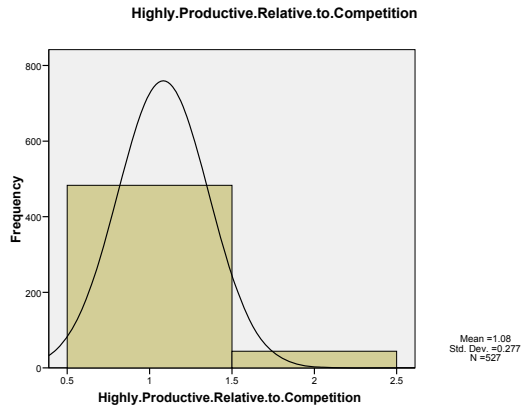
The following tables give the descriptive statistics of the following variables:

- Highly productive relative to competition
- Investment in R&D
- Expense of R&D
- Personal Opinion on whether investment in planning, hiring and employee development, affect labor productivity.

Statistics					
		Highly .Productive Relative. to Competition	Invest.RnD	Expense.RnD	HR.Invest. Effect.on.Labor Productivity
N	Valid	527	527	527	527
	Missing	0	0	0	0
Mean		1.08	1.59	.63	1.20
Std. Error of Mean		.012	.022	.040	.027
Median		1.00	2.00	.00	1.00
Mode		1	2	0	1
Std. Deviation		.277	.504	.917	.629
Variance		.077	.254	.841	.395
Range		1	2	4	3
Minimum		1	0	0	0
Maximum		2	2	4	3

Highly.Productive.Relative.to.Competition

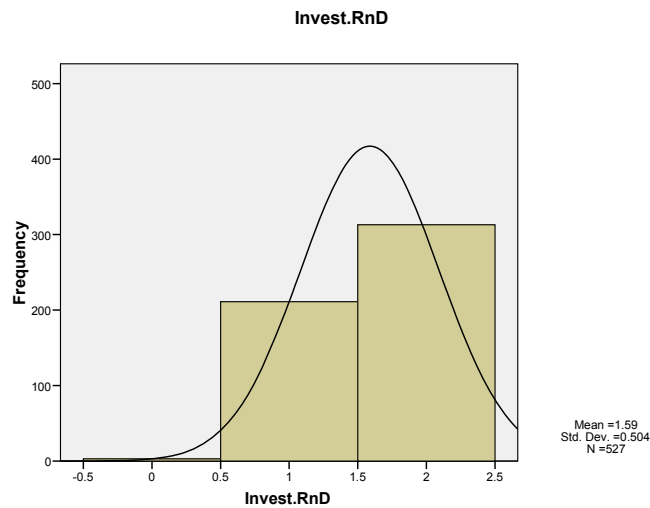
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	483	91.7	91.7	91.7
	NO	44	8.3	8.3	100.0
	Total	527	100.0	100.0	



The above statistics show that 91.7 % of the survey answered that their employees are highly productive relative to competition, which is a very good indication.

Invest.RnD

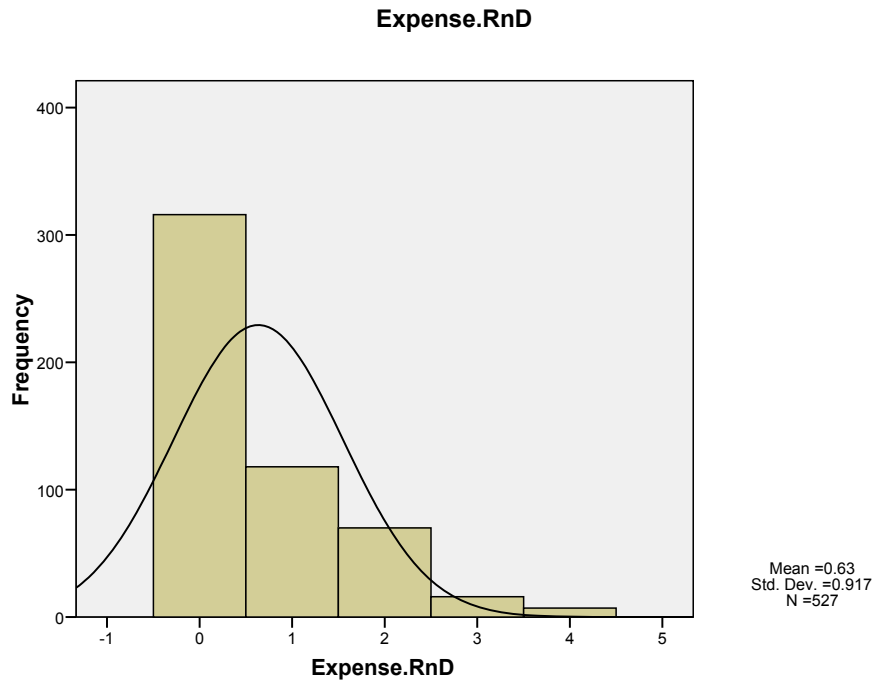
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	3	.6	.6	.6
	YES	211	40.0	40.0	40.6
	NO	313	59.4	59.4	100.0
	Total	527	100.0	100.0	



The above statistics show that only 40 % of the survey answered that their companies invest in Research and Development, whereby more than half of the firms affirmed that they do not invest in R&D at all. These results were expected since very few sectors of the Lebanese Economy consider investment in R&D.

Expense.RnD

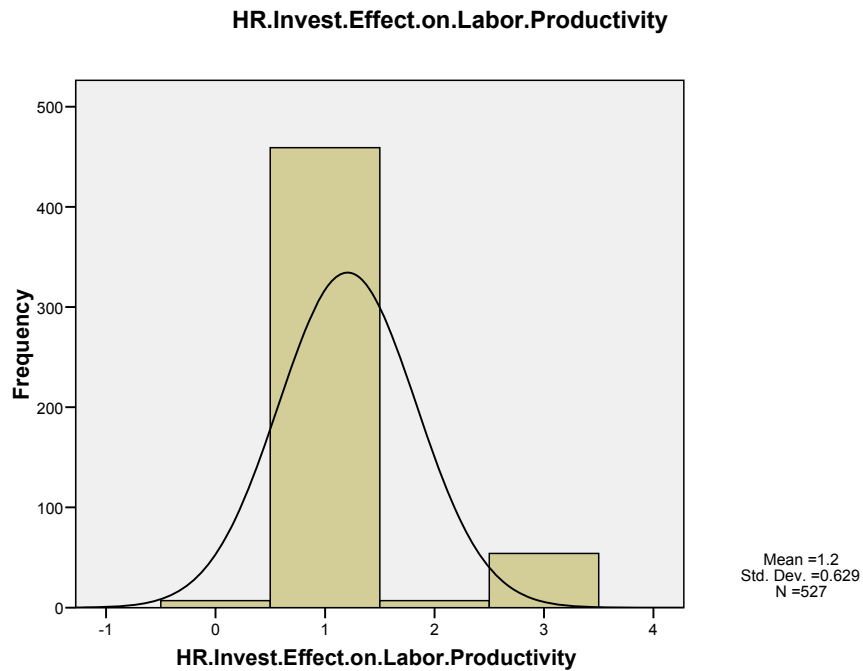
	Frequency	Percent	Valid Percent	Cumulative Percent
Valid No Answer	316	60.0	60.0	60.0
Less than 5 %	118	22.4	22.4	82.4
Between 5.1 % & 10 %	70	13.3	13.3	95.6
Between 10.1 % & 20 %	16	3.0	3.0	98.7
More than 20.1 %	7	1.3	1.3	100.0
Total	527	100.0	100.0	



The above statistics show that out of the 40 % that invest in R&D, the majority spend an amount equivalent to 5 % or less of their total assets on R&D.

HR.Invest.Effect.on.Labor.Productivity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	7	1.3	1.3	1.3
	Positively	459	87.1	87.1	88.4
	Negatively	7	1.3	1.3	89.8
	No Effect	54	10.2	10.2	100.0
	Total	527	100.0	100.0	



The above statistics give the results of the last question in the survey which indicates that 87.1 % affirm that there is a positive relationship between investing in human resource planning, hiring, employee development and labor productivity. Whereby, 1.3 % actually believes that there is a negative relationship between the variables stated and almost 10 % consider that there is no effect between investment in human resource and labor productivity.

Regression Results

The following two tables show the results for model 1:

Model 1 Summary									
Mode	R	R-Square	Adjusted R-Square	Std. Error of the Estimate	Change of Statistics				
					R-Square Change	F Change	df1	df2	Sig F Change
1	.129	.017	.006	248853.236	.017	1.584	5	467	.163

Coefficients of Model 1:

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	38240.471	51770.337		.739	.460
	Formal.Planning.No. of.Employees	10746.134	31628.553	.019	.340	.734
	Formal.Planning.Skills	-46486.5	35176.170	-.075	-1.322	.187
	Formal.Evaluation.Hiring.Policies	45938.510	26778.006	.090	1.716	.087
	Succession.Plans	41155.095	26456.556	.077	1.556	.120
	Career.Path	-30289.2	25309.273	-.060	-1.197	.232

a. Dependent Variable: Labor.Productivity

Model 1 shows that there is a positive relationship between formal planning of number of employees, to formal evaluation of hiring policies and succession plans with labor productivity. On the other hand, there seems to be a negative relationship between formal planning of skills and career path with labor productivity. Moreover, formal evaluation of hiring policies, formal planning of skills and succession plans are more significant than career path and formal planning of number of employees.

$R^2 = 1.7\%$ and the adjusted $R^2 = 0.6\% \Rightarrow$ which means that 0.6% of variation in Labor Productivity is explained by the regression model (Investment in Planning) after taking into consideration the degrees of freedom and the number of independent variables.

The following two tables show the results for model 2:

Model 2 Summary									
Model	R	R-Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig F Change
1	.129	.017	-.010	253091.365	.017	.636	12	451	.811

Coefficients of Model 2

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-150592	218878.7		-.688	.492
	No.Candidates. Interviewed	863.092	683.118	.060	1.263	.207
	S1	15370.878	25547.107	.031	.602	.548
	S2	26592.430	28978.300	.048	.918	.359
	S3	1348.065	47808.626	.001	.028	.978
	S4	13268.511	58344.400	.011	.227	.820
	S5	29918.882	29116.190	.052	1.028	.305
	S6	-29099.8	27292.991	-.055	-1.066	.287
	S7	41721.372	52681.889	.038	.792	.429
	Selection.Test.Skills.Test	-8372.291	26321.612	-.016	-.318	.751
	Selection.Test.Aptitude. Test	-1194.310	32191.006	-.002	-.037	.970
	Selection.Test. Behavioral.Test	7820.584	25694.718	.015	.304	.761
	Selection.Test.Medical. Exam.Test	19733.744	38597.675	.026	.511	.609

a. Dependent Variable: Labor.Productivity

Model 2 shows that there is a positive relationship between the number of candidates interviewed, employee referrals (*labeled as S1*), graduate and undergraduate institutions (*labeled as S2*), search firms (*labeled as S3*), private and governmental employment agencies (*labeled as S4*), walk-ins (*labeled as S5*), internet advertisements (*labeled as S7*), behavioral selection test and medical selection test with labor productivity. On the other hand, there seems to be a negative relationship between newspaper advertisement (*labeled as S6*), skills selection test and aptitude selection test with labor productivity. Moreover, number of candidates interviewed is the most significant variable, whereas search firms (*labeled as S3*), is the least significant.

$R^2 = 1.7\%$ and the adjusted $R^2 = 1\% \Rightarrow$ which means that 1% of variation in Labor Productivity is explained by the regression model (Investment in Hiring), after taking into consideration, the degrees of freedom and the number of independent variables.

The following two tables show the results for model 3:

Model 3 Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig F Change
1	.093	.009	.002	252843.574	.009	1.328	3	453	.811

Coefficients of Model 3

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12257.358	44469.364		.276	.783
	Training.Employees	-1038.418	27577.693	-.002	-.038	.970
	Promotion.From.Within	46698.696	24179.628	.092	1.931	.054
	No.Formal.Trainings	-118.670	385.833	-.014	-.308	.759

a. Dependent Variable: Labor.Productivity

Model 3 shows that there is a positive relationship between promotions from within and labor productivity. On the other hand, there seems to be a negative relationship between training of employees and number of formal trainings with labor productivity. Moreover, the only significant result among the above three variables is promotion from within.

$R^2 = 0.9\%$ and the adjusted $R^2 = 0.2\%$ => which means that 0.2% of variation in Labor Productivity is explained by the regression model (Investment in Employee Development), after taking into consideration the degrees of freedom and the number of independent variables.

Contribution

This study is based on previous research by Koch and McGrath in the year 1996 that is conducted in the United States of America. However, the contribution of this study will be its implementation to the Lebanese market across various sectors. This is the only study conducted in Lebanon on the topic and considering the variables studied in the paper.

Significance

Today, Human Resource management is becoming more and more an imperative contemporary issue. The field of HR in Lebanon is relatively understudied. The importance of this study is that it covers a significant number of Lebanese Economic sectors with multiple explanatory variables.

DISCUSSION AND CONCLUSION

The study was conducted using a sample of 527 which is considered a good sample representing the Lebanese population; had the study covered a bigger sample size (population), it would have yielded better results. Moreover, the lack of statistical data in Lebanon made this study solely rely on questionnaires that might not be taken seriously by some respondents, and might have eventually led to biased results.

The study shows that there is a positive relationship between promotions from within and labor productivity. On the other hand, there seems to be a negative relationship between training of employees and number of formal trainings with labor productivity. Moreover, the only significant result among the above three variables is promotion from within.

This study contributes to considering the effect of participative leadership (which involves delegation, empowerment, and joint decision making) on employee motivation, loyalty, self-esteem, work attitudes (hence, on employee behavior as a whole), in organizations in Lebanon. The results that this paper came up with, clarify the nature of these relationships. In light of these results, and after testing for each variable alone, testing for the overall significance proved that there is a positive relationship between delegation, empowerment, joint decision making and employee behavior (measured by employee motivation, loyalty, self-esteem, and work attitudes). Delegation was the most statistically significant variable in this study.

In short, it can be clearly shown that participative leadership (particularly delegation) plays a crucial role in positively affecting the overall behavior of the employee in an organization in Lebanon.

Limitation of the Study

As previously discussed, some of the Lebanese Economic sectors were either not represented or poorly represented (example, Energy and water). In addition, when computing the Labor productivity in terms of the average net sales, quantitative figures were missing on the questionnaire. Instead, they were substituted by ranges and the average per range was computed when inputting the data to the SPSS. However, both the upper and the lowest brackets were not represented in terms of averages, but in terms of upper or lower boundaries correspondingly.

Recommendations

It is of great importance that thorough future research is conducted to reinforce Human Resource Management in Lebanon in particular and the Middle East in general. Moreover, the belief in the effect of investing in Human Resource that would lead to increase in Labor productivity should be more elaborated and examined. Thorough research is needed so that the study comes up with better, more accurate and more significant results.

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ISSUES IN INNOVATION FOR NORWEGIAN SMES

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ABSTRACT

Innovation is frequently viewed as the key to success in many arenas, from individual businesses to a nation's general economic growth. Business performance has been linked to overall innovativeness (Akgun, Keskin, Byrne & Aaren, 2007). In a study of British SMEs, innovative firms were more likely to be operating profitably while non-innovators were more likely to be struggling (Gray, 2006). It is not surprising, then, that innovation is seen as a vital element in economic growth in Norway (Norwegian Ministry of Trade, 2010). Similar to many other nations, Norway is dominated by small and medium-sized businesses (Norwegian Ministry of Trade, 2010). SMEs face increases challenges in innovating due to their small size and limited resources. According to Eurostat (2009), larger companies are more likely than SMEs to control the resources necessary for innovation, including human and financial capital. This study uses data from the Eurostat Community Innovation survey to more closely examine innovation by analyzing the self-reported effects of innovation on Norwegian SMEs and comparing these to the effects reported by businesses with 250 or more employees.

INTRODUCTION

Innovation is frequently viewed as the key to success in many arenas, from individual businesses to a nation's general economic growth. It is seen as a vital element in economic growth in Norway (Norwegian Ministry of Trade, 2010), where the economy is dominated by small and medium-sized businesses (Norwegian Ministry of Trade, 2010). SMEs, however, face significant challenges in their attempts to innovate due to their small size and limited resources. According to Eurostat (2009), larger companies are more likely than SMEs to control the resources necessary for innovation, including human and financial capital.

This study uses data from the Eurostat Community Innovation survey to more closely examine innovation by analyzing the self-reported effects of innovation on Norwegian SMEs. These reports effects are compared by business size, including small (10-49 employees), medium (51-249 employees) and large (250 or more employees) businesses. In the next section, a brief review of the motivation for innovation is presented, followed by the methodology, results and analysis of this study.

THE IMPORTANCE OF INNOVATION

Innovation is a dynamic process which can adapt as necessary to deal with changes in resources, technology or economics or even changes in a firm's expectations for innovation (Australian Institute for Commercialisation, 2011). According to Tony Blair, "Innovation is absolutely essential to safeguard and deliver high-quality jobs, successful businesses, better products and services for our consumers, and new, more environmentally friendly processes" (Gannon, 2007). Business performance has been linked to overall innovativeness as innovative firms are up to twice as profitable as other firms (Akgun, Keskin, Byrne & Aaren, 2007; Gannon, 2007; Gilmore, 2009; Tidd, Bessant & Pavitt, 2005). In a study of British SMEs, innovative firms were more likely to be operating profitably while non-innovators were more likely to be struggling (Gray, 2006). Charan and Lafley (2008) contend that innovation not only promotes growth but also enhances a variety of capabilities that improve the ability to enter markets and attract customers. They state that by discovering new ways of doing things, employees also become more energized and productive, further leading to improvements in financial performance.

Product or service development may be the most familiar form of innovation, but other types include processes, logistics, marketing and business model innovation (Australian Institute for Commercialisation, 2011; Charan & Lafley, 2008). Developments in the internet that have allowed companies to expand their marketing channels to include websites are a prime example of marketing innovation. Strategic partnership that allow for collaboration with clients, distributors and suppliers represent innovation in business models.

Both the strategy for innovation and the measure of success for innovation is based on a firm's motivation for innovation (Australian Institute for Commercialisation, 2011). Without clear goals for innovation, commercialization of the results of innovation is not likely (Fischer, Polt & Vonortas, 2009). It is also important to determine partners' motivation for innovation. If a partner's goals are not being achieved, enthusiasm will wane and future collaboration could be endangered.

According to the Australian Institute for Commercialisation (2011), common goals for innovation include developing a new product, selling or licensing the results of innovation, protecting or expanding market share, increasing recognition in the marketplace, better retaining staff and improving operational efficiency. Similarly, the report to Nordlandsforskning by Madsen and Brastad (2005) regarding Innovation Norway showed that among those Norwegian firms that received financial assistance in innovation, product development was the most common area of increase competence, followed by production processes, market development, use of advanced technology, organization and management, and national and international network development.

COLLABORATION FOR INNOVATION

Network collaboration is highly important in innovation because innovation itself is a social process (Australian Institute for Commercialisation, 2011; Charan & Lafley, 2008). A study of Australian businesses showed that collaboration was related to a 70% increase in the chances for creative innovation (Australian Institute for Commercialisation, 2011). One reason for this is that many ideas come from outside the company (Gilmore, 2009). An IBM survey of CEOs found that employees were the primary source of innovative ideas, followed closely by business partners and customers (Australian Institute for Commercialisation, 2011). In an Australian study, customers were the most frequently listed collaboration partners, followed by suppliers, competitors, investors and universities (Australian Institute for Commercialisation, 2011). In a study of Norwegian firms, the source of innovation most often deemed highly important to innovation was the enterprise itself, followed by customers and suppliers (Robinson & Stubberud, 2010). Although competitors ranked low in that study, they can be a source of effective cooperation partners (Charan & Laflan, 2008).

A study regarding the impact of European Framework Programmes for Research and Development found that participating innovative firms were significantly more networked with customers and with universities than average (Fisher et al., 2009). Whereas a high quality network can lead to new ideas that blossom and bear fruit, a shortage of links with external parties can lead to a reduced number of ideas for innovation (Australian Institute for Commercialisation, 2011). This is especially important in the modern era of globalization where easy access to information can make it difficult to obtain and maintain competitive advantages. Despite the importance of collaboration, a focus on networking as an end goal can be less successful in terms of generating new knowledge compared to a focus on achieving commercial objectives (Fisher, et al., 2009). This suggests that networking may best be viewed as a means to an end rather than as an end in itself.

This study examines the reported effects of innovation, focusing on concrete results such as increased ranges or improved qualities of products and processes and reduced costs. In the following section, the results of this study are presented and analyzed.

METHODOLOGY, RESULTS AND ANALYSIS

Data for this study were obtained from the Eurostat Community Innovation survey. This 2004 survey collected data about innovation activities that occurred during the 2002-2004 period. As shown in Table 1, 3,233 innovative Norwegian firms were included in this study, and of them, 2,254 were considered small (10-49 employees), 753 were categorized as medium-sized (50-249 employees) and the remaining 215 were large (250 or more employees). This study examines the “highly important effects of innovation” as reported by the participants as well as the issues and problems these innovative companies reported.

TYPE OF FIRM	10-49 EMPLOYEES	50-249 EMPLOYEES	250 OR MORE EMPLOYEES	TOTAL
Enterprises with innovative activities, number	2,265	753	215	3,233
Enterprises with innovative activities, % of total	32.4%	53.5%	63.4%	37.0%
Total firms	6,988	1,408	339	8,735
Size of firm, percentage of total firms	80.0%	16.1%	3.9%	100%

Two facts become immediately apparent when analyzing the data in Table 1. First, the vast majority of the firms that participated in this survey were small, as is common in most countries. Second, only 3.9% of the firms in the study were large, but 63.4% of them were engaged in innovative activities. Medium-sized companies were more similar to large than to small firms in terms of percentage of companies in the survey (16.1%) and in terms of the proportion of firms in that size class that engaged in innovation (53.5%). Only those firms that were innovative were included in the analysis of effects of innovation and the problems in attempting to innovate discussed in this study.

As shown in Table 2, product and service development was the innovation effect reported to be highly important to the most business owners. Increased range of goods and services and increased quality of goods and services were reported by almost one-quarter of respondents. A smaller proportion of medium-sized businesses reported these two effects, with improved quality (21.9%) being reported 1% more often than increased range of goods and services (20.9%). In a trend that shows a decline in the likelihood of reporting this effect as the business size grows, only 16.7% of large businesses deemed increased range of goods and services a highly important effect, while 20.9% reported increased quality. These data show a difference of 7.8% between small and large businesses (24.5% vs. 16.7%) reporting increased range of goods and services as a highly important effect and a 3.5% difference (24.4% vs. 20.9%) for increased quality of goods and services.

Entering new markets or increasing market share was also found to be a more commonly reported effect of innovation for small businesses (17.0%) than for large businesses (11.6%), and to a moderate extent for medium-sized businesses (15.4%). It could be that SMEs benefitted more from innovation or perhaps the large businesses were already in many markets or had a large market share and therefore did not experience the increase to be highly important in relation to what they were already doing.

TABLE 2: HIGHLY IMPORTANT EFFECTS OF INNOVATION BY BUSINESS SIZE

EFFECT	10-49 EMPLOYEES	50-249 EMPLOYEES	250 OR MORE EMPLOYEES
Increased range of goods and services	24.5%	20.9%	16.7%
Improved quality in goods or services	24.4	21.9	20.9
Entered new markets or increased market share	17.0	15.4	11.6
Improved flexibility of production or service provision	14.0	12.5	13.0
Met regulation requirements	13.0	10.9	11.6
Increased capacity of production or service provision	12.8	15.3	12.6
Reduced labor costs per unit output	9.2	11.3	13.5
Reduced environmental impacts or improved health and safety	7.5	8.9	12.1
Reduced materials and energy per unit output	3.6	5.2	7.9

Large differences were not evident between companies of different sizes in terms of improved flexibility of production or service provision and increased capacity of production or service provision, although it should be noted that medium-sized enterprises were the most likely to report increased capacity. It could be that these medium-sized businesses took a significant step towards becoming large businesses. They were the least likely to see meeting regulation requirements as a highly important effect, but this difference was fairly small.

This trend of more small businesses and fewer large businesses reporting a given effect reverses itself when examining effects related to reductions in various factors. Reduced materials and energy per unit output was reported by 7.9% of large businesses, but only 5.2% of medium-sized businesses and 3.5% of small businesses. This reduction may be related to the reduced environmental impacts or improved health and safety effects as well as reduced labor costs per unit, both of which were highest amongst large businesses. In fact, reduced labor costs were the third most commonly cited effect among large businesses. Reduced costs may be especially important to large businesses because they are likely to be producing a greater volume of products or services than SMEs, meaning that a small reduction in cost could lead to a significant change in profits.

Large businesses were apparently more likely to start innovative projects, although not necessarily bring them to fruition (see Table 3). This could be a reason that a much higher proportion of larger businesses than small businesses are in the “innovative” category. Only 6.4% of small business and 5.7% of medium-sized businesses reported abandoning innovation activities at the concept stage, compared to 11.2% of large businesses. The gap becomes even larger when examining innovation activities abandoned after they began as 21.4% of large businesses reported this, compared to 8-10% of SMEs. However, small and medium-sized firms

were considerably more likely to report that their innovation activities were delayed (18.2% and 17.8%) than abandoned. A similar proportion of large businesses reporting delayed innovation (22.8%) as abandoned after it began (21.4%). These results point to the difficulty of seeing innovative ideas through the entire process from idea to market.

INNOVATION ISSUES	10-49 EMPLOYEES	50-249 EMPLOYEES	250 OR MORE EMPLOYEES
Innovation activity abandoned at the concept stage	6.4%	5.7%	11.2%
Innovation activity abandoned after it began	8.0	9.8	21.4
Innovation activity seriously delayed	18.2	17.8	22.8
No need to innovate due to prior innovation	0.7	1.1	1.9
No need to innovation because no demand for innovations	1.0	1.2	1.9

Without more detailed data about the number of projects attempted, it is difficult to determine whether SMEs were significantly more successful in seeing innovation projects through to completion, as the data initially indicate. It is possible that SMEs are more cautious with their innovation attempts and do not proceed even to the concept stage unless a project looks favorable from the outset. That is, small firms with fewer resources may be more risk-averse. On the other hand, if large businesses take more risks in considering new innovations, a higher number of potential innovations could lead to a higher number of abandoned activities. Very few companies of any size reported that they saw no need for innovation, showing that both SMEs and large businesses recognize the importance of innovation.

The specific problems reported most commonly by companies of different sizes tended to vary somewhat based on firm size, as shown in Table 4. Looking down the column showing the problems reported by firms with 250 or more employees, it is clear that, overall, large firms were less likely to say that they experienced problems (in innovation) of any type. However, the problems dealing with costs and funding were the problems reported most often by all firms. Except for lack of funds from sources outside the enterprise, in which medium-sized businesses were the least likely to report this as a problem (8.9% compared to 10.2% for large businesses and 12.8% for small businesses), large firms were the least likely to report problems with funding and costs. Small businesses, on the contrary, were almost twice as likely to consider innovation costs too high (18.3%) compared to large businesses (9.8%). Lack of funds (both within and outside of the enterprise) was also a bigger problem for small businesses. This makes intuitive sense given that small businesses tend to have fewer resources in the firm, and that external funding sources such as banks are usually more willing to provide financing for larger companies.

TABLE 4: HAMPERED INNOVATION ACTIVITIES BY BUSINESS SIZE

PROBLEM HAMPERING INNOVATION	10-49 EMPLOYEES	50-249 EMPLOYEES	250 OR MORE EMPLOYEES
Innovation costs too high	18.3%	13.0%	9.8%
Lack of funds within the enterprise	14.6	11.4	9.8
Lack of funds from sources outside the enterprise	12.8	8.9	10.2
Uncertain demand for innovation goods or services	9.0	6.5	6.5
Markets dominated by established enterprises	6.4	4.3	2.8
Lack of qualified personnel	6.9	3.7	5.1
Difficulty in finding cooperation partners for innovation	2.3	1.5	2.3
Lack of information on technology	3.2	1.6	1.9
Lack of information on markets	3.1	2.5	1.9

Two problems, uncertain demand and markets dominated by established enterprises, were also experience by more small businesses than by firms of other sizes. It is no surprise that only 2.8% of large businesses compared to 4.3% of medium-sized businesses and 6.4% of small businesses reported that the markets were dominated by established enterprises given that larger businesses would most likely be the ones dominating the markets. However, given that a relatively small proportion of SMEs reported this problem, this issue is not as widespread as problems related to innovation cost and lack of funds. The fact that more small businesses reported uncertain demand (9.0% compared to 6.5% of medium and large businesses) may be related to the data regarding abandoned activities shown in Table 2. If small business owners perceived that there is not a certain demand for a new or improved product or service, they may be less likely to start a projects in the first place.

The lack of qualified personnel was experienced by more small businesses (6.9%) but medium-sized business (3.7%) was the least likely to report this problem as 5.1% of large businesses reported it. This could be an indicator that small businesses have difficulty attracting people who are willing to work in a company with 10 or fewer employees, possibly because of perceived limits on a potential employee's future in a small company. On the other end of the spectrum, large businesses may experience problems in attracting enough qualified applicants given the need for a greater number of people. Medium-size enterprises seem to be in a sweet spot where they are perceived to be large enough to be attractive employers but not so large that they cannot find enough qualified employees.

While qualified personnel represent human resources within the firm, cooperative partners in innovation represent a form of human resources outside the firm. Collaboration with others has been shown to be important to innovation (Australian Institute for Commercialisation,

2011; Charan & Lafley, 2008; Fischer et al., 2009), but the firms in this study have either found the partners they need or are not as dependent on collaboration for success in innovation. Indeed, this confirms the results of the Norwegian study (Madsen & Brastad, 2005) that found that the development of networks ranked at the bottom of the list for increased competence resulting from the Innovation Norway program. A rival theory to this is that businesses do not realize how much more effectively they could innovate if they collaborated with others. Because they do not realize that results could be better with cooperative partners, they do not identify the lack of networks as a problem.

Finally, the lack of information on technology or on markets was reported as a problem by few companies of any size. Given that uncertain demand was seen as hampering innovation by 9.0% of small businesses and 6.5% of medium and large businesses, a lack of information about markets may be a more significant problem than these companies realize. With increased information, uncertainty could decrease, and innovation activities could be more successful as consumers needs are better met by new or improved products and service.

CONCLUSIONS

The findings of this study suggest that although small businesses are the least likely to be engaged in innovation overall, they are the most likely to benefit from innovation when looking at increasing the range of goods and services produced and the quality of those goods and services. In addition, small businesses are also more likely to report that their entrance into new markets or increased market share as well as improved flexibility of production or service provision were highly important effects of innovation.

These findings echo the results of another study conducted in Europe. According to the study of European Framework Programmes for Research and Development (Fisher et al., 2009, p. 8, 10), “SMEs demonstrate more economically driven objectives (innovation, commercialization and market related) than large companies” although medium-sized companies seemed to reap the greatest benefits from innovation through participation in this program. Large businesses in that study were apparently the least successful project participants in regard to product or process innovation. In this study of Norwegian firms, large businesses were the most likely to report reduced costs, and environmental impacts were also deemed highly important effects, but large firms were also less likely to report positive effects related to markets and new or improved products.

A suggestion emerging from analysis of this study’s results concerns the funding for small businesses. Given that high innovation costs and a lack of funds were problems for a greater proportion of small businesses than for large businesses, a modest amount of assistance might result in significant results. Small businesses were less likely to abandon projects, and may therefore be more successful in bringing projects they start all the way to fruition. Education

programs providing information on the usefulness of collaboration, and, in fact, the practical application of market information, might also improve the results of innovation.

A significant limitation to this study was that it could not connect data from one time period to another. It would have been useful to compare previous costs and product and service ranges with those reported after innovation. Qualitative research examining the entire context for innovation, including why companies do and do not innovate, future research should examine these issue to determine how small businesses could be encouraged to innovate and increase the chance of success in innovation.

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MANAGERIAL ACCOUNTING AS A TOOL FOR CORPORATE STRATEGY: SYNERGY CREATION AND ANERGY INHIBITION

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ABSTRACT

This paper addresses how some Japanese companies attempt to create synergy by aligning their corporate headquarters strategy with those of their business units and divisions. In addition to synergy creation, anergy (opposite of synergy) inhibition is considered of equal importance to corporate strategy. The authors have explored new styles of alignment based on Japanese corporate case studies. The common thread of these companies was their implementation of the balanced scorecard (BSC) in order to ensure alignment and include Ricoh, Sharp, and Mitsubishi Tokyo UFJ.

At Ricoh, corporate strategy is formulated around financial goals with the BSC used as a strategic goal management system in order to achieve these goals. Sharp's functional headquarters (HQ) formulated the synergy and anergy inhibition for business offices using BSC and strategy maps. The functional headquarters' strategic goals were disseminated throughout its business offices. At Mitsubishi Tokyo UFJ, each section is required to provide its input by constructing its strategic maps and communicate them to the Corporate HQ. Building on this feedback, the HQ formulates a corporate strategy from a company-wide perspective and constructs a strategic map in order to cascade the corporate strategic goals down the business units' levels. Two major insights were drawn from these case studies. First, the HQ cannot achieve synergy by focusing solely on financial aspects and ignoring other potential sources of synergy (such as customer and operations- driven synergies) as illustrated by Ricoh's case. Second, Sharp and Mitsubishi Tokyo UFJ cases demonstrate that synergy creation, and anergy inhibition cannot be successful unless the HQ and its business units are deeply involved in the process of devising various business strategies.

INTRODUCTION

There is no academic consensus on how managerial accounting can be used as a tool to formulate and implement a corporate strategy. For instance, Anthony (1965) advocates the use of managerial accounting information to implement managerial control systems thereby monitoring whether the company is on track towards achieving its strategic goals. Other scholars, however, have expressed doubts over the usefulness of management accounting tools, such as Activity-

based Costing (ABC) and the Balanced Scorecard (BSC), to achieve that purpose (Chapman, 2005, pp. 3-4). Working with many companies throughout the last two decades or so, Kaplan and Norton (1996a, 1996b, 2006, and 2008) argue that the BSC may be used as an effective management control system that enables strategy implementation. Skaerbaek and Truggestad (2010) went further to suggest that accounting tools can even shape the strategic options of the company. Most recently, aligning the corporate strategy with its business units' strategies has increasingly drawn attention among scholars and practitioners alike (Kaplan and Norton, 2006).

Much of the debate over the rationale behind a corporate strategy has been centered on two issues: synergy creation and product portfolio management. For example, Ansoff (1969) maintains that corporate strategy should be devised with synergy creation in mind. Hofer and Schendel (1978) advocate the formulation of corporate strategy while focusing on product portfolio management. Campbell et al (1995) argue that the creation of synergy is only effective when leveraging common practices and processes among related businesses. For Ito (2007), corporate strategy is crucial not only for the creation of synergy but also for corporate level management by ensuring that corporate value is not eroded.

Based on an explorative study of three Japanese companies, this study investigates the effectiveness of the BSC in disseminating the corporate strategy and enhancing the alignment between the corporate level and the business units as advocated by Kaplan and Norton (2006). The alignment is approached with the ultimate objective of creating synergy¹ and/or inhibiting anergy².

The paper is organized as follows. The first section is devoted to the survey of the literature. In the second section, the authors illustrate the different types of alignment they encounter through exploration of three Japanese companies. The third section will conclude.

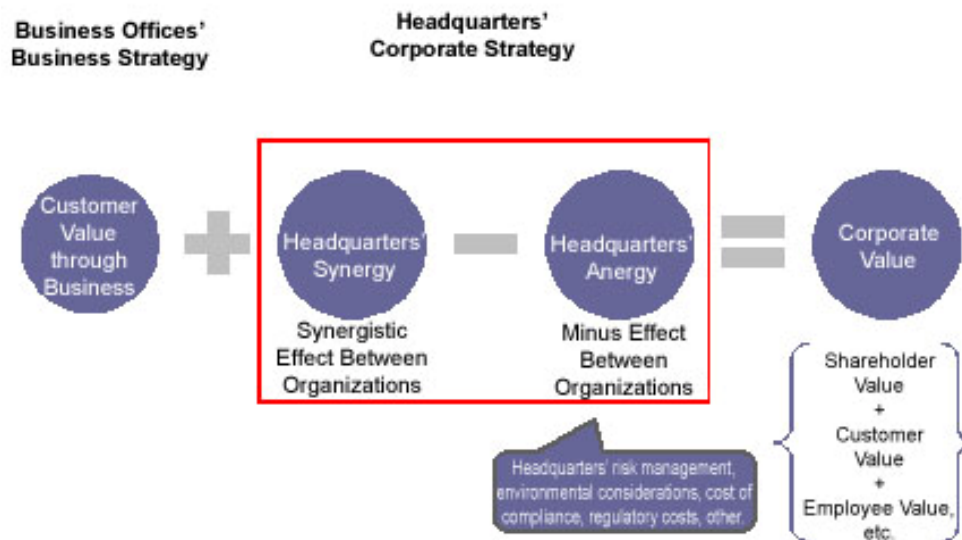
LITERATURE REVIEW

The creation of synergy has sparked a long debate among scholars. Some authors are very skeptical about the effectiveness of the HQ in laying the grounds for synergy creation. They argue that synergy cannot be achieved unless the opportunities on the ground really arise; it should not be imposed by top management. For instance, Goold & Campbell (1998) argue that corporate executives are so obsessed by the potential benefits of synergy that they end up overlooking the downsides. Eisenhart and Galunic (2000) maintain that business units should co-evolve in order to reap the benefits of the opportunities of synergy as they arise. They argue that through frequent meetings and information sharing, business units operating in a dynamic market, rather than the HQ, are in a better position to leverage the opportunities to create value.

Based on their studies of several companies, Kaplan and Norton (2006) argue that the BSC has helped in capturing the benefits of alignment. It did so by translating the corporate strategy into corporate policies administered by business units. Priorities of the corporate strategy are then cascaded down the business units to ensure that the business unit's objectives

and measures are synchronized with those of the corporate. They add that an alignment index—the extent to which corporate goals are aligned with business unit’s goals—will help facilitate the alignment process. Enterprises that successfully align their corporate, business units and operating support strategies are deriving greater financial benefits.

Figure 1: The Rules of Corporate Strategy and Business Strategy in Corporate Value Creation
(source Ito, 2007)



Drawing on extensive field research and case studies across many industries, Kaplan and Norton (2006) argue that value creation for the company as a whole derives from the value proposed by the business units to their customers. Simons (2000) warns against strategic risks which he defines as unpredictable events and conditions that broadly reduce the abilities of corporate executives in successfully implementing business strategies. In the same vein, Ito (2007) argues, as illustrated by Figure 1, that anergy, contrary to synergy, has been overlooked by corporate top managers. Anergy can be defined as the hidden factors that either inhibit the creation or contribute to damage the corporate value of the company. For example, Kaplan & Norton (2004, 2006) maintain that anergy will occur when the corporate level, through their inefficiency and lack of alignment process coordination with its business units will simply add up to the cost of running these separate business units.

The BSC as a Tool for Alignment

Studying diversified British companies, Goold and Campbell (1987) identified three approaches of managing strategy and ensuring alignment: financial control, strategic planning, and strategic control. Financial control is a bottom up approach where business units are in

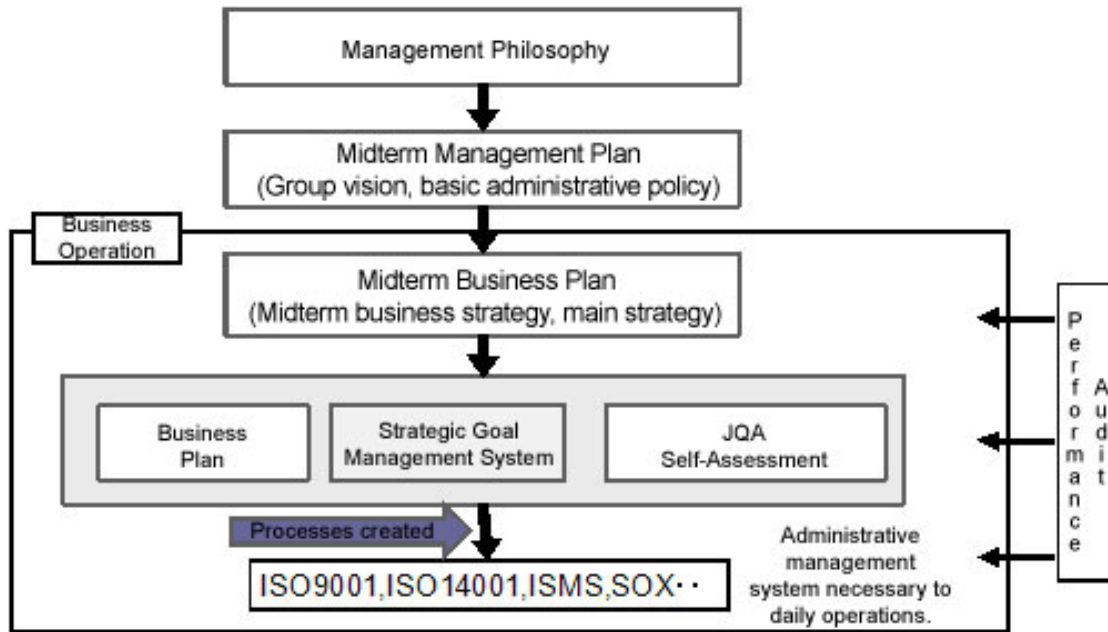
charge of devising their strategies while the HQ uses the budget to monitor and control the implementation of these strategies. Strategic plan is a top-down approach where the HQ is deeply involved in the business offices' strategy formulation while leveraging the benefits of synergy. The third approach is hybrid- middle-up-top-down- in the sense that it attempts to capture the benefits of the two first approaches. The following section illustrates these different approaches by exploring three Japanese companies. Further, the cases illustrate how the BSC has been used to help the alignment process.

Bottom-up Alignment

Ricoh Company, Ltd. (hereafter referred to as "Ricoh"), which introduced its strategic goal management system in 1999, is among the companies using this "bottom-up" alignment approach whereby its business offices use the BSC to construct their strategies while the corporate HQ attempt alignment with the business offices through the use of budgeted targets. That is, how business offices are doing in relation to financial targets.

According to the midterm business plan, which is in turn derived from the midterm management plan (see Figure 2), the financial goals set by the HQ consist of 2.5 trillion Yen of consolidated net sales, firm-wide profits amounting to 250 billion Yen, an operating profit ratio of 10%, an return on equity (ROE) ratio target of 12.5%, and a dividend payout ratio of 30%. These mid-term business plan goals are cascaded down into the annual business plan, the strategic goal management system, and the Japan quality award (JQA) self assessment. The annual business plan goals are then translated into quarterly goals. The Strategic goal management system, featuring the BSC, puts emphasis on critical measures and monitors the progress towards the achievement along these measures. Finally, The JQA self assessment is concerned with issues related to the delivery of value proposed to the customer. Those three systems features the Plan Do Check Act (PDCA) cycle where the strategic goal management system attempts to achieve the strategic goals laid down in the business plan and the JQA self assessment gauges the progress toward achievement of these goals and whether the progress is translated into improved financial figures.

Figure 2: Ricoh Corporate Strategy and Business Strategy
 (Source: internal documents provided by Ricoh)



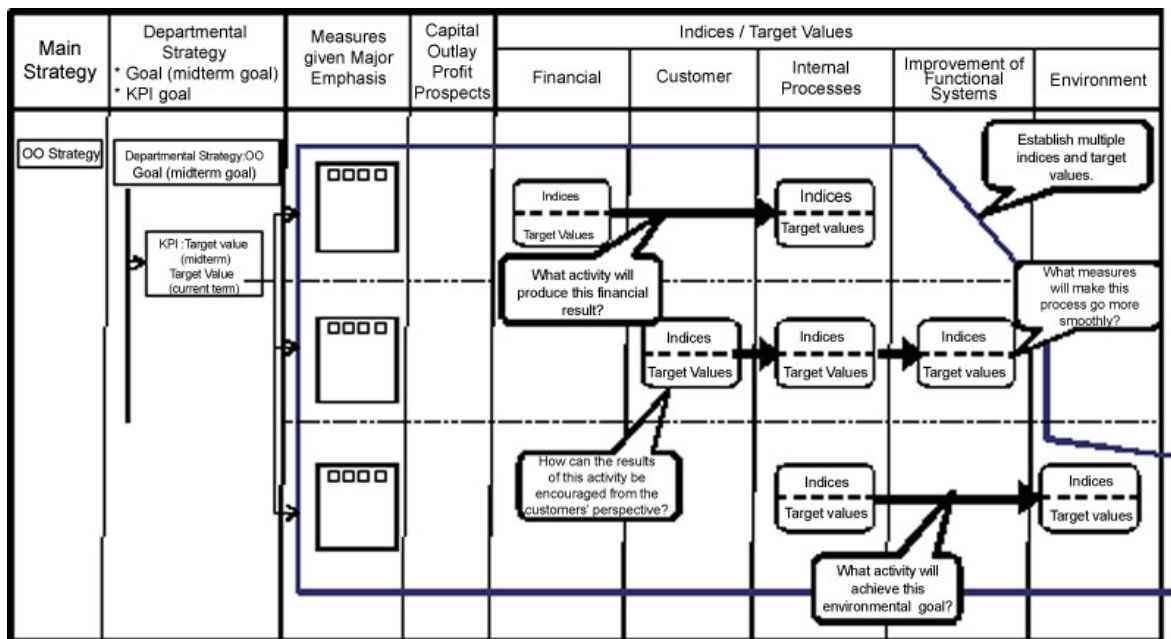
When establishing annual earnings goals according to a business plan, first financial goals are established for each of the functional departments: development, production and sales. Next, in order to fulfill business strategy, the financial goals of the functional departments are cascaded down to strategic business units (SBU), as shown in the matrix of the three SBUs (A, B and C) and the functional systems displayed in Figure 3. In short, the horizontal functional system goals are developed into the vertical SBU financial goals. In order to achieve these financial goals, each SBU developed its BSC based on five perspectives, as shown in Figure 4.

Figure 3: SBU and Functional Systems Matrix
 (Source: Materials provided by Ricoh 2008)

Business Plan		Strategic Goal Management System			
		SBU -A	SBU -B	SBU -C	Operating Profits
Functional Systems	SBU				
	Development				
	Production				
	Sales				
Operating Profits					

In order to fulfill the financial goals planned by HQ, as shown in Figure 4, each SBU crafts its business strategy by developing a BSC that sets targets along these goals. For example, in order to fulfill the strategic goal of expanding the sale of a certain product, critical indicators (i.e. indices and values), such as created business value, improvement of assets efficiency, acquisition of market share and reduction of environmental burden (measured by the energy efficiency and amount of CO2 emission) are monitored. The business plan goal is considered met when the level of these critical indicators are in line with the financial goals set by the corporate HQ.

Figure 4: Ricoh’s Strategy Development (Source: Materials provided by Ricoh, 2008)

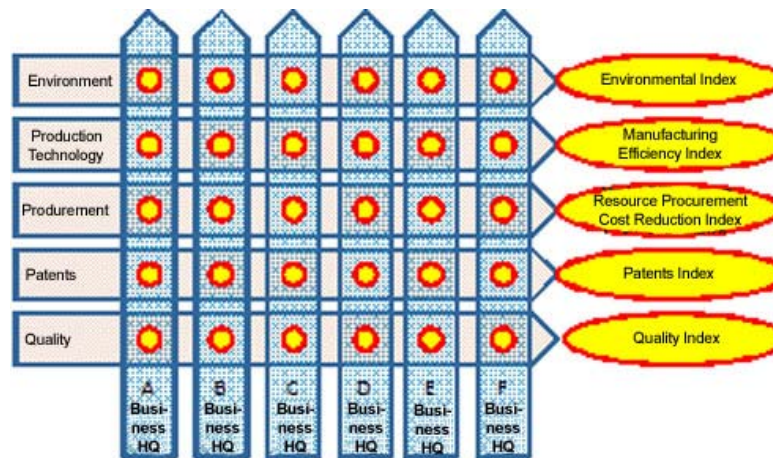


Top-Down Alignment

At Sharp Corporation (hereafter referred to as “Sharp”), a company that follows a “Top-down” approach, the HQ attempts to align with its business offices by being deeply involved in the formulation of business strategy. Sharp HQ is composed of functional headquarters, administrative headquarters, and business headquarters. As shown in figure 5, the functional headquarters are comprised of environment, production and technology, procurement, patents, and quality. Since these functional headquarters are in charge of alignment, they are required to devise their own BSC and construct their strategy maps along four perspectives. Accordingly, corporate strategic goals are set by the functional headquarters. For example, strategic goals and target values for CO2 reduction are established by the environmental function at the HQ and are

then communicated, through the BSC, to all business units, which in turn, are required to achieve them.

Figure 5: Synthesis of Sharp's Functional Headquarters and Business Headquarters
(Source: Materials provided by Sharp, 2008)



Middle-Up-Top-Down Alignment

“Middle-up-top-down” is an alignment process where the HQ crafts a strategy proposal and sends it for consultation to all managers of the business units and a thorough analysis of vision, strategy, and objectives are carried out. The Bank of Tokyo-Mitsubishi UFJ, Ltd. (hereafter referred to as Mitsubishi Tokyo UFJ) uses this type of management. Mitsubishi Tokyo UFJ was formed in 2006 following a merger between Tokyo Mitsubishi Bank and UFJ Bank. A central strategic theme of Mitsubishi Tokyo UFJ’s BSC is the corporate social responsibility (CSR) which is captured by two corporate objectives: corporate value improvement and value reduction prevention (see Figure 6).

In line with the CSR objectives, important activities are designed to prevent erosion of corporate value (anergy) include compliance, internal control, and information security while improving corporate value is targeted mainly through emphasis on diversity and customers- first service. Specific measures were developed to assess the effectiveness of these activities in achieving the two above-mentioned corporate objectives.

Figure 6. Synthesis of CSR and Strategy
 (Source: Materials provided by Mitsubishi Tokyo UFJ, 2008)

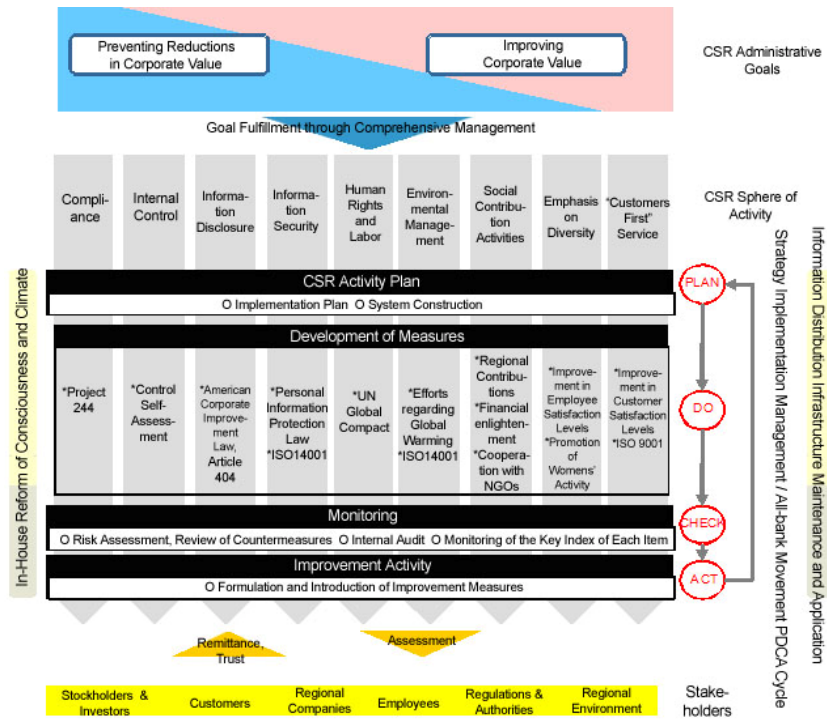


Figure 7 provides a strategy map of corporate strategy at Mitsubishi Tokyo UFJ illustrating the use of the BSC to implement its strategic goals. In order to create a world-renowned general financial group, the company seeks to be ranked among top five worldwide by aiming to be number one in service, reliability and globalization.

The customer perspective, in line with the CSR strategic theme, includes society and environment in addition to its focus on traditional regular customers. The extent of customer satisfaction is monitored to ensure improvement of corporate value while the society and environment dimension aims at preventing value reduction.

Before a strategy map is constructed for corporate strategy, departmental strategy maps are constructed. Departmental strategy maps for the retail sector, legal entity sector, international sector, market sector, business and system sector, and corporate sector are constructed. After a thorough analysis of these strategy maps, the HQ integrate them and then construct a bank-wide strategy map. Communication between HQ and the departments is an important feature of Mitsubishi Tokyo UFJ strategic planning. The group, in charge of strategic planning, plays a coordinating role by synthesizing the various business units' strategies, reflecting them into the corporate-level strategy, and setting critical performance indicators (KPI) and target values. These targets will be monitored and progress towards achieving them evaluated.

Figure 7. Mitsubishi Tokyo UFJ's Strategy Map (Source: Materials provided by Mitsubishi Tokyo UFJ, 2008)

Global Top 5			
*Top Line Growth *Improvement of Outlay Efficiency		*Upgrading of B/S Architecture *Improvement of Capital Efficiency	
No. 1 in Service, No. 1 in Reliability, No. 1 in Internationality			
【Customers】		【Society & Environment】	
*Degree of Customer Satisfaction (Retail, legal entities, overseas)		Internal Degree of Customer Satisfaction (Administration, departments, affiliate companies)	
		Regional Society Global Environment	
Value Creation Process			Value Damage Avoidance Process
RM	PO	Operations	
*Proposal power with regard to customers *Channels *Internal and External Cooperation *Business models, etc.	*Investment bank products *Market-related products *Checkable products *IT products, etc.	*Business operations quality *Productivity & Efficiency	*Governance *Compliance *Internal Control *Information Security *Trust, Market, Op. *Crisis Management
Human Resources and Organizational Culture		Administrative Infrastructure and IT	
*Degree of Employee Satisfaction *Skill, Manpower *Workplace Environment	*Communication *Assessment, Treatment *Career Formation, etc.	*New BIS Support *Strategic ALM *Human Resources System	*Allocated Capital System *IT Governance *CRM System, etc.

CONCLUSION

At Ricoh, which uses the “bottom-up” approach where the responsibility for crafting the strategies rests on the shoulders of business units while the corporate HQ control through financial goals included in business plans. While this form of management enables the HQ to weed out unprofitable projects, it does not capture the advantages of synergy. Focusing narrowly on financial aspects may blind the corporate to other non financial aspects, which are equally important, and induce the HQ to failure in leveraging of other forms of synergies such as shared resources between business units, coordinating customer relationship etc...

The “top-down” approach adopted by Sharp the company-wide midterm plan is communicated through the BSC and the functional headquarters’ strategy map. Functional HQ focus is boiled down to five strategic themes including environment, manufacturing technology, procurement, patents, quality. These themes were well aligned with the perspectives of the BSC. However, any attempt to create synergy is impeded by the distance between these functional HQ and the business units. Lack of knowledge about the opportunities that are out there at the level of business units may have paved the way for suboptimal outcomes.

Finally, the Mitsubishi Tokyo case which uses the “middle-up-top-down” approach, illustrates how the creation of company-wide synergy is attempted by the synthesis, at HQ level, of strategy maps formulated by the departments. Communication between headquarters and the departments was considered crucial and KPI were carefully established and disseminated.

ENDNOTES

1. \Synergy is created when the corporate level identifies opportunities for leveraging various strengths of its business units such as sharing an expensive resource or assets , some critical expertise, and R&
2. Anergy will occur when the corporate level, through its inefficiency, corporate overhead and bureaucracy, will increase the the cost of running the separate business units.

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THE RELATIONSHIP BETWEEN CHINESE REAL ESTATE MARKET AND STOCK MARKET

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ABSTRACT

This study examines the relationship between real estate market and stock market in China. Chinese real estate market is divided into three sub-periods based on price indexes from January 1999 to November 2009. ADF test, co-integration test, and Granger Causality test results show that the fluctuations of Chinese real estate market and stock market have stage correlation.

INTRODUCTION

The real estate industry in China has boomed since 1998 (Fung, Jeng, & Liu, 2010). The real estate market is an important part of China's economy. Real property composes major part of social wealth. Real estate price index is one of national economy vanes. Meanwhile, Chinese stock market develops from a weak efficient market to a semi-strong efficient market, and becomes an important barometer of national economy. Research on interaction mechanism of Chinese real estate market and stock market will help investors choose reasonable assets and establish efficient portfolios, and help Chinese government carry out effective supervision on capital markets. For example, Chinese government should control the amount of "hot money" that flows into stock market in order to avoid stock bubble while squeeze real estate bubble.

This study applies time series analysis to divide Chinese real estate market into three sub-periods based on real estate sales price indexes from January 1999 to November 2009. ADF test, co-integration test, and Granger Causality test results show that the fluctuations of Chinese real estate prices and stock prices have stage correlation, in some sub-periods the real estate market led the stock market. It might provide helpful information for investors to establish effective portfolios and for Chinese government to make relevant policies.

LITERATURE REVIEW

The arguments about the relationship and interaction mechanism of real estate market and stock market are mainly divided into two sides: segmented or integrated. Liu, Hartzell, Greig, & Grissom (1990) researched the relationship between the U.S real estate market and stock market

with asset pricing model and concluded that two markets were segmented. However, Ibbotson & Siegel (1984) analyzed the relationship between the U.S real estate prices and S&P 500 stock index and found the existence of negative correlation. Studies of Okunev & Wilson (1997), Okunev, Wilson & Zurbruegg (2001), and Ullah & Zhou (2003) showed the existence of correlation between the U.S real estate market and stock market, and the stock market played a leading role. Quan & Titman (1999) studied relationship between real estate prices and stock prices of 17 countries, and concluded there was significant positive correlation in the long run. Studies of Stone & Ziemba (1993), Liow (2006), and Shen & Lu (2008) separately showed positive correlations between real estate markets and stock markets in Japan, Singapore and China. Hence it is unclear whether real estate market and stock market are segmented or integrated.

METHODOLOGY AND EMPIRICAL RESULTS

Data Description

The monthly data of Chinese Real Estate Sales Price Index (*CRPI*) is selected to analysis Chinese real estate fluctuating cycles. Data is from China Economic Information Network Statistics Database.

Shanghai Composite Index *HCPI* and Shenzhen Component Index *SCPI* are chosen as the indexes to measure prices changes in Chinese stock market. *HCPI* and *SCPI* are published by Shanghai Stock Exchange and Shenzhen Stock Exchange.

In order to remove heteroscedasticity and reduce volatility, the indexes are made dimensionless and taken logarithm to get the corresponding new variables which are *LCRPI*, *LHCPI* and *LSCPI*.

Time Series Analysis and Test

The basic principle of time series analysis is that any economic time series can be composed of its first order differential sequence. To increase the symmetry of differential sequence, mean of all differential values are calculated. Then a new time series can be generated with the first order differences and the mean.

First, we define $Y(t)$ as time series of Chinese real estate price index (*CRPI*). Then the first order differential sequence of $Y(t)$ is generated:

$$Y\Delta(t) = Y(t+1) - Y(t) \quad (t = 1, 2, 3, \dots, n) \quad (n=131)$$

The results of ADF test indicate that $Y\Delta(t)$ is stationary at the 1 percent level of significance.

		ADF Test Statistic	PROB.
$Y(t)$		-3.156089	0.0983
$Y'(t)$		-5.274925	0.0001
Test critical values	1% level	-4.033727	
	5% level	-3.446464	
	10% level	-3.148223	

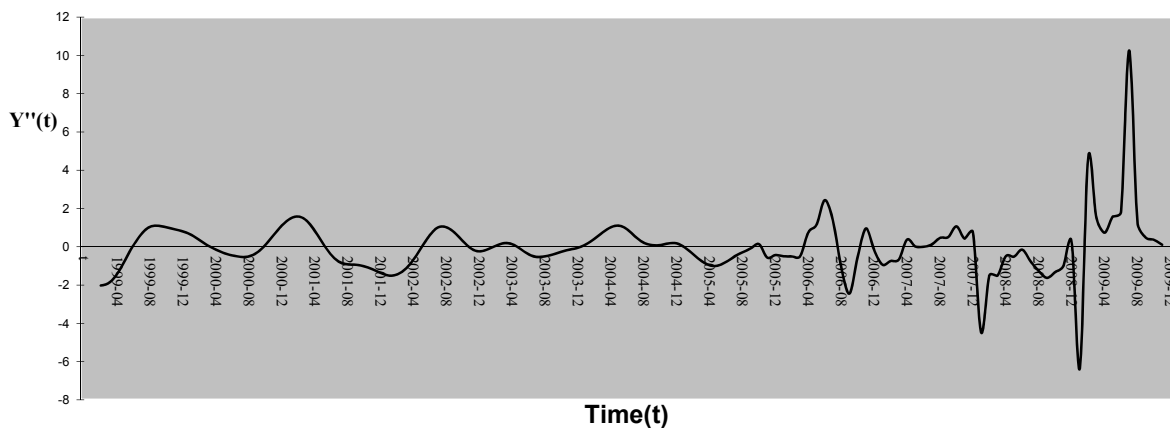
$$H = \frac{1}{n} \sum_{t=1}^{n-1} Y'(t) / (n-1)$$

H is the average value of $Y'(t)$ covered $t-1$ years. Here, $H = 0.1323 > 0$, which indicates the trend of $Y(t)$ is upward.

$$Y''(t) = Y'(t) - H \quad (1 \leq t \leq n-1)$$

Then the new differential time series $Y''(t)$ is generated and shown in figure 1.

Figure 1



Overall, the fluctuating trend of Chinese real estate market is upward. Combined with major events during the period, Chinese real estate market can be divided into three sub-periods: January 1999 to April 2005, May 2005 to January 2008, and March 2008 to October 2009.

Augment Dickey-Fuller Test (ADF test)

ADF test is applied respectively on time series of $LCRPI$, $LHCPI$, and $LSCPI$ and their first order differences $DLCRPI$, $DLHCPI$, and $DLSCPI$ in three sub-periods. ADF statistic values are less than critical values at the 1 percent significance level after the first order difference. So the first order difference sequences are stationary.

TIME	VARIABLE	ADF STATISTIC	CRITICAL VALUE (1%)	TEST EQUATION*	RESULT
1/1999~11/2009	LCRPI	-3.173166	-4.033727	(C, T)	Not stationary
	LHCPI	-1.99034	-4.031309		Not stationary
	LSCPI	-1.698804	-4.031309		Not stationary
	DLCRPI	-5.475863	-4.038365		Stationary
	DLHCPI	-5.967869	-4.031309		Stationary
	DLSCPI	-5.947102	-4.031309		Stationary
1/1999~4/2005	LCRPI	-1.731925	-3.525618	(C, N)	Not stationary
	LHCPI	-1.773146	-3.520307		Not stationary
	LSCPI	-2.051703	-3.520307		Not stationary
	DLCRPI	-4.109851	-3.525618		Stationary
	DLHCPI	-7.944620	-3.521579		Stationary
	DLSCPI	-8.793404	-3.521579		Stationary
5/2005~1/2008	LCRPI	-0.064007	-2.639210	(N, N)	Not stationary
	LHCPI	2.670071	-2.639210		Stationary
	LSCPI	3.100284	-2.639210		Stationary
	DLCRPI	-3.486200	-2.644302		Stationary
	DLHCPI	-3.783803	-2.641672		Stationary
	DLSCPI	-3.611474	-2.641672		Stationary
2/2008~11/2009	LCRPI	0.717293	-2.679735	(N, N)	Not stationary
	LHCPI	-0.564451	-2.679735		Not stationary
	LSCPI	-0.291309	-2.679735		Not stationary
	DLCRPI	-4.010954	-2.685718		Stationary
	DLHCPI	-4.813476	-2.685718		Stationary
	DLSCPI	-4.209537	-2.685718		Stationary

* C, T and N denote separately test equations including intercept, trend and neither of them.

Cointegration Causal Test

First, we estimate equations with OLS method.

$$LCRPI = c_1 + a \times LHCPI + e_1$$

$$LCRPI = c_2 + b \times LSCPI + e_2$$

a , b are parameters, and e_1 , e_2 are residuals.

In the total period, there are equations as follows:

$$LCRPI = 4.384371 + 0.033060LHCPI + e_1$$

$$(61.07283) (3.472573) \quad R^2=0.085488 \quad S.E=0.043307 \quad F=12.05876$$

$$LCRPI = 4.437370 + 0.023084LSCPI + e_2$$

$$(75.04605) (3.320789) \quad R^2=0.078753 \quad S.E=0.043466 \quad F=11.02764$$

Then, we test the unit roots of residuals series.

Table 3: ADF Tests Results of Residuals [@]				
TIME	RESIDUAL	ADF STATISTIC	CRITICAL VALUE	RESULT
1/1999~11/2009	ε_1	-2.702823	-2.583744	Stationary
	e_2	-2.771089	-2.583744	Stationary
1/1999~4/2005	ε_1	-1.976559	-1.945456 **	Stationary
	e_2	-3.175017	-2.597476 *	Stationary
5/2005~1/2008	ε_1	-4.834757	-2.644302 *	Stationary
	e_2	-3.279594	-2.644302 *	Stationary
2/2008~11/2009	ε_1	-4.511116	-2.685718 *	Stationary
	e_2	-4.128769	-2.685718 *	Stationary

[@] Test equations do not include intercept and trend.
 * , ** represent separately the critical values at the 1 percent and 5 percent level of significance.

Residuals series are stable. The equations are not spurious regressions. So $LCRPI$ is integrated with $LHCPI$, and $LSCPI$.

Granger Causality Tests

In order to obtain the Granger causes of stock market and real estate market, the lags of first to tenth orders are calculated based on the Granger test method of Vector Auto Regression (VAR) model. Results are showed in table 4.

Table 4: The Results of Pairwise Granger Causality Tests					
TIME	NULL HYPOTHESIS	LAG	F-STATISTIC	PROB.	RESULT
1/1999~11/2009	LCRPI does not Granger Cause LHCPI	1	0.97012	0.32652	Not refusal
	LHCPI does not Granger Cause LCRPI	1	1.67593	0.19782	Not refusal
	LCRPI does not Granger Cause LSCPI	1	0.77620	0.37997	Not refusal
	LSCPI does not Granger Cause LCRPI	1	2.26086	0.13516	Not refusal
1/1999~4/2005	LCRPI does not Granger Cause LHCPI	1	7.79510	0.00673	Refusal *
	LHCPI does not Granger Cause LCRPI	1	0.92441	0.33958	Not refusal
	LCRPI does not Granger Cause LSCPI	1	5.27988	0.02452	Refusal * *
	LSCPI does not Granger Cause LCRPI	1	0.91306	0.34288	Not refusal
5/2005~1/2008	LCRPI does not Granger Cause LHCPI	2	22.4719	0.00001	Refusal *
	LHCPI does not Granger Cause LCRPI	2	0.32282	0.72607	Not refusal
	LCRPI does not Granger Cause LSCPI	2	22.1897	0.00001	Refusal *
	LSCPI does not Granger Cause LCRPI	2	0.23536	0.63052	Not refusal
2/2008~11/2009	LCRPI does not Granger Cause LHCPI	1	0.98016	0.32797	Not refusal
	LHCPI does not Granger Cause LCRPI	1	0.00785	0.92984	Not refusal
	LCRPI does not Granger Cause LSCPI	1	0.96507	0.33167	Not refusal
	LSCPI does not Granger Cause LCRPI	1	0.06231	0.80412	Not refusal

*, ** represent separately the critical values at the 1 percent and 5 percent level of significance.

The results show that the fluctuations of Chinese real estate prices and stock prices appear stage correlation. In the period of 1999 to 2007, *LCRPI* was Granger cause of *LHCPI* and *LSCPI*. So the real estate market led the stock market in the sub-period.

CONCLUSION

This study examines the relationship between Chinese real estate market and stock market. It applies time series analysis to divide Chinese real estate market into three sub-periods based on real estate sales price indexes. ADF test, co-integration test, and Granger Causality test results show that Chinese real estate market and stock market are integrated, in some sub-periods the real estate market led the stock market.

This relationship can be explained by many factors and theories. First, many economic factors including national economic development, inflation rates, interest rates and others affect real estate prices and stock prices at the same time, so the changes of real estate prices and stock

prices might exist some correlation. Then, real estate and stock are symbols for both wealth and investment tools. The relationship between real estate and stock can be interpreted by wealth effect, crowding-out effect, substitution effect and portfolio theory.

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INVESTMENT AND TRADE BETWEEN WEST AFRICA AND CHINA: THE SENEGALESE CASE

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ABSTRACT

This paper relates the trade and foreign direct investment between China and West Africa. Trade volume and foreign direct investment still increasing, however with global financial crisis is affecting the global economy.

It is possible to estimate the trade volume from 2000Q1 to 2009Q4 is possible by using the Least Squares (LS). The article clearly shows that trade volume is positively correlated to imports and exports, and not correlated at all to the distance, in the sense that distance is a constant factor the distance is constant.

I also argue that the economic relations between China and West Africa are stronger and stronger are becoming stronger- at a moment when the former aid-based relationship is being or has been- replaced by strong business partnerships

INTRODUCTION

The Sino-African relations started since Mao's presidency. As early as the 1960's China implemented an anti-Western imperialist agenda based on ideological solidarity with other third world or developing countries, China centered on building ideological solidarity with other developing countries on repelling western "Imperialism". Nowadays, China interests evolved into more pragmatic pursuits such as trade, investment and energy. In the Post Cold War era, however, the Sino-African relations have pragmatically shifted from their former ideological focus into an almost strictly economic paradigm- that is, a cooperation based on trade, investment, and energetic issues.

West Africa is rich in natural resources like oil, gas, wood, diamond, gold, uranium. Nigeria, Mauritania, Niger, Chad, Sudan, Senegal, Conakry Guinea, Mali, Ghana and Bissau Guinea are ones of the most solicited by industrial countries.

Recently, China has identified the African continent as a significant economic and strategic partner. America and Europe consider Africa like a treasure ruled by opportunists who didn't respected democratic rules...the rule of law and that free markets is being challenged by the escalating Chinese influence in Africa.

Nowadays, the most pernicious effect of the renewed Chinese interest in Africa is that China is legitimizing and encouraging African's repressive regimes, by increasing the likelihood of weak and failed states (P. Brooks and J.H. Shin, 2010). The United States and Europeans countries

(France, England, and Germany...) were Africa's first strategic partners; now China is coming entering the scenery with new rules of partnership. The US interests lie in countering effectively these reinforced Sino-African cooperation these developments in Africa by deftly encouraging democratic processes, economic freedom and respect for human rights throughout the continent.

China's fast-growing economic ties with Africa are attracting considerable attention. The relationship came into the spotlight during the Forum China-Africa Cooperation (FOCAC) in Beijing in November, 2006 and the Annual Meetings of the African Development Bank (AfDB) in Shanghai in May 2007. While the expansion of trade and investment between Africa and China has been generally welcomed, concerns have been expressed about how China's growing might affect African development. But what roles has China exactly played? What drives China's trade and financial involvement in Africa? What are the implications of the relationship for Africa and other development partners? This paper aims at shedding light on these questions, particularly the first two, by examining the Senegalese case.

There have been relatively a few systematic studies of the resurging economic relations between China and Africa. Alden (2005) reviews the evolution of Sino-African economic relations since the 1970s; Edwards and Jenkins (2005) study trade-poverty links; Kennan and Stevens (2005) attempt to identify possible winners and losers among African countries as China becomes more prominent in world trade; Jenkins and Edwards (2006) examine the direct and indirect trade impact of China and India on sub-Saharan Africa. A recent study by an OECD team emphasizes trade and foreign direct investment (FDI), focusing on China's and India's role in specific commodity and energy markets. (Goldstein and al., 2006)

A World Bank study investigates constraints or policy challenges "at the border," "behind the border," and "between the borders" for increasing Africa-Asia trade and investment (Broadman, 8).

During the 1980s and 90s, under the effect of the oil price shocks the ensuing fall in world prices and significant political transformations (outside and inside Africa), interest in African oil declined. But the new century has again led to a surge in demand for African oil and gas. The major international energy firms are heavily investing in Africa; wells are being drilled along the entire coast, from Morocco, in the North, to Namibia, in the South, as well as in the interior. The production and proven reserves have attained new heights. Currently, several factors are influencing oil production in West Africa: strong world demand, the rise prices at levels not seen in almost thirty years, the development of new technologies in oil and gas exploration and production, etc.

This chapter on the Atlas Regional Integration will show the current situation of world oil and gas production and the role of West African oil and gas is predicted to play over the next decades. It will also highlight some of the future challenges and at stake in the region.

The paper is organized as follows: section one presents the trade and investment between China and West African countries in the large view. The section two deals with the financial situation, and the relations between West African countries. The last section attempts to evaluate

and estimate the trade between China and West Africa. Trade between Senegal and China is taken to estimate the econometric model, because the data are available.

TRADE AND INVESTMENT BETWEEN CHINA AND WEST AFRICA

The first Sino-African forum (consultative process launched in Beijing, 2000) launched a new era. In the span of 8 years, several hundred cooperation agreements for economic assistance (technical cooperation, project aid and budgetary aid) to African countries were approved.

In 2000, several protocol agreements have been signed to cancel all or partial African debt totaling \$10 billion. As a comparison, the initiative favoring the Heavily Indebted Poor Countries (HIPC) Initiative has approved. In the same period the cancellation of the debt of 29 countries of which 25 are African with a total amount of 35 billion US dollars. Moreover, in June 2005 the G8 proposed that three multilateral institutions (the IMF, the International Development Association (IDA) of the World Bank, and the African Development Fund (AfDF)) - cancel 100% of their debt claims on countries that have reached, or will eventually reach, the completion point under the joint IMF-World Bank enhanced HIPC Initiative so as to free up additional resources in order to help these countries reach the Millennium Development Goals (MDGs).

The cooperation framework has been strengthened, as demonstrated by the success of the third Sino-African summit in November 2006, with 48 African countries present. China is ahead of other emerging Asian countries like India, Singapore, Thailand, etc. It rivals OECD by announcing in 2005, \$10 billion in concessional loans to Africa for the period 2006-2008 periods. Are the recent G8's commitments to Africa related to China's growing interest in Africa? This situation sets the stage for a new balance of power within which Africa will be in a better position to negotiate with external development partners. Trade between China and Africa is set, the emerging complementarily, and finally the Chinese investment in different countries and sectors.

Trade between China and Africa

In 1978, the economic and social reforms led by Deng Xiaoping put China on track towards globalization. Today, the country's growth (on average 10% per year for over 20 years) is driven by exports in low-cost goods. The competitiveness of its export products and its raw material requirements are changing the parameters of the global economy. Even if it does not represent a key issue for the Chinese economy, Africa is directly affected by these upheavals.

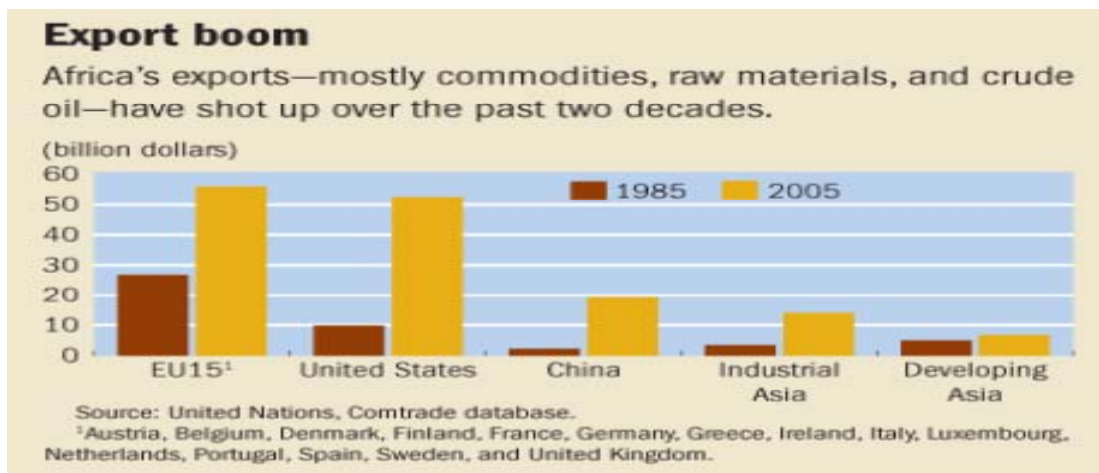
On the trade front, in 2005, Sub Sahara Africa (SSA) exports to China shot up to \$19 billion, or 15% of the region's total exports, from the sum of \$5 billion in 2000 and a quite negligible amount in 1990. This 30% annual growth since 2000 accounts for about one-fifth of SSA's total export growth during that period. The emergence of China as an important trade

partner for SSA is most pronounced for fuels and raw materials. In 2005, China received one-fourth of SSA's raw materials exports and one-sixth of fuels in 2005. Conversely, one-fifth of China's fuel imports came from SSA. In short, China is now SSA's single largest Asian trading partner and its fastest-growing trading destination (Chart 1).

Sub Sahara Africa's (SSA) imports from China—most of which are manufactured products—also surged, from \$3.5 billion in 2000 to over \$13 billion in 2005, representing almost 15% of total SSA imports.

On the investment front, Chinese state-owned companies, often enter into joint ventures with SSA state-owned companies to secure sources of commodities. In Angola, for instance, the Chinese company SINOPEC is investing \$3.5 billion in a partnership with SONANGOL to pump oil from recently auctioned offshore blocks and, plans to build a \$3billion refinery. In Gabon, the CMEC/SINOSTEEL consortium, financed by the Chinese Export-Import Bank, is investing about \$3billion in the exploitation of iron ore deposits. The plan is to construct a railway, a port, and a hydroelectric power station in exchange of an exclusive monopoly on the Gabonese mine industry. Likewise in Equatorial Guinea, a subsidiary of the China National Offshore Oil Corporation (CNOOC) recently signed a production-sharing contract with the National Oil Company of Equatorial Guinea (GEPetrol).

Chart 1



Trade with Africa has increased considerably: it increased 50-fold between 1980 and 2005 reaching \$40 billion. However, this trade barely represents 2.5% of Chinese foreign trade. From an accounting point of view, Africa remains a marginal trading partner for Beijing. From the African perspective, the dynamic is quite different: practically nil 25 years ago, by 2004, China had become Africa's third-ranking trade partner, after the United States and France. In the span of one decade (1993 to 2004), it has successively surpassed Portugal, Japan, India, Italy, the

UK and Germany (see Figure 1). Generally, since 1993, Africa imports more from China – mainly everyday consumer goods - than it exports to it – mainly oil and raw materials (see Figures 2 and 3). However, the situation varies in each region; China is clearly an importer with respect to Central Africa and Southern Africa which have major mining resources, especially oil (see Table 1).

With regard to West Africa, practically all exports to China consist of oil and cotton. Yet these two commodities do not have the same status: cotton is a strategic supply source for the Chinese textile industry whereas West African oil is a marginal supply source for China (see Table 2).

Within a few years, China has thus become the leading trade partner for the exports of major cotton producers (Benin, Burkina Faso, Mali, and Chad). Conversely, West African imports from China continue to increase (see Table 3). With its sizeable population (300 million in 2006, e.g. a third of the continent's population), West Africa is an attractive consumer market for Chinese products. Nigeria alone represents 45% of the regional population and imports 42% of Chinese exports to West Africa. Besides Nigeria, the main destinations for China's exports are in decreasing order Benin (15%), Ghana (9%), Togo (8%), Côte d'Ivoire (7%) and the Gambia (3%). The share of goods imported from China by Côte d'Ivoire and Ghana seem proportional to their population. However, the respective intensity of trade with Benin, Togo and the Gambia is greater in terms of the market size. This situation is due to their position as transit-trade countries in the region.

Over the past 15 years, trade flows between Africa and Asia have increased rapidly, the hallmark of the recent growth of South.

Millions US Dollars	Import	Export
NORTH AFRICA,	816 1	564
WEST AFRICA	257	1,568
CENTRAL AFRICA	841	71
EAST AFRICA	51	401
SOUTHERN AFRICA	2,239	1,311
AFRICA	4,205	4,916

Source: Compiled Data from the Direction of Trade Statistics, IMF (2006) * Sub-regions as defined by the African Union

Chinese Imports	Africa		West Africa	
	Billions US dollars	%	Billions US dollars	%
OIL	10.1	64.2%	0.65	44.8%
COTTON	0.7	4.2%	0.60	37.8%
OTHERS	4.9	31.6%	0.25	17.4%
TOTAL	15.7	100%	1.50	100%

Source: Comrade Database, UNCTAD (2006)

	Exports		Imports	
	2000	2005	2000	2005
BENIN	33	1	4	4
BURKINA FASO	50	1	18	12
CAMEROON	5	12	8	4
CAPE VERDE	-	-	14	15
CHAD	47	2	22	8
CÔTE D'IVOIRE	58	21	-	4
THE GAMBIA	-	21	1	1
GHANA	19	8	9	2
GUINEA	35	17	6	1
GUINEA BISSAU	14	-	5	8
LIBERIA	7	11	8	5
MALI	37	1	6	4
MAURITANIA	19	24	6	4
NIGER	-	-	5	9
NIGERIA	19	16	8	1
SENEGAL	11	15	10	7
SIERRA LEONE	-	10	7	5
TOGO	43	-	10	2

Source: Comrade Data base, UNCTAD (2006)

Figure 1: Africa's main trade partners

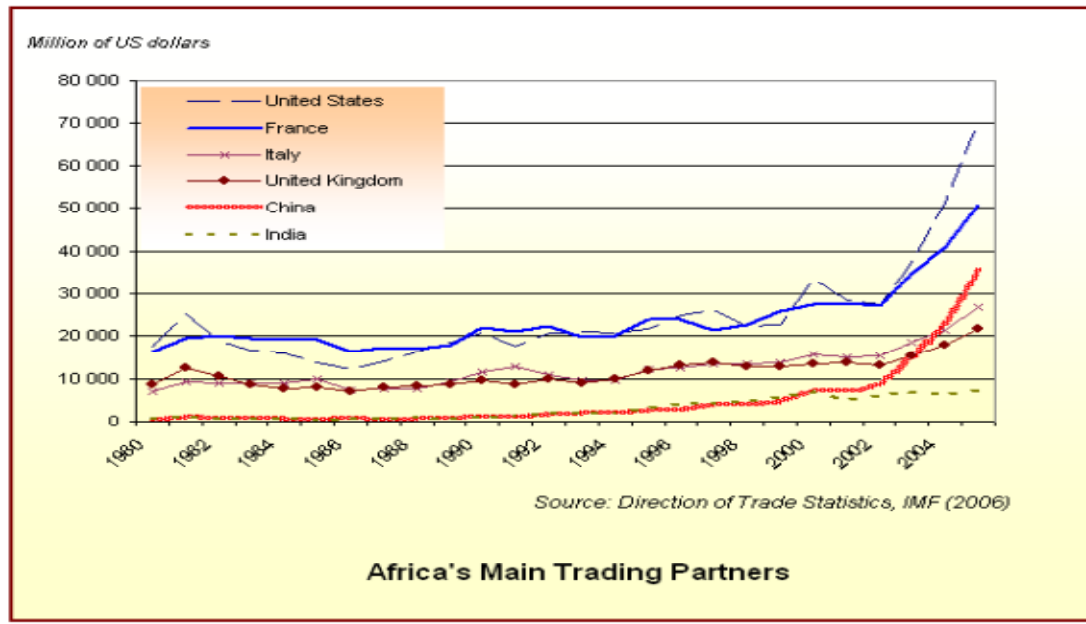


Figure 2: Main Chinese Imports from Africa in 2006

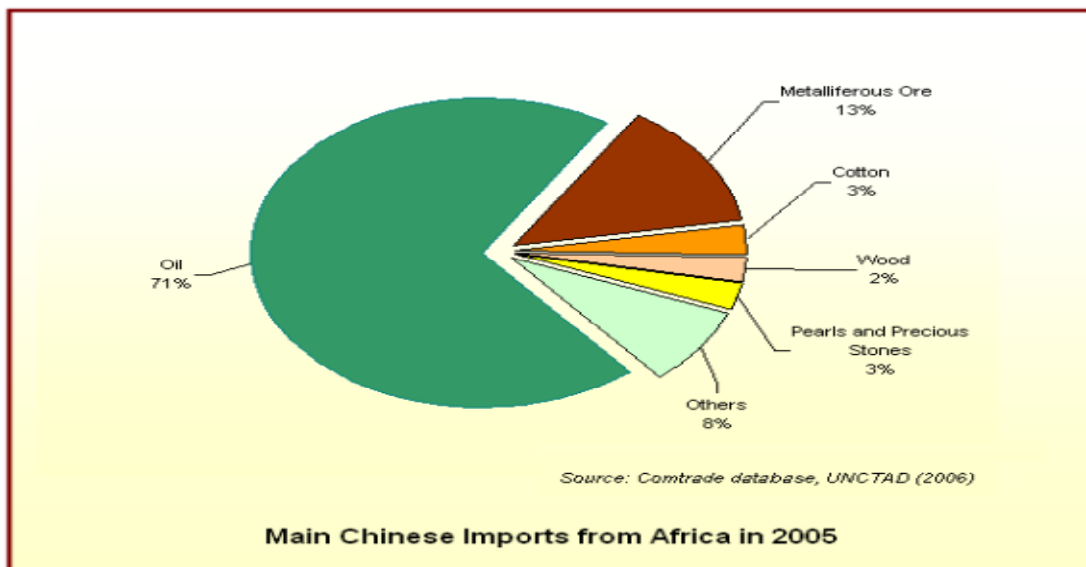
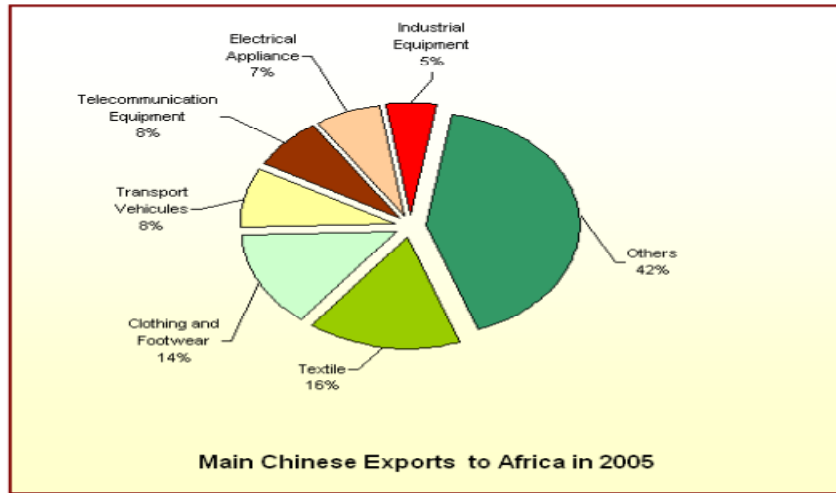


Figure 3: Main Chinese Exports to Africa in 2005



Shifting shares: From 1990 to 1995, Africa's exports to Asia grew by 15 percent and, over the past five years, by 20 percent, with Africa's export growth to Asia surpassing that of all other regions (see Chart 1). Asia is now Africa's third most important export destination after the EU and the United States. Africa's imports from Asia have also grown, but less rapidly than exports (see Chart 2).

Chart 1: Asia Dominates

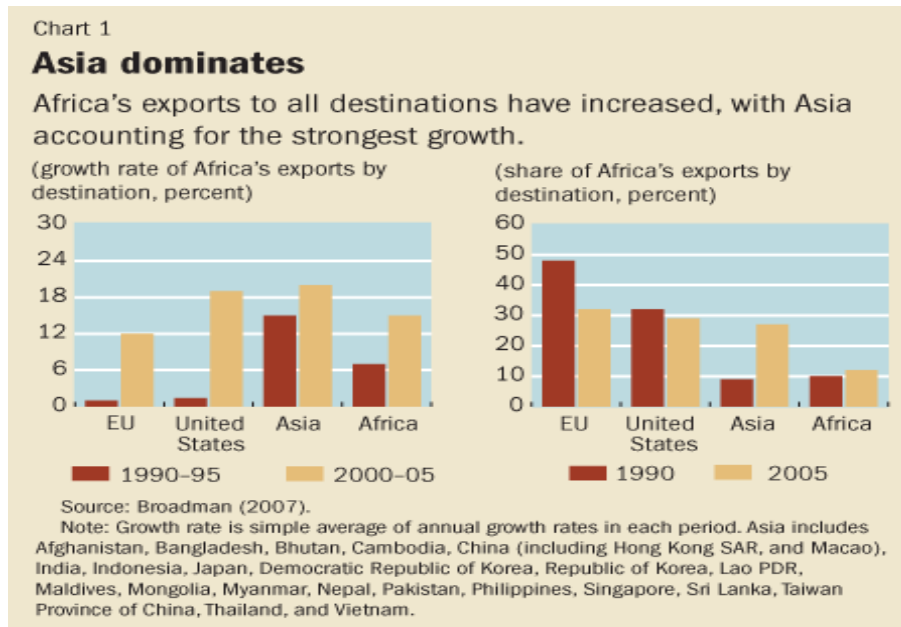
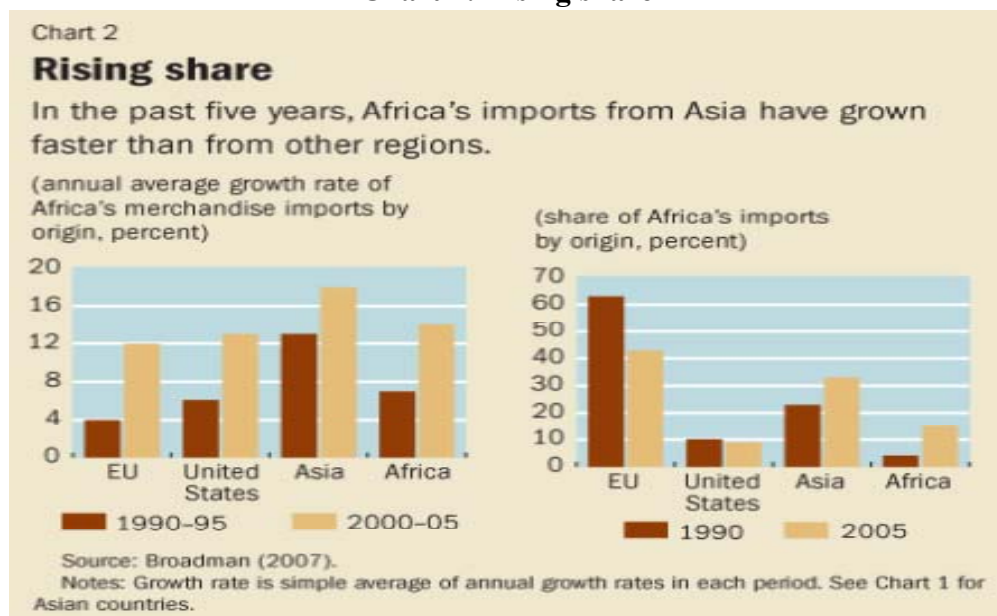


Chart 2: Rising share

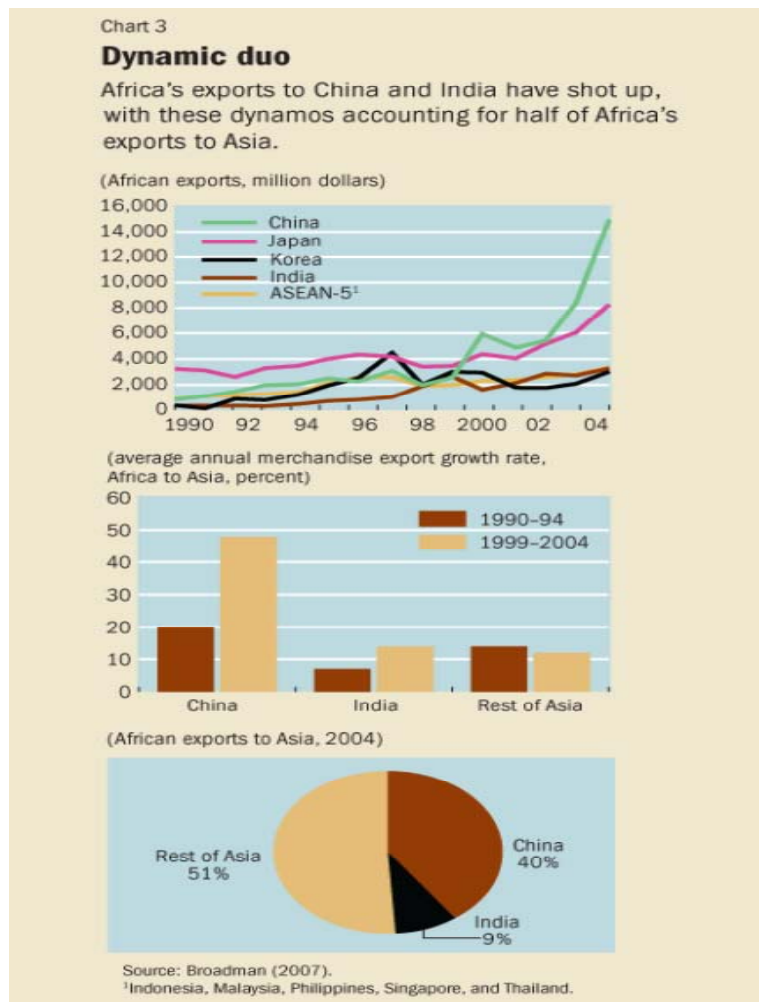


Emerging complementarities:

Manufactured products account for only 20 percent of Africa's total exports, and the pattern of Africa's exports to Asia is consistent with this global pattern. Commodities account for 86 percent of SSA's exports to Asia, and 80% of SSA's imports from Asia are manufactured goods. But there are dynamics at work suggesting growing complementarities between the continents. African countries could supply processed materials to Asian countries, linked to industrial and consumer growth. The growing populations in China and India with higher incomes are spurring purchases from Africa. At the same time, Africa is importing Asian manufactured products for consumption by households and for use as capital goods in the manufacturing sector, in which growth is taking off.

Africa exports mainly petroleum and raw materials to China and non-oil minerals to India. Its exports of oil and natural gas to China represent more than 62% of its total exports to that country, followed by ores and metals (17%) and agricultural raw materials (7%). Africa's exports to India are also dominated by resource-based products, with ore and metals accounting for 61% and agricultural raw materials for 19% (<file:///D:/These%20CHINA/African%20Import%20and%20export%20in%20Asia.htm>). In order to have a large part in African product exports China have to be competitive in the African market, by investing more than Europeans and Americans. Chinese investment in China and in West Africa is investigated in the following section, in order to see the level of Chinese interest in Africa.

art 3: Dynamic duo



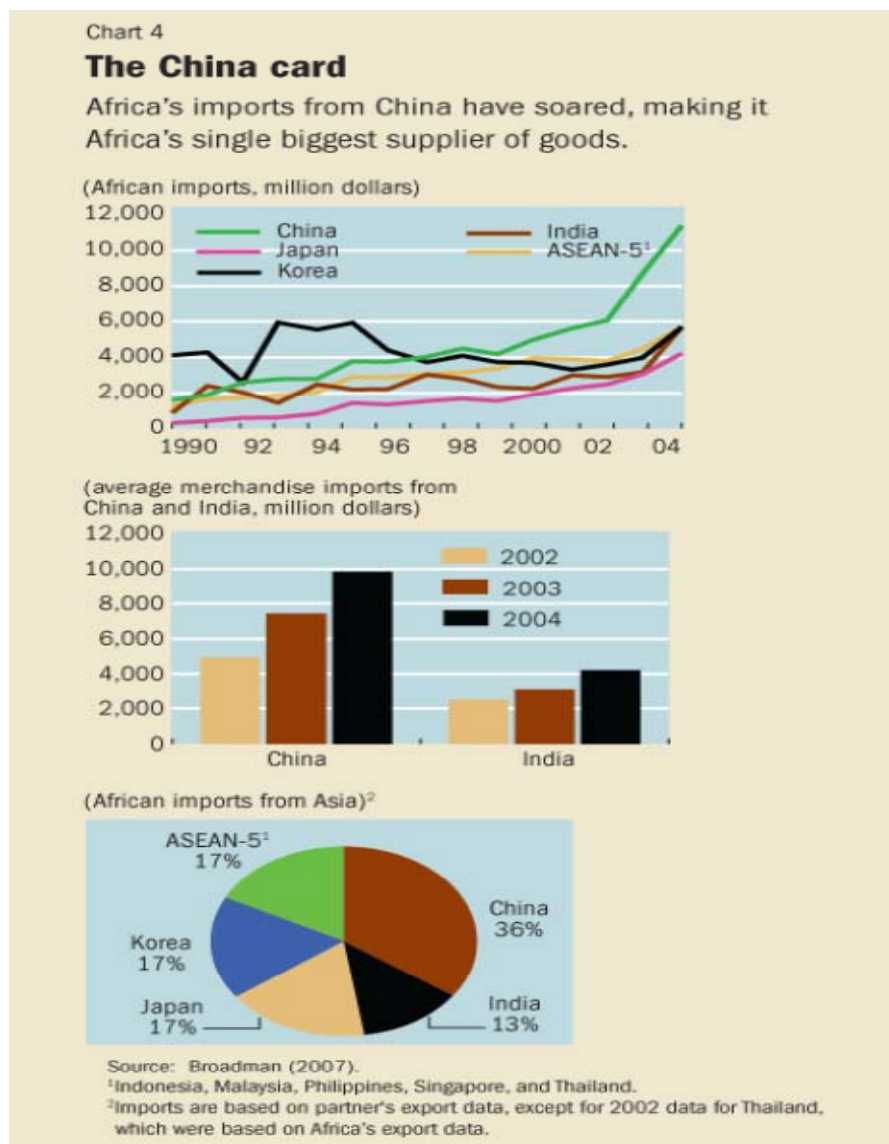
Chinese Investment

Chinese Investment in China

Total investment in fixed assets in the whole country stood at 6,840.2 billion Yuan in the first half of 2010, a rise of 26.3 %, year-on-years. Of which, investment in fixed assets in urban and rural areas hit 5,843.6 and 996.6 billion Yuan, climbing 26.8 and 23.2 % respectively. Among the urban investment in fixed assets, state-owned and state holding enterprises invested 2,355.4 billion Yuan, surging 19.3%; real estate development valued at 1,319.6 billion Yuan, up 33.5 %.

In terms of jurisdiction of management, central investment stood at 512.3 billion Yuan with growth rate of 18.9 % as compared with the year 2009; that of local investment totaled 5,331.3 billion Yuan, jumping 27.6 percent. In terms of different industry structures, investments of primary, secondary, and tertiary industry amounted to 84.6, 2,632.2 and 3,126.9 billion Yuan, expanding 69.5, 26.6 and 26.2 % respectively, year-on-year.

Chart 4: The China card



Considering the different sectors, investments of mining and washing of coal stood at 82.3 billion Yuan, a year-on-year rise of 42.0 %, that of production and supply of electricity and

heat accounting for 354.6 billion Yuan, climbing 7.4 %, that of extraction of petroleum and natural gas grew to 95.7 billion Yuan, increasing 19.8 %; railway transport valued at 80.9 billion Yuan, a year-on-year increase of 20.4 %; that of manufacture of nonmetallic mineral products arrived at 181.5 billion Yuan, rose 46.7 %; that of smelting and pressing of ferrous metals reached 159.6 billion Yuan, growing 27.5 %; and that of smelting and pressing of non-ferrous metals hit 101.2 billion Yuan, a rise of 39.2 %, year-on-year.

In terms of registration status, investments of domestic funds enterprises stood at 5,203.7 billion Yuan, surging 27.6 % over that in the same period last year; that of enterprises with funds from Hong Kong, Macao and Taiwan valued at 275.9 billion Yuan, rising 20.6 %; and that of foreign funded enterprises standing at 334.1 billion Yuan, up 20.7 %, year-on-year.

Regarding buildings under and new constructions, the cumulative number of urban construction projects over 500,000 Yuan was 213,990, by the end of June; a year-on-year increase of 20,830, that of total planned sum of investment in project under construction stood at 22,602.9 billion Yuan, climbing 17.3 %, that of the number of projects started this year, valued at 123,041, increased 12,672, that of total planned investment of newly projects was 3,942.2 billion Yuan, a rise of 1.5 %.

In terms of volume of positioned funds, investment in urban areas hit 6,822.3 Yuan, a year-on-year rise of 24.0 %. Domestic loans, foreign investment and self-rising funds rise to 14.7, 2.0 and 30.9 percent respectively year-on-year (http://www.stats.gov.cn/was40/gtjj_en_detail.jsp?channelid=1175&record=59).

Chinese Investment in West Africa

Even though China's OFDI has raised 19 fold since 2000, its OFDI stock accounts for only 0.6% of global OFDI, and relative to GDP, it lags far behind the world average. China's official OFDI statistics may, however, underestimate the actual volume of outward flows. China's FDI stocks as reported by OECD countries in their respective inward FDI statistics are on average 40% higher.

China is rapidly becoming an important source of outward foreign direct investment (OFDI). Starting from virtually no OFDI in 1979, the initial year of China's open door policy, China has accumulated over US\$ 90 billion of OFDI. China's OFDI flow and stock now stand respectively as the 4th and 6th largest, among developing countries.

Most of the increase in China's OFDI has taken place since 2000 (see figure) when China officially initiated a "go global" strategy to promote its OFDI. This facilitated OFDI by relaxing controls on outward capital flows and promoting simplified administrative requirements.

A large proportion of FDI inflows to SSA go to the oil sector. For the past 15 years, 70% of FDI has been invested in five of Africa's seven oil-exporting countries and in South Africa, which has attracted the most dynamic FDI among African countries, including in the financial sector after its mid-1990s liberalization. Still, although 50 to 80 % of FDI in most African

countries goes to natural resource exploitation, some countries are increasingly able to attract FDI into the telecom, food processing, tourism, construction, electricity, retail trade, light manufacturing, and transportation equipment sectors. This is a recent phenomenon, for which Asian investors, especially Chinese and Indians, are in the vanguard.

Chinese FDI to Africa represents a small proportion of China's total FDI portfolio, although Africa is second to Asia as the major destination of Chinese FDI. China has had economic and political ties with the region since the cold war era, with an active role in investing in infrastructure projects. Globally, 75 percent of China's FDI is in the tertiary sector, including construction and business activities, although a large proportion has recently gone to oil-rich countries. In 2002, the Chinese authorities allowed 585 Chinese enterprises to invest in Africa, accounting for 8 % of total approvals. South Africa had 98, valued at \$119 million. Today, about 700 Chinese enterprises are operating in Africa (This article draws from his new book, *Africa's Silk Road: China and India's New Economic Frontier* (2007), published by the World Bank).

The participation of the African continent in the International Division of Labor (IDL) has been limited. Financial investments, mainly in the form of foreign direct investments (FDIs), remain low (3% of global FDI in 2004) and vary considerably from year to year (see Map 3).

Although the United Kingdom, the United States and France remain the leading investors in Sub-Saharan Africa, new countries in East Asia, South America and even South Africa are interested in the emerging opportunities on the continent. Among these countries, China contributed 0.7% of FDI in Africa between 1979 and 2002.

Between 1979 and 2002, almost 10% of Chinese foreign direct investment was in Africa (see Table 4). Over that period, six African countries were among China's top 30 partners, including two West African countries (Nigeria and Mali). Until 1995, the focus was strongly on southern Africa. Since then, however, the scope of Chinese investments in Africa has broadened.

Recently, this trend has intensified and China could become a major player in the future. In 2004, Chinese FDIs were more than \$900 million of the total \$15 billion in FDI received by Africa. These investments should continue over the coming years for two concomitant reasons. Firstly, the gradual lifting of restrictions on the Chinese government, in order to prevent the increase in currency reserves from putting pressure on interest rates, should favor growth of investments outside the country. Secondly, China has made firm commitments to facilitate trade and investment on the African continent.

According to the results of a survey carried out in 2000 on 100 Chinese multinationals, Africa is a priority market for a third of them. Between 650 and 750 Chinese companies are now established in Sub-Saharan Africa. The main investment sector is oil. But, many other sectors, viewed as high potential or profitable, attract strong capital flows from Beijing, Shanghai and elsewhere: mining, fishing and exotic wood, manufacturing industries as well as infrastructures (roads, railway, ports, airports, telecommunications, etc.). Of the thousands of projects executed in Africa, 500 are exclusively conducted by the China Road and Bridge Corporation construction

company. The ZTE Corporation, -(a Chinese group specializing in telecommunications, established in 1985)- is launching into several African countries.

Rank	Region	Number of projects	Accumulated value (1979-2002) \$ million
1	ASIA	3,672	5,482
2	NORTH AMERICA	847	1,270
3	AFRICA	585	818
4	LATIN AMERICA	362	658
5	EUROPE	1,194	561
6	OCEANIA	300	550
	TOTAL	6,960	9,340

Source: Ministry of Commerce of China, in « China: an emerging FDI outward Investor » (2003)

	Inward FDI stocks (\$ million)	Chinese FDI stocks (\$ million)	Proportion (%)
CAMEROON	1,505	16	1.1
GHANA	1,610	19	1.2
MALI	523	58	11
NIGERIA	22,570	44	0.2
SOUTH AFRICA	29,611	125	0.4
TANZANIA	2,335	41	1.8
ZAMBIE	2,241	134	6.0

Source: Jenkins, R. (2006) The economic impacts of China and India on Sub-Saharan

African Demand for Infrastructure

Inadequate infrastructure is one of the top constraints to business in Africa, where energy and transportation are among the main bottlenecks to productivity growth and competitiveness.

According to a study prepared by the staffs of the World Economic Forum, the World Bank, and the AfDB, African firms lose as much as 8 % of sales due to power outages, and transportation delays can account for as much as 3 percent of lost sales (*World Economic Forum*, 2007). Poor infrastructure also holds back commercial agriculture. Improving infrastructure is therefore crucial if Africa, particularly SSA, is to diversify exports, move up the value chain, and achieve sustained growth.

There is a large unmet demand; upgrading infrastructure requires financing and technical expertise, both lacking in many African countries. Moreover, traditional donors both bilateral and multilateral tend to allocate only a relatively small proportion of their funding to infrastructure (Table 4), and for the private sector, investing in infrastructure in poor countries is a high-risk business.

Chinese enterprises have nevertheless been active in Africa's infrastructure market. They are not newcomers—Chinese engineers and workers have been building large projects such as the Tanzania-Zambia railway since the 1960s. They have also gained experience in modernizing China's own infrastructure. Their technology may be less capital-intensive and their labor and material costs tend to be lower than competitors from Western countries, which give them an edge in pricing and risk taking. Finally, access to substantial, long-term financing in China reinforces their competitive position. It is therefore not surprising that infrastructure financing and construction have become a booming business for China and Africa.

Table 6: Major Aid Use by Donor¹, 2005

	Social and Administrative Infrastructure	Economic Infrastructure	Agriculture, Industry and Other Production
	(Percent of Total ODA)		
EU-152	26	8	4
UNITED STATES	43	8	5
JAPAN	20	23	8
IDA3	20	33	12
AFDF4	18	21	22

Source: OECD/DAC; World Bank Annual Report 2006, Compendium of Statistics on Bank Group Operation 2007.
¹ OECD/DAC data are on a net disbursement basis. Other major use includes humanitarian aid, and commodity aid.
² Weighted average based on share in net ODA.
³ Data for 2006, includes aid provided by IBRD.
⁴ Data for 2006.

China's Approach to Financing

A pattern emerging in China's official financial support to Africa is that it differentiates between social services and business development projects. Implicitly, grants (including in kind) and quasi-grants (interest-free or low-interest-rate loans, with a willingness to reschedule) are used for projects that are meant to provide public goods or social services, such as hospitals, schools, public buildings or facilities, and technical assistance. To finance projects that are expected to generate revenue or export earnings through state financial institutions and enterprises China provides trade credit and commercial loans, often with repayment linked to the output of the projects (e.g. oil). This approach thus aligns debt financing with evolving repayment capacity. Instead of delivering a whole infrastructure project as an in-kind grant, as in the 1960s–1970s, China now uses aid to facilitate investment—only a small part of China's infrastructure activity in Africa is outright aid.

Concessional financing is often used as only part of financing package for commercial projects. For example, in Gabon, the CMEC/SINOSTEEL consortium, with financing from

China EXIM Bank, is constructing railways, ports, and hydroelectric power station as part of the project to develop an iron ore mine (IMF, 2007, pp40). In Nigeria, oil rights secured in early 2006 are linked to plans to build power and other infrastructure (White, 2006). Because aid is used to finance infrastructure that complements investments in productive or export sectors, it helps leverage financing from nongovernmental sources and indirectly stimulates growth in the recipient country.

China's official financing seldom directly supports a country's recurrent public expenditure. Any assistance to current spending is usually in kind (e.g., free medicine, medical services, training of professionals, and scholarships). China's technical assistance also seems to relate mostly to sector development rather than government functioning or external consultants for public service. These aspects of China's official assistance (Aligning debt financing with commercial projects, using aid to leverage financing from nongovernment sources, and focusing on capital expenditure and development of the productive sectors) help explain the changing financing mix and growing Chinese financial flows to Africa. The relationship between the West African countries is set in the following chapter with organizations.

WEST AFRICAN COUNTRIES ECONOMICS AND FINANCIAL RELATIONSHIP

West African countries have economics and financial relationship inside the ECOWAS and the West African Economic and Monetary Union (WAEMU) in order to set to work discursive projects on macroeconomic integration. Historically, the emphasis has been laid on the objective of macroeconomic integration in the Union resulting for instance, in the establishment of macroeconomic convergence criteria as set in the 1999 *Pact of convergence, stability, growth, and solidarity*. In contrast, less attention has been so far paid to the process of financial integration in spite of its potential benefits to the Union. Financial integration can be defined as a process, driven by market forces. During the process separate national markets gradually enter into competition with one another and eventually become one financial market, characterized by converging prices, product supply, and converging efficiency/profitability among the financial services providers (European Union, 2005).

Integration may also emerge thanks to formal efforts to integrate financial markets in a Regional Integration Agreement (RIA). Integration in this sense may involve eliminating restrictions to cross-border financial operations by firms from countries in the same RIA, as well as harmonizing rules, taxes, and regulations between the member countries (Galindo et al. 2002). There are three widely accepted interrelated benefits of financial integration: (1) more opportunities for risk sharing and diversification, (2) better allocation of capital among investment opportunities, and (3) potential for higher growth. Moreover, in the context of a monetary union, financial integration facilitates the conduct of monetary policy. Overall, it is generally recognized that the benefits of a well-monitored financial integration process are likely to outweigh the implied costs (Baele and al. 2004).

The regional financial sector

Financial depth and size of the banking system

Financial depth in the WAEMU is low but comparable to the average for sub-Saharan Africa (SSA) (Table 7). At 24.3 %, the ratio of M2 to GDP is close to the sub-Saharan median of 23.4 % (The median is for the 2000–2003 period. The average M2-to-GDP ratio for sub-Saharan Africa is 32.1 % for the same period.). Similarly, the ratio of net credit to the economy of 15.4 % of GDP is comparable to the SSA average of 16.7 %t. The regional banking system is relatively small. As of end-2003, banking assets were about 30 percent of GDP in the WAEMU. In contrast, this ratio reaches 77 % in the EU new member states (EU NMS) and 280 percent in the EU-15.

Table 7: Loans and Deposits in Developing Countries (In percent of GDP)

	Loans	Deposit
LATIN AMERICA	30.2	28.1
SUB-SAHARAN AFRICA	16.7	13.4
MIDDLE EAST AND NORTH AFRICA	40.1	28.3
ASIA	37.2	26.4
EUROPE AND CENTRAL ASIA	14.2	11.9
CEMAC (2002)	9.5	12.4
WAEMU (2003)	17.8	22.5

Source: Fund staff calculations

Table 8: WAEMU: Banking Intermediation, 2003 (In percent)

	Loans	Deposits	Loans/ Deposits	Banks Assets	Banks Assets/GDP
BENIN	9.3	10.4	70.4	10.3	32.5
BURKINA FASO	10.3	10.9	75.1	10.9	28.6
COTE D'IVOIRE	35.6	31.6	89.7	32.0	26.0
GUINEA-BISSAU	0.1	0.2	30.4	0.2	9.0
MALI	14.5	13.2	86.8	14.3	35.7
NIGER	2.5	2.8	68.6	3.0	12.1
SENEGAL	22.9	25.0	72.6	23.3	38.5
TOGO	4.9	5.7	67.7	5.9	33.8
WAEMU	100.0	100.0	79.4	100.0	29.5
EU NMS			74.3		77.4
EU 15			123.0		280.0

Sources: BCEAO, EU, and Fund staff calculations

Reflecting their share in the regional economy, banks in Senegal and Côte d'Ivoire dominate the WAEMU's banking sector. These two economies account for about 54 percent of

GDP and about the same share of regional banking assets (Table 8). Comparatively, the smaller economies like Guinea-Bissau, Niger, and Togo together account for less than 10 % of regional bank assets in the WAEMU. The small deposit base in the region is being intermediated. The average loan-to-deposit ratio is higher than in the EU new member states (EU NMS) and stands at about 80 percent in the WAEMU. The loan-to-deposit ratio is still lower, however, than in more advanced economies such as the EU-15 where it reaches 123 percent.

Financial soundness indicators

Financial soundness indicators point to a fragile regional banking sector (Table 9). In particular, banking problems are more serious in Togo and Côte d'Ivoire, while in Mali and Niger, the situation of some specialized institutions has deteriorated. In addition, the profitability of small and medium-sized banks remains low. Although the average solvency ratio reached 11.4 percent in 2004, a number of banks (representing 26 percent of deposits) did not respect the minimum 8 percent capital adequacy ratio. Asset quality remains poor as the average share of nonperforming loans increased to 20.4 percent in 2004 and most countries have a ratio above this figure (Côte d'Ivoire, Guinea-Bissau, Mali, Niger, and Togo). A number of factors have had a negative impact on financial soundness indicators. The problems in Côte d'Ivoire are largely due to the sociopolitical crisis which started in 1999.

As a result, large groups have refocused their activities to a smaller number of core clients while small and medium-sized banks are trying to expand their operations. More generally, poor asset quality in the region has been a structural problem relating to a high concentration of credit, links to the public sector, and the vulnerability of the terms of trade shocks. Finally, accounting practices in the WAEMU typically result in very few write-offs and provisioning efforts have affected the profitability of a number of banks (the average provisioning rate stood at about 61 % at end-2004).

The current systemic banking problem in Togo has, however, its roots in the accumulation of government arrears to public sector enterprises (PSEs), which in turn were unable to meet their obligations to the financial system, including state-owned banks. This problem is systemic (the banking system as a whole has negative capital and all large banks are affected). The Togolese authorities have embarked on a recapitalization exercise of some banks involving the issuance of government bonds to purchase nonperforming loans.

Table 9: WAEMU: Financial Soundness Indicators, 2003–04

	Number of financial institutions	Share of assets (percent)	Banks' risk weighted capital asset ratio (percent)	Share of nonperforming loans in total loans (percent) 4/	Ratio of provisions to nonperforming loans (percent)	Return on equity (percent)
	2003/2004	2003/2004	2003/2004	2003/2004	2003/2004	2003/2004
WAEMU	87 93	100.0 100.0	10.6 11.4	19.7 20.4	67.7 61.1	7.4 9.9
BENIN	09 09	10.3 10.0	06.2 09.5	10.3 12.9	51.0 45.0	01.9 05.4
BURKINA FASO	12 13	10.9 10.7	07.9 11.0	12.4 13.3	71.4 66.1	15.6 14.4
CÔTE D'IVOIRE	20 18	32.0 31.3	16.3 12.2	25.1 26.5	66.0 61.2	03.0 05.8
GUINEA- BISSAU	01 02	0.2 0.3	53.3 38.7	27.4 ...	56.4 ...	18.5 19.4
MALI	13 14	14.3 14.0	07.9 17.8	15.6 23.1	57.5 47.8	7.6 -22.6
NIGER	08 09	03.0 03.2	15.7 13.3	26.5 19.2	76.5 75.0	07.5 12.9
SENEGAL	14 15	23.3 24.4	11.6 11.6	14.0 12.9	75.1 75.8	17.2 17.5
TOGO	11 11	05.9 06.1	-6.6 -3.5	... 29.5	75.7 61.7	-11.2 ...
LARGE BANKS1/	19 19	63.0 61.5	12.6 13.0	20.7 21.7	69.3 65.2	10.1 11.9
MEDIUM BANKS2/	20 24	24.8 27.1	4.4 8.5	14.6 17.0	57.0 48.9	7.9 9.3
SMALL FINANCIAL INSTITUTIONS 3/	48 47	12.2 11.4				
SMALL BANKS	25 27	10.2 9.4	13.6 10.4	24.5 21.5	72.3 61.8	-1.0 4.6
SMALL NONBANKS FIN. INST.	23 20	2.0 2.0				

Sources: Banking Commission and Fund staff estimates.
1/ Banks with assets greater than CFAF 100 billion.
2/ Banks with assets greater than CFAF 50 billion but lower than CFAF 100 billion.
3/ Banks with assets lower than CFAF 50 billion and all nonbank financial institutions.
4/ Including provisions

Interbank and Money Markets

In the context of a monetary union, the common currency and the associated money market play a very important role as catalysts for financial integration (In the WAEMU, the CFA franc arrangement with its common currency dates back to the 1960s and can even be traced back to the colonial period). Complete integration in the markets closer to the common currency such as the interbank money markets can be achieved rapidly with clear benefits for the conduct of monetary policy. An integrated interbank market, as illustrated by the experience in the EU, can ensure an even distribution of BCEAO liquidity and a homogenous level of short-term interest rates across the union (see Papa Demos, 2005).

The WAEMU interbank market is, however, thin and its activity is limited to intra-group transactions. Interbank transactions fell to CFAF 66 billion in 2005 or a little more than 2 percent of domestic credit (Table 10). Obstacles to the development of the interbank market include the

absence of a legal framework, appropriate collateral (as most transactions are not collateralized), a network to match supply and demand, and a counterparty risk assessment framework (see Banque de France (2004)). The excess liquidity in the banking system may also be an impediment to further interbank transactions (Table 11) (Excess reserves are measured as actual minus required reserves).

	1997	1998	1999	2000	2001	2002	2003	2004	2005
WAEMU	105.6	152.4	199.6	155.6	126.8	105.6	52.8	48.0	66.0
CEMAC	3.9	19.4	21.2	14.7	23.6	13.1	9.2	7.5	...

Sources: BCEAO and BEAC

A well functioning payment system is a key determinant of integrated money markets and great progress has been achieved in the WAEMU. For instance, money markets integration was made possible in the EU thanks, inter alia, to the establishment of the pan-European payment infrastructure (TARGET system). In the WAEMU, a reform of the payment and settlement system is well underway with the setting up of an RTGS system (STAR-UEMOA), an interbank settlement system (SICA-UEMOA) and plans for an interbank payment system for bank cards (GIM-UEMOA and CTMI-UEMOA).

	Excess liquidity	
	CFA franc billions	In percent of Broad money
2000	293.1	7.0
2001	186.1	4.0
2002	348.2	6.5
2003	370.9	6.7
2004	430.0	7.4
MAY-2005	402.2	...

Sources: BCEAO. 1/ Reserves in excess of required reserves.

The conduct of monetary policy in the Union will have to be adapted as financial markets become more integrated. In the WAEMU, reserve requirements have been used extensively as other sterilization instruments have proved to be less effective in a context of excess liquidity and thin interbank money markets. These reserve requirements are, however, differentiated as they differ by country, indicating that there is scope for further financial integration (Table 12).

Table 12: WAEMU: Reserve Requirements as of End-2005 (In percent)

	16 Dec 00- 15 Apr 00	16 Apr 00- 15 Aug 00	16 Aug 00- 15 Sep 00	16 Sep 00- 15 Apr 02	16 Apr 02- 15 Mar 04	16 Mar 04- 15 Jun 05	Since Jun 16 05
BENIN	3.0	3.0	9.0	9.0	9.0	13.0	15.0
BURKINA FASO	3.0	3.0	3.0	3.0	3.0	3.0	7.0
CÔTE D'IVOIRE	1.5	3.0	3.0	5.0	5.0	5.0	5.0
GUINEA-BISSAU	3.0	3.0	3.0	3.0	3.0	3.0	3.0
MALI	3.0	3.0	3.0	3.0	9.0	9.0	9.0
NIGER	1.5	3.0	5.0	5.0	5.0	5.0	9.0
SENEGAL	1.5	3.0	9.0	9.0	9.0	9.0	9.0
TOGO	1.5	3.0	3.0	3.0	3.0	3.0	3.0
AVERAGE	2.3	3.0	4.8	5.0	5.8	6.3	7.5
STD. DEV.	0.8	0.0	2.5	2.4	2.6	3.5	3.7

Source: BCEAO

OVERVIEW OF THE METHODOLOGY

Data and Model description

The methodology underlying the trade expansion analysis, which is conceptually straightforward. Trade is greatly facilitated by good transport infrastructure. Our analysis seeks to establish an empirical relationship between trade flows among China and Senegal and the quality of infrastructure while controlling for other factors such as the economic size of exporting and importing countries. I estimating by using the Last Squares (LS) method; our data are from the International Financial Statistics (IFS). And it starts from 2000Q1 to 2009Q4.

There are two main innovations in this work. Firstly, the analysis for China generates estimates of trade expansion at the international level rather than between West African countries. This complicates matters considerably because very few countries collect data on internal trade flows.

But a credible analytic framework at the International level would open up tremendous opportunities for West African countries engagement in the transport sector. Secondly, the applications for West Africa and ECA based the main impact evaluation on improvements in an imputed, general quality measure of trade network links that is assumed constant between China and West African countries (as in the case of Senegal). This was necessary, because detailed infrastructures quality information is not consistently available across countries. The analysis presented here, in contrast, measures the impact of improvements in travel times between economic countries. These are calculated using spatially referenced trade network.

The methodology employed in our analysis builds upon the estimation of a gravity model of trade between China and West African countries. This model, in analogy to the theory of gravity in physics, states that the trade volume between two trading partners is proportional to their economic size, and inversely proportional to the distance of separation between them.

Therefore we expect two bigger countries to trade more than two smaller ones, and countries that are located in close proximity are likely to trade more than those that are further apart. The measure of an economy's size is usually GDP or gross country product.

Mathematically, this yields the following formulation of the gravity trade model:

$$T_{ij} = k \frac{E_i^\alpha M_j^\alpha}{d_{ij}^\gamma}$$

Where T_{ij} = Trade volume between counties i and j.

E_i = Economic scale of the exporting country i.

M_j = Economic scale of the importing country j.

d_{ij} = Distance or travel time between countries i and j.

k = A scaling parameter.

Many extensions of the standard gravity model have been proposed. These incorporate additional information that may influence trade between two countries such as whether trading partners share a common border or common language, special trade agreements or general measures of remoteness.

In practice, straight line and even network distance is an incomplete measure of "friction" between two trading countries, since it ignores the quality of transport infrastructure that facilitates or hinders trade. Network quality can be incorporated in the trade model by adding a separate term that measures road quality for each network link. Our analysis instead uses GIS computed travel times between trading partners as the measure of separation, which is an aggregate measure of both, distance and road (boats) quality.

The initial gravity model parameters are estimated using trade flows for 1997 between Chinese provinces and travel times computed using the road network representation that does not include expressways. After applying a log transformation and retaining d_{ij} as the measure of travel time, we estimate the following regression:

$$(2) \text{Log}T_{ij} = k + \alpha \cdot \text{Log}E_i + \alpha \cdot \text{Log}M_j + \gamma \cdot \text{Log}d_{ij} + \varepsilon_{ij}$$

Although this model is estimated using countries level data, I am ultimately interested in specific trade flows between China and Senegal through the boats network. Therefore, I use the estimated parameters from the countries level model together with estimated countries level of Imports and Exports, and the travel times between countries, to predict baseline flows Beijing-Dakar, Shanghai-Dakar, or Guangzhou-Dakar.

The model estimation

The main policy simulation is used to assess how trade flows would increase or decrease along the years with the reduction in travel times due to the implementation of the expressway program. We replace base network travel times with those derived from the main cities and the values of imports and exports. The difference between the China's main cities to Dakar are not significant, considering the two boats, one leave Guangzhou and the other leave Shanghai. They almost spend the same time 28 to 30 days, because, the distances are approximately 14,000 kilometers.

The estimate of the model Log T gives:

$$(3) \quad \text{Log}T_{ij} = 0.703 + 0.454.\text{Log}E_i + 0.544.\text{Log}M_j$$

(0.703) (0.454) (0.544)

The exports and imports are significant and their coefficients (t-statistics > 2) are respectively 0.454 (110.523) and 0.544 (140.094). The distance is not correlated and it gives a line vector.

The imports and exports are positively correlated to the trade volume. When imports and exports increase (decrease), the trade volume increases (decrease). In this case the distance does not have any effect on the trade volume. In order to have a larger view, I'll integrate other functions including the difference function.

The difference function:

$$(4) \quad d\text{log}T_{ij} = 0.001 + 0.544.d\text{log}E_i + 0.443.d\text{log}M_j$$

(0.001) (0.544) (0.443)

The difference logarithmic function's coefficients are less significant than the logarithmic function. The distance is also a line function.

With the Log function, the t-statistic value of elasticity trade exports (trade imports) is higher than in the difference log function. The constant t-statistic is also higher with the Log function than with the difference Log function.

Trade between China and Senegal depends on imports and exports, but not on distance, because, the distances between cities are almost the same. The main factors that influence the trade is the increasing good demand, China needs mineral resources from West Africa and particularly Senegal. And West Africa also needs manufactured products from China. However the distance, when the price is more cheap compares to the other countries, clients will go where the total cost are more benefit for them.

Functions	Constant (exogenous)	Exports constant	Imports constant
LOG	0.703	0.454	0.544nn
DLOG	0.001	0.544	0.443
T-STATISTIC LOG	89.849	110.522	140.094
T-STATISTIC DLOG	1.262	108.688	93.263
R-SQUARE LOG	0.999		
R-SQUARE DLOG	0.999		

CONCLUSION

This paper has provide an assessment, based on fractional information, of China's economic involvement in Africa (with the focus on Senegal) and to identify the forces shaping burgeoning China-West Africa economic relations. The study is undertaken against the background of a rapidly changing landscape of international trade and finance that has eclipsed traditional aid flows to middle income countries, making West Africa ever more central to development finance.

For West Africa, China have been a market, a donor, a financier and investor, a contractor, and a builder. While aid was historically of major importance, two significant changes have occurred since the turn of the new century. Because trade and investment have become much more significant in volume than aid flows, economic relations between China and West Africa are clearly commercial rather than aid-driven. Meanwhile, the private sector has stepped to center stage. Here China's foreign economic relations mirror changes in its domestic economy.

China-West Africa economic exchanges have become much more decentralized and broad-based.

The paper has identified four factors associated with recent changes in China's economic engagement with West African. Chinese trade to West African countries and particularly Senegal, growing and specially exports. China's financial approach and West Africa's financial integration are mainly mentioned. China's financial institutions have been instrumental in cementing the new commerce-based and economic ties. In the process, they are helping correct chronic undervaluation of Africa by investors and helping fund new investments in Africa's exports and infrastructures.

Africa will become an increasingly attractive market as incomes rise. Progress in regional integration makes its markets even more attractive. It will also become a key destination for FDI, and it will continue to need infrastructures. Together, these powerful market forces may put Sino-Africa economic relations firmly on a commercial footing. Both public and private sectors have a part to play in ensuring that the expanding trade and investment ties are mutually beneficial and contribute to sustainable growth and development in Africa. The impacts of

possible changes in Chinese demand for African terms of trade, trade patterns and technology transfer for African countries is worthwhile topics for further research.

More generally, the African continent will undoubtedly remain an attractive market showing constant growth (if only in demographic terms) for Chinese manufactured products. The risk of a growing “invasion” of competing imports or imports preventing the development of local industry should therefore be taken into account. To balance this, two factors could encourage Chinese investors to finance West African industry: firstly, the increase in sea transportation costs should progressively favor the creation of primary processing units in particular (iron, bauxite).

Secondly, the prospect of the Economic Partnership Agreements (EPAs) between African regions and the European Union should encourage Chinese industrialists (but also Indian, Brazilian, etc.) to produce within these regions in order to gain access to the European market. The ECOWAS zone is, from this perspective, particularly well-positioned as it offers three advantages: geographic proximity to Europe, availability of raw materials (cotton, iron, bauxite, etc.) and a more available, abundant and low-cost workforce than in North Africa, for example. If this hypothesis is proven, it is probable that countries with non-convertible currency (Ghana, Nigeria, etc.) will be more attractive than countries in the franc/euro zone where production costs are higher.

Political and geo-strategic considerations will undoubtedly continue to have an impact and will probably compensate to some extent for this bias. Whatever may happen, many African leaders see the Chinese irruption on their continent as an economic opportunity, doubled by a political opportunity— “What if Africa became a strategic issue, it could leave the area of submission to go forward into the era of negotiation.”

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Forum on China-Africa Cooperation <http://www.focac.org/eng>

International Energy Agency (OECD) <http://www.iea.org>

West Africa: The big rush <file:///D:/These%20CHINA/West%20Africa%20International%20Finance.htm>

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A COMPARATIVE ANALYSIS OF THE ADOPTION RATES OF SOCIAL NETWORKING AND MICROBLOGGING BETWEEN INDUSTRIALIZED AND DEVELOPING NATIONS

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ABSTRACT

This paper provides an analysis of an emerging trend in online social interaction service adoption for Brazil, Russia, India, and China, also known as the (BRIC) countries, and also for so-called newly industrialized countries (NICs) such as Malaysia and Mexico using data collected from a global panel survey started in July 2009 and continues today. We posit that developing countries, when compared to technologically and economically more mature developed countries, are adopting Microblogging services such as Twitter at a significantly greater and relative rate than Social Networking Services such as Facebook.

This assertion is supported using a Z test comparing the proportions of users for each service type in each country type surveyed. If the observed pattern continues it will have important implications to firm's intent on communicating marketing messages using so-called Web 2.0 applications and services in these highly sought-after new growth markets.

INTRODUCTION

In recent years the world has seen a seismic expansion of social broadcast behavior on the worldwide web. The rapid adoption of online social interaction services and applications is not limited to modern technologically advanced countries. In January 2010 The Economist reported the following information on the growth and broad global reach of this phenomenon. *The globe's largest online social network boasts over 350m users--which, were it a nation, that would make Facebook the world's third most populous after China and India. That is not the only striking statistic associated with the business. Its users now post over 55m updates a day on the site and share more than 3.5 billion pieces of content with one another every week. As it has grown like Topsy, the site has also expanded way beyond its American roots: today some 70% of its audience is outside the United States (The Economist, 2010).*

Web-based social interaction is taking root in a significant number of developing countries. The sheer size of the populations of developing nations combined with the continued proliferation of mobile internet access within them makes the growth potential for web-based social broadcasting great in these countries. China and other emerging markets throughout the

world will account for 75% of the world's total growth in the next two decades and beyond, according to U.S. Department of Commerce estimates (Cateora et. al, 2009). Therefore, web based social interaction may provide marketers an important way promote their products and services within these countries.

This paper provides an analysis of an emerging trend in online social interaction service adoption for Brazil, Russia, India and China also known as the (BRIC) countries and also for so-called newly industrialized countries (NICs) such as Malaysia and Mexico using data collected from a global panel survey started in July 2009 and continues today. We posit that developing countries when compared to technologically and economically more mature developed countries are adopting Microblogging services such as Twitter at a significantly greater and relative rate than Social Networking Services such as Facebook.

This assertion is supported using a Z test comparing the proportions of users for each service type in each country type surveyed. If the observed pattern continues it will have important implications to firm's intent on communicating marketing messages using so called Web 2.0 applications and services in these highly sought after new growth markets.

This study is significant because it provides critical information on the preferences of developing nations to two distinct and pervasive categories of online social interaction service. Firms interested in penetrating markets in developing countries must understand their unique cultural biases towards different types of marketing communication channels outside the traditional marketing channels. Properly selected online social interaction services and applications may provide opportunities for marketers to better promote their products and services within these developing countries.

LITERATURE REVIEW

The world has seen an unprecedented rapid rise in the adoption of online social interaction applications and services. In the US alone Facebook usage grew from 42,089,200 in January 2009 to 103,085,520 in January 2010 which means that over 50% of the US population are now registered Facebook users. Moreover although the majority are of younger age demographics the 34-55 age group grew 329% between 2009 and 2010 to almost 3 of 0,000,000 users and 29% of the Facebook users (Corbett, 2009).

Online social interaction applications and services are a subset of the so-called Web 2.0 world. We have been careful to use the term Web 2.0 sparingly because there has been some debate on what constitutes Web 2.0 and whether it is just marketing jargon (Laningham, 2006). The debate over Web 2.0 was most visibly made between Tim O'Reilly whom is largely credited with coining the term Web 2.0 and Tim Berners-Lee whom is largely credited for inventing the web. Recently the two seem to have come to terms in that Web 2.0 does in fact exist as evidenced in an interview conducted by Tim O'Reilly with Tim Berners-Lee (Web 2.0 Summit, 2009). O'Reilly has documented a hierarchy of Web 2.0 applications however it is unlikely that

Berners-Lee and other web pundits are in complete agreement with O'Reilly's scheme. The term Web 2.0 does appear in the literature and is therefore useful at least for referential purposes.

The term Web 2.0 is commonly associated with web applications that facilitate interactive information sharing, interoperability, user-centered design, and collaboration on the World Wide Web (Wikipedia, 2010). Although Wikipedia is not typically considered a proper academic reference due to its lack of rigor and limited source transparency it seems an appropriate reference for this definition considering Wikipedia is a classic example of a Web 2.0 collaborative application known as a wiki.

Online social networks are increasingly being recognized as an important source of information influencing the adoption and use of products and services. Viral marketing—the tactic of creating a process where interested people can market to each other—is therefore emerging as an important means to spread-the-word and stimulate the trial, adoption, and use of products and services. (Subramani, Rajagopalan, 2003) A recent example supporting Subramani & Rajagopalan's ascertains was the domestic USA launch of the internationally popular Ford Fiesta. In April 2009 Ford tapped 100 top bloggers and gave them a Fiesta for six months. The catch: Once a month, they're required to upload a video on YouTube about the car, and they're encouraged to talk — no holds barred — about the Fiesta on their blogs, Facebook and Twitter (PEW, 2009).

Researchers such as Thackeray add some prudent perspective to the hype surrounding Web 2.0 type promotions. Because of the novelty and potential effectiveness of Web 2.0, social marketers may be enticed to prematurely incorporate related applications into promotional plans. However, as strategic issues such as priority audience preferences, selection of appropriate applications, tracking and evaluation, and related costs are carefully considered, Web 2.0 will expand to allow promotion practitioners more direct access to consumers with less dependency on traditional communication channels (Thackeray, et. al, 2008). Some of the strategic issues raised such as audience preference and appropriateness of applications become even more significant in the international marketing environment. In this study we set out to add knowledge to the literature useful in addressing the strategic issues of audience preference and appropriate applications for developing nations.

Mikolaj Jan Piskorski of the Harvard Business School sets a framework for exploration in his collaboration with Tommy McCall a prominent Information Graphics Editor and Designer. They construct a visual model of international usage patterns for social internet usage. As the analyst on this project Pioskorski makes the following comment discusses their behavioral world map. *“Perhaps the most interesting developments are in emerging markets, where users are going online in ever growing numbers. Unlike Western users, many of whom established their patterns when the technology was fairly limited, users in the BRIC nations are joining a much more diverse social web. On four of the five broadcast behaviors, these countries demonstrate the most balanced use of various types of social platforms. And emerging markets have much*

more room to grow their internet populations, so the experimentation is likely to continue” (Piskorski, M., McCall, T., 2010).

The model mapping the so-called social internet visualizes five social broadcast behaviors in total that should be of most interest to potential marketers. The broadcast behaviors are Social Networking Services, Video Sharing Services, Photo sharing services, Blogs, and Micro Blogs. In this study we further analyze the Piskorski and McCall model categories or so called broadcast behaviors. This study argues that their selection of social internet service categories are the most attractive to marketers targeting developing countries because they possess the following characteristics; rapid growth potential, worldwide adoption patterns and user centricity in application. The first two criteria make sense a priori. User centricity is also an important attribute because it potentially allows targeting of identifiable consumer segments.

In order to better clarify what each social broadcast behavior means selected examples of service providers for each behavioral category broadcast behavior category are provided in Table 1 on the following page. Please note some service providers operate in more than one behavioral category.

SOCIAL NETWORKING	VIDEO SHARING	PHOTO SHARING	BLOG	MICROBLOG
Facebook	YouTube	Flickr	Huffingtonpost	Twitter
MySpace	GoogleVideo	Fotolog	Mashable!	Frazr
LinkedIn	YahooVideo	Kodak Easy Share	Eurogamer	Pownce
Orkut	Dailymotion	Photobucket	BoingBoing	Tumblr
Hi5	Blip.tv	Snapfish	Gizmodo	Jaiku
Tagged	Flixya	Webshots	The International Student Blog	Foursquare

METHODS

Sample

The data analyzed is based on a panel survey commissioned by Trendstream Research utilizing Lightspeed Online Research survey panelists around the world. Trendstream Research is a London based market research company offering advanced analysis of social networking trends. Lightspeed Online Research, Inc is a private Market Research and Analysis firm located in Basking Ridge, NJ with offices around the world. This study uses the first 3 panel survey waves released over a year period between July 2009 and July 2010. Wave 1 was released in July 2009 Wave 2 was collected in the second half of 2009 and subsequently released in January 2010. Wave 3 was collected between January 2010 and July 2010 when it was released. The number of respondents from each country is provided in Tables 2A 2B and 2C (following).

COUNTRY	SAMPLE SIZE	COUNTRY	SAMPLE SIZE	COUNTRY	SAMPLE SIZE
Australia	750	India	762	Russia	761
Brazil	755	Italy	1038	South Korea	755
Canada	1032	Japan	922	Spain	1004
China	1011	Malaysia	0	UK	2298
France	1007	Mexico	7524	USA	2129
Germany	1047	Netherlands	752		

COUNTRY	SAMPLE SIZE	COUNTRY	SAMPLE SIZE	COUNTRY	SAMPLE SIZE
Australia	751	India	768	Russia	747
Brazil	765	Italy	1005	South Korea	755
Canada	1014	Japan	751	Spain	1010
China	1002	Malaysia	0	UK	2009
France	1003	Mexico	756	USA	2004
Germany	1003	Netherlands	761		

COUNTRY	SAMPLE SIZE	COUNTRY	SAMPLE SIZE	COUNTRY	SAMPLE SIZE
Australia	769	India	753	Russia	756
Brazil	756	Italy	1016	South Korea	754
Canada	1003	Japan	751	Spain	1008
China	1000	Malaysia	751	UK	2025
France	1026	Mexico	763	USA	2003
Germany	1002	Netherlands	776		

Data Collection

In order to prevent respondent fraud and ensure the quality of the panel data a series of real-time checkpoints are used. New panel registrants have to pass all the checkpoints when completing the panel registration survey. Registrants who fail any of the checks are unable to join the panel were not allowed to participate in surveys. The checkpoints used are provided in table 3 (below).

PROXY DETECTION	Detect a proxy server used to mask the registrant's true IP address and past fraudulent activity
IP GEOFENCING	Locates the registrant's country of origin through his/her IP address and determines their eligibility for registration based on country-specific rules
POSTAL ADDRESS VERIFICATION	Verify the registrant's postal address and zip/postal codes against a current country-specific address directory
CAPTCHA	Prevent automated programs from joining our site through a challenge-response test
EMAIL ADDRESS VERIFICATION	Query our database to ensure the email address is unique (all panelists must verify their email address through a double opt-in registration process)

Once the panelists are registered measures to identify and remove fraudulent survey data are taken through a series of quality checks. Respondents who do not participate in the survey to the best of their abilities were identified and all survey answers they provide are removed from the final data. The participant quality checks are provided in table 4 (below).

RESPONDENT ENGAGEMENT	At the beginning of a survey, respondents must agree to provide honest, thoughtful answers to each question
SURVEY SPEEDSTERS	Respondents who rushed through the survey are identified by comparing survey completion times to the norm
GRID SPEEDSTERS	Respondents who rushed through grid questions are identified by comparing grid completion times to the norm
TRAP QUESTIONS	Survey questions with obvious answers can determine whether a respondent is fully engaged with the survey
RESPONDENT SATISFACTION	At the end of a survey, feedback from respondents is gathered and assessed to help determine the quality of the survey

Since the study is designed to analyze the behavior of people that have access to the internet the large sample size provides a sample that is representative of the population of online users in each country. The measures taken during the data collection process ensure the validity of the respondents and the quality of their responses.

Analysis

After thoroughly scanning of the aforementioned broadcast behavior categories (e.g. Web 2.0 subcategories) our analysis narrowed down to Social Networking and Microblogging because these broadcast behaviors showed visual evidence of higher adoption rates for microblogging relative to social networking for developing nations as opposed to developed (industrial) nations. The data selected for further statistical analysis is presented in Appendix 1.

The available data is grouped into two populations. The first population group is the modern industrialized countries that included Australia, Canada, France, Germany, Italy, Japan,

Netherlands, South Korea, Spain UK and USA. The population of developing countries based on the available data included Brazil, Russia, India, China, Malaysia and Mexico.

The next step is to determine if the proportional difference of the groups is statistically significant to the point where it could not be explained by random chance. In order to make this determination the data is analyzed using a Z test of the proportions of each population. However since our populations were made up of multiple countries we took some initial steps to prepare the data for analysis.

Before comparing the proportions of the groups an outlier test is to run to determine if any countries or panels could skew the results. The outlier test selected is the Grubbs' test, also called the ESD method (extreme studentized deviate) test. We run the test at a significance level of .01 and calculated the proportion of microbloggers in each country to the proportion of social networkers in each country as our input. We run one test for our developed country population and one test for our developing country population. One outlier is identified in the first wave of the panel for South Korea.

The next step is to consolidate proportional use of microblogging to social networking by population. This is accomplished by calculating the mean of the proportions of the developed countries and the mean of the proportions of the developing countries.

The final step of our analysis is to run the Z test for the proportions of microbloggers versus social networkers comparing the population of developing countries against developed countries. The collective sample size for the developed country population is 37,689. The collective sample size for the developing country population is 19,630.

Results

GRUBB'S TEST – DEVELOPING COUNTRIES				
Descriptive Statistics – Developing Countries				
Mean: 0.3794 SD: 0.1578 # of values: 16				
Outlier detected? No Significance level: 0.01 (two sided)				
WAVE	COUNTRY	RATIO OF MICROBLOGGING TO SOCIAL NETWORKING	Z	SIGNIFICANT OUTLIER?
Wave 1	Brazil	0.23	.09466	
Wave 2	Brazil	0.28	.06298	
Wave 3	Brazil	0.37	.0594	
Wave 1	China	0.78	2.5389	
Wave 2	China	0.5	0.7644	
Wave 3	China	0.7	2.0319	
Wave 1	India	0.42	0.2575	
Wave 2	India	0.36	0.1228	
Wave 3	India	0.38	0.004	
GRUBB'S TEST – DEVELOPING COUNTRIES				
Descriptive Statistics – Developing Countries				

Mean: 0.3794 SD: 0.1578 # of values: 16 Outlier detected? No Significance level: 0.01 (two sided)				
WAVE	COUNTRY	RATIO OF MICROBLOGGING TO SOCIAL NETWORKING	Z	SIGNIFICANT OUTLIER?
Wave 3	Malaysia	0.24	0.8833	
Wave 1	Mexico	0.35	0.1862	
Wave 2	Mexico	0.31	0.4396	
Wave 3	Mexico	0.31	0.4396	
Wave 1	Russia	0.25	0.8199	
Wave 2	Russia	0.28	0.6298	
Wave 3	Russia	0.31	0.4396	

GRUBB'S TEST – DEVELOPED (INDUSTRIALIZED) COUNTRIES Descriptive Statistics – Developed Countries Mean: 0.2406 SD: 0.1913 # of values: 33 Outlier detected? Yes - Critical value of Z: 3.28581505962 Significance level: 0.01 (two-sided)				
WAVE	COUNTRY	RATIO OF MICROBLOGGING TO SOCIAL NETWORKING	Z	SIGNIFICANT OUTLIER?
Wave 1	Australia	0.15	0.4736	
Wave 2	Australia	0.13	0.5782	
Wave 3	Australia	0.2	0.2123	
Wave 1	Canada	0.11	0.6827	
Wave 2	Canada	0.14	0.5259	
Wave 3	Canada	0.16	0.4213	
Wave 1	France	0.14	0.5259	
Wave 2	France	0.11	0.6827	
Wave 3	France	0.09	0.7872	
Wave 1	Germany	0.18	0.3168	
Wave 2	Germany	0.12	0.6304	
Wave 3	Germany	0.21	0.16	
Wave 1	Italy	0.33	0.4673	
Wave 2	Italy	0.27	0.1536	
Wave 3	Italy	0.24	0.0032	
Wave 1	Japan	0.53	1.5127	
Wave 2	Japan	0.47	1.1991	
Wave 3	Japan	0.59	1.8263	
Wave 1	Netherlands	0.08	0.8395	
Wave 2	Netherlands	0.11	0.6827	
Wave 3	Netherlands	0.05	0.9963	
Wave 1	South Korea	0.88	3.3422	Outlier.P<0.01
Wave 2	South Korea	0.52	1.4604	
Wave 3	South Korea	0.62	1.9831	

GRUBB'S TEST – DEVELOPED (INDUSTRIALIZED) COUNTRIES				
Descriptive Statistics – Developed Countries				
Mean: 0.2406 SD: 0.1913 # of values: 33				
Outlier detected? Yes - Critical value of Z: 3.28581505962				
Significance level: 0.01 (two-sided)				
WAVE	COUNTRY	RATIO OF MICROBLOGGING TO SOCIAL NETWORKING	Z	SIGNIFICANT OUTLIER?
Wave 1	Spain	0.19	0.2645	
Wave 2	Spain	0.19	0.2645	
Wave 3	Spain	0.29	0.2582	
Wave 1	UK	0.12	0.6304	
Wave 2	UK	0.14	0.5259	
Wave 3	UK	0.14	0.5259	
Wave 1	USA	0.16	0.4213	
GRUBB'S TEST – DEVELOPED (INDUSTRIALIZED) COUNTRIES				
Descriptive Statistics – Developed Countries				
Mean: 0.2406 SD: 0.1913 # of values: 33				
Outlier detected? Yes - Critical value of Z: 3.28581505962				
Significance level: 0.01 (two-sided)				
WAVE	COUNTRY	RATIO OF MICROBLOGGING TO SOCIAL NETWORKING	Z	SIGNIFICANT OUTLIER?
Wave 2	USA	0.14	0.5259	
Wave 3	USA	0.14	0.5259	

The mean proportion of the developed countries is 0.22 with South Korea Wave 1 removed. The mean proportion of the developing countries is .38. The Z test for the proportions is run at a confidence level of 99% and yields the following results.

Confidence Level: 99%

Group 1

Base size: 37689

Proportion: 8292 (22%)

Group 2

Base size: 19630

Proportion: 7459 (38%)

Z Value: 40.71

1-Tail Confidence Level: 100% (Significant)

2-Tail Confidence Level: 100% (Significant)

The Z-Test for Two Proportions tests proportions from two independent groups to determine if they are significantly different from one another. By converting a Z value of 40.71

to a probability we can state that the odds of this difference in usage rate being random chance is 1 in infinity. Therefore these results conclusively support the case that developing nations are using interacting on the web differently than developed nations when comparing microblogging to social networking.

DISCUSSION

The total number of users of interactive online services, social networking or other Web 2.0 applications in developing nations comprises a very small portion of the overall populations of these nations. However these countries have historically been slower in experiencing technology diffusion due to limitations in infrastructure, income and possibly to some extent cultural predisposition. With these facts in mind it is still fair to say that the adoption rates of Web 2.0 services have been high in many of these countries for those not blocked by the so called digital divide. Also the proliferation of mobile/wireless access is creating increased internet access opportunities in developing countries. These factors support the prospect for rapid growth in the adoption of online services in countries with formerly limited access. Therefore, our results demonstrate a statistically significant difference in the early stage adoption rates of microblogging services as compared to the dominant social networking services in developing nations. This finding should send a strong message to firms planning to use these types of services to carefully consider the vehicle they are using for the intended promotional message.

It is anticipated that the penetration of both social networking and microblogging will continue to grow in developing countries to market usage rates closer to those of industrialized nations. It is unclear whether the types of services adopted will be consistent with the western countries who are the predominant early adopters of social internet usage. This study is an early attempt to start this line of investigation.

More research is needed to understand the differences in the motivations of developing nation users of dominant pure play social networking services such as Facebook as opposed to the motivations of using microblogging services such as Twitter. Commercial research firms such as Trendstream, Comshare, Sysmos and Nielsen Experian are collecting this type of information. Additionally there are several models and indexes in academic literature that could be useful in explaining factors that may contribute to differing technology adoption patterns in developing countries. Finally studies analyzing the effectiveness of each category of interactive service as a marketing tool in developing nations would also be valuable. This is particularly important as the use of these non-traditional promotional channels grow in concert with the anticipated growth of markets in developing nations.

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Appendix 1							
POPULATION GROUP 1 DEVELOPED COUNTRIES				POPULATION GROUP 2 DEVELOPING COUNTRIES			
COUNTRY	PANEL WAVE	PERCENT WITH SOCIAL NETWORK PROFILE	PERCENT MICRO BLOGGING	COUNTRY	PANEL WAVE	PERCENT WITH SOCIAL NETWORK PROFILE	PERCENT MICRO BLOGGING
Australia	1	40	6	Brazil	1	60	14
Australia	2	45	6	Brazil	2	64	18
Australia	3	46	9	Brazil	3	67	25
Canada	1	46	5	China	1	27	21
Canada	2	49	7	China	2	46	23
Canada	3	43	7	China	3	47	33
France	1	29	4	India	1	57	24
France	2	35	4	India	2	64	23
France	3	43	4	India	3	66	25
Germany	1	33	6	China	1	27	21
Germany	2	26	3	China	2	46	23
Germany	3	29	6	China	3	47	33
Italy	1	36	12	Malaysia	3	72	17
Italy	2	41	11	Mexico	1	40	14
Italy	3	42	10	Mexico	2	48	15
Japan	1	15	8	Mexico	3	49	15
Japan	2	17	8	Russia	1	48	12
Japan	3	17	10	Russia	2	53	15
Netherlands	1	36	3	Russia	3	59	18
Netherlands	2	35	4				
Netherlands	3	38	2				
South Korea	1	16	14				
South Korea	2	25	13				
South Korea	3	26	16				
Spain	1	36	7				
Spain	2	42	8				
Spain	3	42	12				
UK	1	43	5				
UK	2	49	7				
UK	3	50	7				
USA	1	44	7				
USA	2	49	7				
USA	3	50	7				

UNCERTAINTY AVOIDANCE INDEX AND ITS CULTURAL/COUNTRY IMPLICATIONS RELATING TO CONSUMER BEHAVIOR

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ABSTRACT

Geert Hofstede's (1980) seminal study of national cultures involving five dimensions of cultures laid the foundation for researchers to investigate this phenomenon in greater detail. Hofstede's study rated sixty eight countries on five cultural dimensions – power distance, uncertainty avoidance, individualism, masculinity, and long term orientation. This study uses one of these cultural dimensions - uncertainty avoidance index - and associates it to the behavior of consumers in different cultures/countries. The study proposes and tests five hypotheses involving uncertainty avoidance and its implication for consumers in sixty eight countries in six continents – North America, South America, Africa, Europe, Australia, and Asia. The study finds support for three of the five hypotheses.

THEORETICAL BACKGROUND

Culture has been defined as a shared set of values and beliefs by Hofstede (1980), and it is common to members of the group (Hall 1966) and separates them from other groups (Hofstede 1997). Cultural values define the self and personality of consumers in different cultures. The five dimensions of cultural values as proposed by Hofstede (1980, 2001), and Hofstede and Hofstede (2005) are – power distance (low vs. high), uncertainty avoidance (low vs. high), individualism (vs. collectivism), masculinity (vs. femininity), and long term (vs. short term) orientation. Countries with high power distance index have a great inequity between superiors and subordinates. Countries with high uncertainty avoidance index have a society where people do not like to take risks and prefer security and safety in everyday life. Countries that rank high in the individualism index have societies that promote self interest rather than the interest of the group. Finally, countries that score high on the masculinity index have societies where the gap between men and women is very wide.

Scholars have studied the influence of all of the cultural factors that were proposed by Hofstede (1980), and its impact on behaviors of people in different cultures (countries). However, there is conflicting viewpoint about the impact of culture on consumption. There are some who think that since the world is getting smaller, people are travelling more, cultures are getting more homogenous and thus their preferences are becoming similar (Elinder 1965, Ganesh 1998; Hannerz 1990; Levitt 1983). Walker (1996) thinks that the consumer culture has been

homogenized by mass media while Jain (1989) concludes that the homogenization is the effect of socio-economic infrastructures and economic development. Companies have subsequently started using somewhat standardized marketing strategies for different cultures and countries (Zou and Cavusgil 2002), which has led companies to promote global brands (Aaker and Joachimsthaler 1999), and position their products to a global consumer culture (Alden, et al. 1999).

On the other hand, there are those who believe that there is not enough information that there has been any convergence of national cultures to a so called global consumer culture. Usunier (1997), Craig et al. (1992) think that the opposite is true, especially in industrialized countries where there appears to be some divergence in people's behaviors. This is because national cultural values are deeply influenced by a country's history (De Mooij 2000), and even after people are exposed to different cultures they hold on to their own values and do not necessarily change and start buying foreign products which may be cheaper (Kotler 1986; Suh and Kwon 2002).

This leads one to believe that cultural differences still play a dominant role (Clark 1990; Steenkamt et al. 1999; Hofstede 2007; Takada and Jain 1991) in determining the values of people in different cultures and ultimately their behavior (Markus and Kitayama 1991; Triandis 1989). Cultural differences have been linked to the differences in attitudes and persuasion (Aaker 2000; Aaker and Maheswaran 1997; Chang and Chieng 2006), emotions (Matsumoto et al. 2008; Wang et al. 2006; Yuki et al. 2007) behavior and habits of consumers (Green and Langeard 1975; Hempeel 1974; Lee and Green 1991; Malhotra and McCort 2001; Zhang and Gelb 1996).

Diffusion of new products (Dwyer et al. 2005; Gatignon et al. 1989; Ganesh 1998; Ganesh et al. 1997; Helsen et al. 1993; Kumar et al. 1998; Kumar and Krishnan 2002; Mahajan and Muller 1994; Takada and Jain 1991; Talukdar et al. 2002; Steenkamp 2001; Steenkamp et al. 1999; Van Everdingen and Waarts 2003; Yaveroglu and Donthu 2002), acceptance of new products (Yeniyurt and Townsend 2003), innovativeness (Shane 1995; Tellis, et al. 2003), entrepreneurship (Morris et al. 1993), organizational behavior Hofstede (1983), and consumption of products and services (Chui and Kwok 2008; Suedo 2004) have also been linked to the differences in cultural values of different cultures (countries).

Culture's impact on branding has been studied by Aaker and Joachimsthaler (1999), Aaker et al. (2001), De Mooij (2004, 2010), Duncan and Ramprasad (1995), Foscht et al. (2008), Monga and Roedder (2007), Sung and Tinkham (2005), and Taylor (2002, 2005, 2007). Culture's influence on advertising has been studied by Albers (1994), Albers-Miller and Gelb (1996), Calantone et al. (2006), Chang et al. (2007), Cho et al. (1999), Cutler et al. (1997, 2000), De Mooij (2003, 2010), De Mooij and Hofstede (2010), Dow (2005), Faiola and Matei (2005), Gudykunst and Ting-Toomey (1988), Han and Shavitt (1994) McQuarrie and Phillips (2008), Mindy (2001), Miracle (1987), Miracle et al. (1992), Miyahara (2004), Nelson and Paek (2008), Okazaki et al. (2006), Pae et al. (2002), Polegato and Bjerke (2006), Praet (2001), Singelis and

Brown (1995), Singh et al. (2006), Souiden et al. (2006), Stern and Resnik (1991), Roth (1995), Taylor (2005, 2007), Taylor and Okazaki (2006), Wong and Merrilees (2007), Zandpour et al. (1994), and Zhou et al. (2005). Culture's influence on international travel and tourism was studied by Money and Crofts (2005).

Uncertainty Avoidance

Hofstede (1980) uses the term uncertainty avoidance based on Cyert and March's (1964) study and defines it as, "the extent to which people feel threatened by uncertainty and ambiguity and try to avoid these situations" (De Mooij and Hofstede 2010, pg. 89). Countries with high uncertainty avoidance need rules and formality to structure life. Uncertainty avoiding societies may be less innovative than uncertainty accepting societies (Hoffman and Hegarty 1993; Kedia et al. 1992; Shane 1995). Cultural values like uncertainty avoidance explain the differences in the corporate venturing process in different countries (Venkataraman et al. 1993). Uncertainty avoiding societies prefer to conform to organizational norms and procedures (Schneider 1989). Uncertainty avoidance has also been associated with ethical orientation (Boldgett et al. 2001, Vitell et al. 1993; MacNab et al. 2004), quality control (Lagrosen 2002), R&D (Hoppe 2004), and corporate governance (Hofstede 2004).

On the other hand, uncertainty accepting cultures do not demand high levels of documentation and formal plans and projections before making decisions (Horovitz 1978), they have greater tolerance for different ideas and prefer autonomy (Hofstede 1980), have less formal organizations (Hofstede 1997), and less regulations and high codes of behavior (Rodrigues and Kaplan 1998). People in countries that are low on the uncertainty avoidance index are also more likely to punish corporations for irresponsible behavior than people who live in countries with high uncertainty avoidance index (Williams and Zinkin 2004). Since citizens of a country have similar language, history and religion, nationality has been considered synonymous and used as a proxy for culture (Dawar and Parker 1994; Hofstede 1983).

RESEARCH OBJECTIVES

This study uses Hofstede's cultural dimension of uncertainty Avoidance Index (UAI) and extends the implications of UAI to consumers in different countries/cultures using the following hypotheses.

People in countries with higher uncertainty avoidance index do not feel secure about the outcome of investments and thus the tendency to not invest in ventures, especially if they are perceived as risky. Since people living in countries with low UAI like taking risk, they do not mind taking risks and will invest a higher percentage of their income relative to those living in countries with high UAI. This leads to hypothesis 1.

H1: People living in countries with high UAI will have a lower investment rate than those living in countries with lower uncertainty avoidance index.

People living in countries with a high UAI do not like to invest their money in business ventures since these cultures believe that investment is fraught with uncertainty and is risky. People in countries with lower uncertainty avoidance index embrace the idea of market risks and market based rewards instead of government dictated outcomes. Outcomes of the free market system like success and failures is widely embraced and accepted much more than high uncertainty avoidance cultures. Governmental intervention in the free market system is expected and appreciated in countries with high uncertainty avoidance index. Subsequently, hypothesis 2 is proposed.

H2: People living in countries with a higher uncertainty avoidance index will have a lower free market index than those living in countries with lower uncertainty avoidance index.

People in low uncertainty avoidance index countries like to take risks and will pick up and move to wherever there are opportunities for a better livelihood even risking the comfort and security of their social environment. This is in sharp contrast to people from high uncertainty avoidance index countries where they may be tied down by the certainty and comfort of their social norms, family and friends. Hypothesis 3 is proposed.

H3 People living in countries with a higher uncertainty avoidance index will have a lower mobility rate than those living in countries with lower uncertainty avoidance index, i.e., high UAI countries will stay where they were born and will not relocate as frequently as those living in countries with lower uncertainty avoidance index.

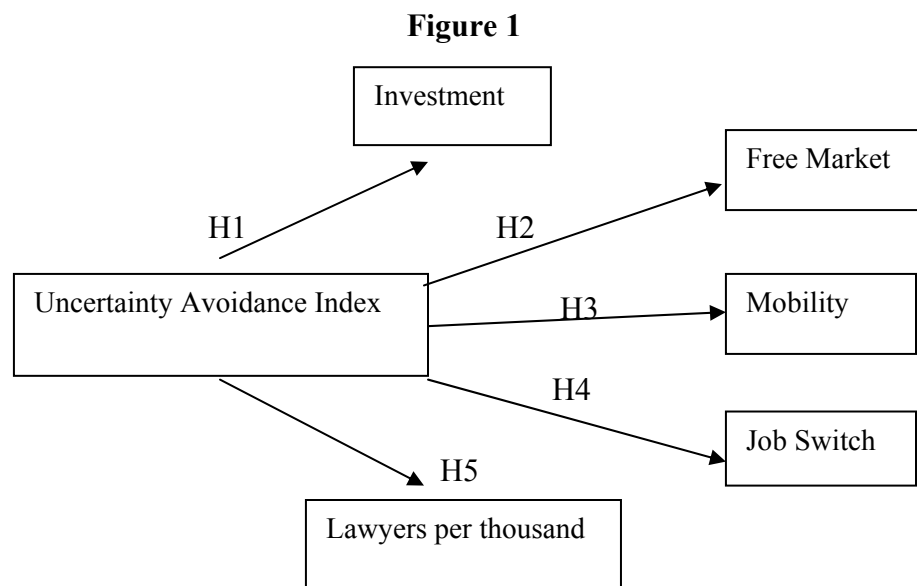
People in low uncertainty avoidance index countries like taking risks and will switch jobs, and even careers, in order to move up, even though this may be a risky proposition. They will pick up and move to wherever there are job opportunities, more so than people in high uncertainty avoidance index countries. People in high uncertainty avoidance index countries do not like taking risks and will thus stay in the same job and with the same firm for a very long time, or they may even retire with that firm. This could mean giving up opportunities to be upwardly mobile because they like the idea of job and career security over uncertainty. Hypothesis 4 follows this line of argument.

H4 People living in countries with a lower uncertainty avoidance index will have a higher job switch rate (and even a career switch rate) than those living in countries with a lower uncertainty avoidance index.

People living in countries with high UAI do not like to do business, or any other deals, without proper legal documents which will safeguard them against uncertainty. They want the certainty of a legal contract so that they can reduce the risk of the unknown in any dealing. On the other hand, people living in low UAI countries do business with a handshake and trust rather than legal documents. Giving their word and keeping their word is more important than legal documents. This is in sharp contrast to people in high uncertainty avoidance index countries where business can be done without knowing the other side, as long as the business deal has its merits, and as long as there is a binding legal contract that protects them. For this, people will very likely use lawyers and the legal system. This leads to the following hypothesis 5.

H5 People living in countries with a high uncertainty avoidance index will also have a higher number of lawyers per capita than those living in countries with low uncertainty avoidance index.

Figure 1 below shows the relationship between UAI with investment, free market, job mobility, job switching, and number of lawyers per thousand citizens.



DATA COLLECTION AND ANALYSIS METHODS

Data for this study is collected from different sources like the United Nations, the World Bank, CIA Fact Book, and data from OECD countries. First, a correlation matrix is used to see if the hypotheses are in the predicted direction. Next, cluster analysis is used to group 68 countries based on their uncertainty avoidance index. Finally, the five hypotheses are tested using analysis of variance.

RESULTS AND DISCUSSION

First, Pearson's Correlation Index is calculated to test the direction and significance of the proposed hypotheses. Table 1 below shows Pearson's correlation between uncertainty avoidance index and the five variables. The correlation between UAI and Investment is -0.296 and is statistically significant at the 0.05 level, signifying that the direction of the hypothesized relationship is supported, i.e., higher UAI countries tend to have lower investment. The correlation between UAI and the economic freedom index is -0.223 and significant at the 0.10 level signifying that the direction of the relationship supports the hypothesis that countries with higher UAI tend to have lower free market systems. The relationship between UAI and job-to-job mobility rate is -0.645 and significant at the 0.05 level indicating that people living in countries with a higher UAI will not switch jobs (since this may be perceived as risky), and move from one place to another (since this may mean uprooting one's self and the family). The mobility rate is used as a surrogate for the job-to-job mobility rate and thus, the relationship between UAI and job-to-job mobility rate will be the same as the mobility rate. The relationship between UAI and lawyers per thousand citizens is in the opposite direction, thus supporting the hypothesized direction of the relationship, i.e., countries with higher UAI will use more lawyers than countries with lower UAI. However, the relationship is not statistically significant.

	Uncertainty Index	Investment as a % of GDP	Economic Freedom Index	Lawyers per thousand	Job-to-job mobility rate	Public sector as a % of total employment
Uncertainty Index	1.00	-0.296**	-0.223*	0.118	-0.645**	-0.87
Investment as a % of GDP	-0.296**	1.00	-0.220	-0.134	0.63	0.005
Economic Freedom Index	-0.223*	-0.220	1.00	0.018	0.581**	-0.29
Lawyers per thousand	0.118	-0.134	0.018	1.00	-0.112	-0.494
Job-to-Job Mobility rate	-0.645**	0.063	0.581**	-0.112	1.0	0.506**
** Significant at the 0.05 level			* Significant at the 0.10 level			

Next, cluster analysis is performed using Hofstede's uncertainty avoidance index on the 70 countries that were used by Hofstede. Using Ward Linkage, five clusters are identified, as

shown in Figure 2. The list of countries in each cluster is shown in Table 2, along with the uncertainty avoidance score for each country within the cluster. Cluster one consists of countries that have the lowest uncertainty avoidance indexes and are labeled “very high risk takers”. Cluster 2 consists of countries with a somewhat higher uncertainty avoidance index than the first group, and is labeled, “somewhat high risk takers”. Cluster 3 consists of countries with moderate uncertainty avoidance indexes and are labeled, “neutral risk takers”. Cluster 4 consists of countries that are the second highest in the uncertainty avoidance index and are labeled, “somewhat risk averse”. Finally, cluster 5 consists of countries that score the highest on the uncertainty avoidance index and are labeled, “very high risk averse”.

Table 2: List of Countries in the 5 Clusters and their Uncertainty Avoidance Index				
Very High Risk Takers	Somewhat High Risk Takers	Neutral Risk Takers	Somewhat High Risk Averse	Very High Risk Averse
China: 30 Vietnam: 30 Sweden: 29 Denmark: 23 Ireland: 35 United Kingdom: 35 Malaysia: 36 India: 40 Jamaica: 13 Singapore: 13	Bangladesh: 60 Estonia: 60 Finland: 59 Iran: 59 Switzerland: 58 Trinidad: 55 West Africa***: 54 East Africa**: 52 Netherland: 53 Philippines: 44 United States: 46 Australia: 51 Slovakia: 51 Norway: 50 New Zealand: 49 South Africa: 49 Canada: 48 Indonesia: 48	Brazil: 76 Venezuela: 76 Czech Republic: 74 Italy: 75 Germany: 65 Thailand: 64 Luxembourg: 70 Pakistan: 70 Austria: 70 Arab World*: 68 Morocco: 68 Taiwan: 69 Ecuador: 67	Hungary: 82 Mexico: 82 Columbia: 80 Israel: 81 South Korea: 85 Turkey: 85 Bulgaria: 85 Panama: 86 Spain: 86 Argentina: 86 Costa Rica: 86 France: 86 Chile: 86 Peru: 87	Japan: 92 Surinam: 92 Romania: 90 Malta: 96 Russia: 95 Belgium: 94 El Salvador: 94 Poland: 93 Guatemala: 101 Uruguay: 100 Portugal: 104 Greece: 112
Arab World* consists of Egypt, Iraq, Kuwait, Lebanon, Libya, Saudi Arabia, & United Arab Emirates East Africa** consists of Ethiopia, Kenya, Tanzania, & Zambia West Africa*** consists of Ghana, Nigeria, & Sierra Leone				

Next, the mean uncertainty avoidance index scores are found for the five clusters and analysis of variance performed to test for statistical differences among the five clusters. Table 3 shows the mean scores for the five clusters, the F statistics and the significance. The table shows that there is a significant difference at the 0.05 level among the five clusters.

Table:3: Mean Uncertainty Avoidance Index for the Five Clusters and ANOVA						
Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	F.	Sig.
28.0	52.56	70.2	85.13	97.18	258.97	0.05

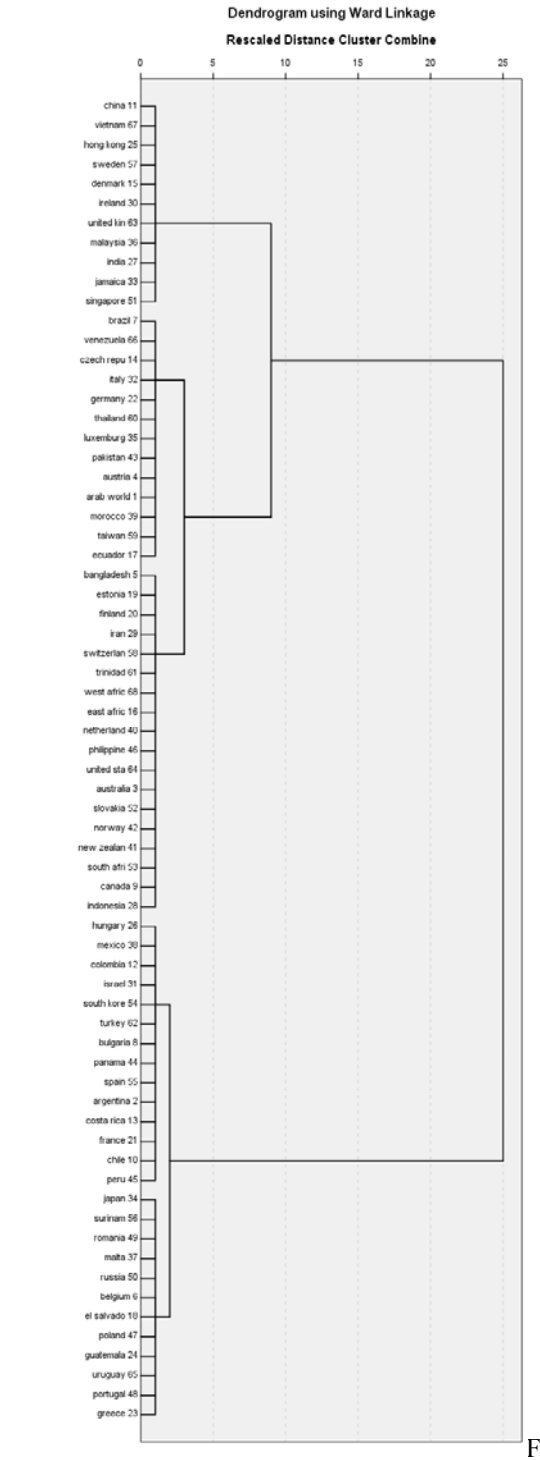


Figure2

The first hypothesis states that people living in countries with a high uncertainty avoidance index do not like to invest their money, since investment is fraught with uncertainty and perceived as risky. Thus, high UAI countries will have a lower investment rate than those living in countries with lower uncertainty avoidance index. Table 4 shows the mean investment as a percentage of GDP for the countries in the five different clusters. The table shows that there is a significant difference at the 0.05 level among the five clusters, thus supporting the first hypothesis.

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	F.	Sig.
29.4	22.54	22.05	23.51	22.49	3.73	0.05

Hypothesis two states that people living in countries with a lower uncertainty avoidance index will have a higher free market index than those living in countries with lower uncertainty avoidance index. Table 5 shows the mean scores for the five clusters on the economic freedom index and the F. statistics. However, the relationship is not significant at the 0.05 level. This may be because lately almost all countries have embraced the free market system, in some shape or form, and this may be the reason why there is no significant difference among the five clusters.

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	F.	Sig.
69.89	68.50	61.79	66.27	64.60	1.22	0.31

Hypothesis three states that people living in countries with a high uncertainty avoidance index will have a lower mobility rate, i.e., they will tend to stay where they were born and will not relocate as frequently than those living in countries with lower uncertainty avoidance index, even though there may be better opportunities elsewhere.

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster5	F.	Sig.
11.80	7.54	5.54	5.97	5.45	4.76	0.05

Due to lack of data, the overall mobility rate is taken as a surrogate for the job-to-job mobility rate, hypothesis 3 is combined with hypothesis 4 which states that people living in countries with a low uncertainty avoidance index will have a higher job switch, and even career switch, rate than those with living in countries with lower uncertainty avoidance index. Table 6 shows that there is a significant difference among the five clusters on the job-to-job mobility rate. The results support hypothesis 3 and hypothesis 4.

Hypothesis 5 states that people living in countries with high uncertainty avoidance index will also have a lower number of lawyers per capita than those living in countries with lower uncertainty avoidance index. Table 7 shows the number of lawyers per 1,000 people in the countries belonging to the five clusters. Based on the F statistics, this hypothesis is not supported. This is because there was very sparse data for the number of lawyers for the countries all over the world. The only data that is available is for OECD countries. This author believes that a more robust data could have supported this hypothesis. However, another reason could also be that since the world is becoming more open to business, especially the western ways of doing business, countries are adopting these methods and are using lawyers more frequently in order to avoid any misunderstandings.

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	F.	Sig.
10.12	11.14	14.93	13.83	12.01	0.16	0.95

MANAGERIAL IMPLICATIONS

A person planning to do business in another country where the culture is very different than his/her should be aware of such cultural differences – especially uncertainty avoidance which was the focus of this study. For instance, if one goes from a low UAI culture to a high UAI culture then one should understand the behavior of the people in those countries, especially risk taking behavior, i.e., people in countries with high UAI do not like to take risks in their personal, or professional life. One should also be willing to accept the habits of people in those cultures, i.e., people living in high UAI cultures do not spend a lot of their resources on non-necessities and live a relatively conservative lifestyle and may not as flamboyant as people in countries that are low on the uncertainty avoidance index. Similarly, people living in countries with high UAI when doing business with people in low UAI should be prepared to accept the risk taking behavior of people in countries that are low in the UAI, e.g., the ups and downs of a free market system and the lack of government support when the economy and times are bad.

CONCLUSION

The hypotheses that were proposed in this study were very logical and the author was very hopeful that all of the hypotheses would have been supported by the available data. This author believes that some of the reasons why all the hypotheses were not supported could be because of (1) lack of a robust data base, and (2) a changing cultural landscape in these countries which may have influenced the UAI scores for these countries.

The classification of the countries on the Uncertainty Avoidance Index was done in the early 1980s. However, all of the data that was used in this study to test the hypotheses are

relatively new. Attitudes may have changed in these countries, especially since the economies of a number of these countries have been growing at double digits and they may have also adopted some very western thinking and lifestyle. It is believed that attitudes and behaviors of cultures are relatively stable. However, they may have changed over the course of the last 20-30 years, and this author believes that it is likely that this is happening, which is what has also been reported by Aaker and Joachimsthaler (1999), Alden, et al. (1999), Elinder (1965), Hannerz (1980), Jain (1989), Levitt (1983), Walker (1996), and Zou and Cavusgil (2002). Opinions and lifestyle of people in different cultures may be changing, especially since people are travelling much more than in the past and interacting with other cultures and cultural borrowing may be taking place. In particular television programs and movies may be affecting cultures. It may be time to reevaluate these cultures on the Uncertainty Avoidance Index dimension.

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DO THE OLYMPICS CREATE SUSTAINED INCREASES IN INTERNATIONAL TOURISM?

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ABSTRACT

The purpose of this study is to examine international tourism as a legacy of the hosting the Olympics. Sustained tourism after the Olympics is hypothesized to be a result of the massive media coverage of the event and the host city. The media exposure is thought to create a positive image of the host city and generate international tourism. The largest media market for the Olympics is the US. In this study air passenger traffic from the US to eight Olympic host cities is analyzed pre and post event. Time series models are used to forecast the trend in US air passengers to each city. Tests for increases in passenger volume during and post Olympics are performed. The results show no sustained increase in international tourism from the US to the host city in the post Olympic period.

INTRODUCTION

The primary purpose of this study is to examine international tourism as a legacy of hosting the Olympics. The study focuses on the number of international air passenger arrivals to the host city from the US. Many of the benefits that may be reaped from hosting the Olympics are associated with increased tourism for the host city. The increased tourism generated by hosting the Olympics is argued to occur at the time of the Olympics and may have a lasting affect for years afterward.

The mechanism whereby tourism is increased to the host city comes from four main areas: increased tourism at the time of the Olympics, Olympic visitors returning for an additional visit, Olympics tourists encouraging friends back home to visit, and visitors that are generated by the media coverage of the Olympics and the Olympic location. The most important of these may be the media coverage (Preuss 2004). The US is exposed to more media coverage of the Olympics than any other country (Short 2004). The US comprised 20.9 percent of the viewers watching the opening ceremonies of the 2006 Olympics (ETOA 2006). The US is also the largest source of international visitors for many of the host cities at any time.

The cost of hosting the Olympics has escalated since the 1984 Games in Los Angeles (Malfas, Theodoraki et al. 2004), yet cities wanting to host the mega event form long lines many years in advance to put their names in the pool of those to be considered as a host. This may be a result of the fact that Los Angeles was the first host city in modern times to generate a profit from hosting the Olympics (Holloway 2006; Yongjian 2008). The host cities also seek the

prestige associated with hosting the games as well as benefits similar to those claimed by Los Angeles.

This paper is organized by first providing a review of the literature pertaining to Olympic tourism. This is followed by a description of the data and a discussion of the methodology. Fourth is a presentation of the results for host cities for Olympics occurring between 1992 and 2010. Finally, concluding remarks and implications of the study are discussed.

LITERATURE REVIEW

In an economy where time equals money, one can assume that bidding for the Olympic Games is very expensive simply because of the time involved for nominations, applications, self-evaluations, creating the bid document, submitting the bid, and the evaluation process. Any city can be a bid city (Short 2004), which begins with city nominations and applications. The \$150,000 USD fee that accompanies the application is only a small drop in the bucket of what is actually spent on bidding for the cities that make it to candidacy. More cities apply for candidacy than are selected. Emerging from the bidding process victoriously and eventually hosting the Olympics runs in the billions of dollars. Although the bidding cost is a sunk cost, the International Olympic Committee (IOC) contends that the expenses involved in the process generate positive legacies even for the cities that are not awarded the event (IOC 2007; IOC 2011).

One estimate of the cost of London's winning bid for the 2012 Olympics is \$25.5 million USD with estimated cost of hosting the Games at \$4 billion USD (Anonymous). While the budget for the Games is anticipated to be revenue and expenditure neutral, that budget can be misleading. In London's case, another \$13.7 billion USD is budgeted for the infrastructure, venues, and transportation (IOC 2005), which increases anticipated costs to \$17.7 billion USD.

If the bid process is so expensive and implementation of the plan is so costly, what is the reward the host city and the region receive for hosting the event? One reason for bidding cities to want to host the event may be that Olympic supporters claim positive tourism legacies (ETOA 2006; Preuss 2006). This is done because a positive legacy is inspirational and leads some cities to make a bid for the event (Preuss 2006). The positivity of the Olympic tourism legacy is believed to be a result of perceptual changes from the media coverage. Media coverage from the current Olympics may even motivate audiences to attend the Olympic Games in the next host city two years later (Preuss 2004).

Some prior research has assumed the relationship between the Olympics and tourism is obvious and positive (Getz 1998; Kasimati 2003; de Groot 2005). The Australian Tourism Commission (ATC) reported 26% of those surveyed regarding the Sydney Games reported increase tourism as a reason to host the Olympics. In 1998 an ATC study reported an expected increase in tourism of 1.6 million visitors due to the Olympics (Preuss 2004). The ATC also reported in a 1998 study of Germans that 45 percent would consider vacationing to Australia by 2002, knowing that the Olympics would be in Sydney in 2000 (de Groot 2005).

de Groot (2005) claims two major obvious benefits of hosting the Olympics are an enormous, worldwide television audience and tourism (Malfas, Theodoraki et al. 2004; de Groot 2005). The media coverage of the Olympics typically includes extensive portrayals of

many areas of the host city's region. This coverage is thought to be one of the key elements convincing potential tourists in the audience to visit the host city.

Sometimes the long-term tourism benefit is greater when the short-term financial profit is reinvested for future tourism (Preuss 2006). In some cities, such as Barcelona, the Olympics are simply a mechanism used to help the city increase its tourism. In that case, the strategy may work. Ten years after the Olympics, Barcelona is a very popular tourist destination. The city claims "the most spectacular tourist growth in Europe over a 10-12 year period from 1990/1992 through 2002." However, not all stories are that positive. In fact, the results can vary dramatically from one host city to another.

Other research has found no strong link between tourism and the Olympics, instead Olympic tourism is exaggerated and Olympic visitors may be displacing normal tourists (ETOA 2006). Many researchers ignore the potential displacement of non-Olympic tourists by the Olympic tourists. The displacement effect is a result of local tourists that leave the area during the Olympics, tourists that cancel a visit due to the Olympics, and tourists that delay a visit due to the Olympics. These tourists change their normal travel plans because of the increased cost of visiting and increased congestion at the time of the Olympics (ETOA 2006).

Four basic sources generate Olympic tourists. Television exposure, the first source, increases tourism from people who watch the games on television. The media event depicts the city positively and this is hypothesized to have a positive impact on travel decisions. Foreign tourists who visit during the games comprise the second source. The third source of tourists is generated from foreign visitors returning home and telling friends about the wonderful host city. The fourth is repeat visitors (Preuss 2004). Television exposure is easily the most dominant source. During the 21st Olympic Games, 24 percent of the television coverage was devoted to the sporting events. Another 61 percent covered reruns of the day's events, interviews, and network advertising (Short 2004). The remaining 15 percent was used for segments such as special interest stories.

The European Tour Operators Association (ETOA) argues that large-scale media coverage of other sporting events, such as soccer, are not associated with increasing tourism to event sites. Tourists who visit a city for a sporting event are more interested in the actual sport than the location itself. Many of these people would not travel to the city for any reason other than the event so it's counter intuitive to believe that the Olympics will increase tourism after the games (ETOA 2006). The ETOA reports that theme parks in Los Angeles showed a decline in revenues during the Olympics, resorts in Spain had a drop in demand during the Olympics, and normal attractions in Sydney saw a decline during the Olympics. The ETOA report shows the 1996 Atlanta Olympics average hotel occupancy dropped from 72.9% in 1995, the year before the Olympics, to 68% in 1996. It argues that if a positive effect on tourism is seen, the biggest impact should be observed immediately during and after the Olympics (ETOA 2006). The increased tourism should peak during the year of the Olympics (PriceWaterHouseCoopers 2004). Other research suggests that the Olympics are too short to render a long-term positive effect (Chalip 2002).

Many times, the host city's Olympic Organizing Committee pay for or sponsor the published studies about tourism's benefits. This may introduce a bias into the results. Research such as this may be motivated to conclude a favorable result (Kasimati 2003). Also as noted by

the ETOA reports of Olympic tourism are often exaggerated due to failing to account for displaced tourists that did not visit the site due to the Olympics (Getz 1998; Kasimati 2003; Malfas, Theodoraki et al. 2004; Smith 2009). Overbuilding for the Olympics and sport facilities constructed for the Olympics are not always useful after the Olympics, which can have a negative impact on the location as a tourist destination (Malfas, Theodoraki et al. 2004).

The number of tourists that will visit a specific Olympics may be influenced by the attractiveness of the region as well as economic and political factors (Krajasits, 1995). However, the exact number of people visiting an area because of the Olympics is very difficult to predict (Roef et al 1996). The true number of tourists who visit a host city during the Olympics is thought to be between 400,000 and 800,000 (Preuss 2004). This broad span reinforces the fact that the number of additional tourists generated is difficult to predict.

The results from the many studies conducted over the past decades are contradictory. Some say the Olympics have a long-term positive impact while others say that the length of the Olympics is too short to generate long-term effect on tourism. This study attempts to clarify some of the ambiguity about tourism, which is discussed in the following sections.

DATA

Monthly inbound passenger air traffic from the US to each Olympic site was collected from the Research and Innovative Technology Administration (RITA) coordinating the U.S. Department of Transportation Research Programs. One host city, Nagano, Japan does not have a clear choice of international airport as a destination from the US. As a result, Nagano was therefore omitted from the analysis. The two US host cities from the time period of the games in the study, Atlanta and Salt Lake, were also excluded. This elimination was because the time periods used for each series are determined by the availability of the data at the time of this research. All but one series has an overall length of approximately 19 years, which is more than adequate for the models used in this research. China has only 14 years of data, which is still more than adequate for this research. Seat capacity of flights from the US is not a constraining factor as shown in Table 1. Empty seats indicate excess capacity to Olympic venues. The time periods available, airport, maximum seat monthly occupancy and seat occupancy the month of the Olympics are also shown in Table 1.

Olympic Host City	Airport	Time	Max %	Olympics%
Albertville	Paris	1/90-7/10	94%	52%
Athens	Athens	1/90-7/10	97%	71%
Barcelona	Barcelona	1/90-7/10	96%	47%
Beijing	Beijing	5/96-7/10	94%	67%
Lillehammer	Oslo	1/90-7/10	98%	71%
Sydney	Sydney	1/90-7/10	94%	77%
Turin	Milan	1/90-7/10	90%	65%
Vancouver	Vancouver	1/90-7/10	84%	75%

METHODOLOGY

A large body of work supports the concept that tourist destinations have a cyclical, trend and seasonal patterns over time (Haywood 1986; Weaver 1990; Butler 1994; Cooper 1994; Tooman 1997; Moss 2003; Moss 2008a; Moss 2008b; Lui 2011). The model selected for forecasting tourism, therefore, should incorporate these components. In addition, external events such as 9/11 and SARS have been shown to impact tourism (Chalip 2002; Moss 2003; Preuss 2006; Moss 2008a; Moss 2008b; Lui 2011). ARIMA models, such as the ones used here, have the ability to model both trend and intervention factors controlling for non-Olympic events such as SARS, the Gulf Wars or 9/11 and will be used in this research.

As noted by Butler (1994), seasonality is extremely important and often overlooked in tourism research. Removing seasonality can provide a more accurate estimation of the trend portion of a forecasting model (Bowerman 1993). By using the decomposition method, an estimate of seasonal variation can be obtained in the form of seasonal indices and then used to remove the seasonal variation from the time series; thus, isolating variation attributable to long term trends and interventions (Bowerman 1993; Markidakis 1998; Moss 2003; Moss 2008a; Moss 2008b; Lui 2011). In the decomposition approach, the seasonal indices represent the average percentage of annual passengers for each month of the year. The seasonal index for month j ($j=1, \dots, 12$) is calculated as in Equation 1.

$$Index_j = 1/n_j \sum_i S_{ij}, \quad (1)$$

In Equation 1, j is the month of the year, n_j is the number of the j -th month in the series, S_{ij} is the i -th "raw" seasonal index for month j , $S_t = Y_t / CMA_t$, CMA_t is the centered moving average at time t .

After 9/11 seasonal air travel patterns shifted in some regions of the world (Smith 2005; Moss 2012). Events such as 9/11 or SARS can also cause large deviations in the series that are not attributable to normal seasonal variation (Lui 2011). To refine the ratio to centered moving average calculations, two steps have been added to the normal calculation of seasonal indices. First, seasonal indices are calculated for the time periods before and after 9/11 independently. Second, any raw seasonal index more than two standard deviations from the average seasonal index for a given month are removed prior to calculating the final seasonal index. The seasonally adjusted series are first differenced to achieve stationary series prior to estimation of each ARIMA model.

In the case of Beijing, China log transformations are used to stabilize variance. Intervention factors are used to model the effects of events such as the Olympics, 9/11, the first and second Gulf Wars, and SARS.

After each ARIMA model is estimated for the entire series length the resulting model is then used to estimate the deviations from trend following the Olympics. In order to accomplish this, the actual data are used for the lagged variables in the ARIMA model up to the point in the series when the Olympics occur. At this point the forecasts are not adjusted with the intervention factor used to account for the Olympics in the forecasting model. In addition, at this point in time

all lags requiring post Olympic event data substitute forecast values for actual data values. This methodology has the effect of extending the forecast trend beyond the Olympics as if the Olympics had not occurred. The actual series values and forecast series values are then compared to model the magnitude, duration, and shape of the intervention effect of the Olympics on the series.

RESULTS

Table 2 shows the seasonal indices used to seasonally adjust each series. Each Olympic site exhibits strong seasonality and changes in seasonality post 9/11.

	Albertville		Athens		Barcelona		Beijing		Lillehammer		Sydney		Turin		Vancouver	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Jan	0.74	0.79	0.56	0.52	0.28	0.50	0.83	0.82	0.81	0.71	1.20	1.23	0.85	0.80	0.93	0.91
Feb	0.68	0.67	0.42	0.41	0.32	0.40	0.57	0.71	0.68	0.62	0.93	1.00	0.68	0.73	0.90	0.87
Mar	0.99	0.96	0.64	0.69	0.37	0.65	0.95	0.97	0.96	0.99	0.89	0.92	1.04	1.05	1.07	1.05
Apr	1.00	0.97	0.83	0.77	0.67	0.81	0.84	0.96	0.98	1.02	0.85	0.84	0.95	0.96	0.90	0.88
May	1.20	1.16	1.14	1.20	0.78	1.50	1.02	0.99	1.16	1.13	0.80	0.85	1.13	1.14	1.04	1.04
Jun	1.23	1.23	1.58	1.71	1.77	1.63	1.29	1.18	1.28	1.35	0.96	1.03	1.22	1.19	1.14	1.16
Jul	1.19	1.16	1.88	1.89	2.18	1.48	0.99	1.06	1.45	1.57	1.15	1.17	1.11	1.05	1.27	1.35
Aug	1.37	1.19	1.53	1.56	2.48	1.53	1.14	1.09	1.26	1.39	0.93	0.92	1.32	1.08	1.32	1.34
Sep	1.19	1.12	1.32	1.36	1.91	1.49	0.93	1.01	0.91	0.98	1.00	0.94	1.30	1.17	0.98	0.95
Oct	0.98	1.00	0.98	0.76	1.19	1.16	1.01	1.22	0.97	1.12	1.24	1.13	0.99	0.99	0.82	0.79
Nov	0.80	0.87	0.50	0.47	0.40	0.64	1.00	0.88	0.93	0.81	0.95	0.95	0.80	0.86	0.77	0.72
Dec	0.77	0.93	0.57	0.56	0.42	0.55	1.25	1.04	0.81	0.80	1.01	1.05	0.72	0.91	0.90	0.91

ALBERTVILLE, FRANCE, WINTER 1992

The 1992 Albertville Winter Olympics is the first event examined in this study. Not all Olympic host cities have an international airport with service from the US. In these cases the closest city with a major international airport is used. For Albertville the nearest city is Paris. The ARIMA model for the seasonally adjusted (S.A.) series is shown in Equation 2.

$$Z_t = 641.98 - 0.219Z_{t-1} - .208Z_{t-6} - .119Z_{t-9} + 20,373 \text{ Olym.} - 49,023 * 9/11 - 47,606 * \text{GW1} + 35,507 * 6/03 \quad (2)$$

Where,

$$R^2 = 0.940$$

$$\text{MAPE} = 4.30\%$$

$$\text{Ljung-Box Q-Statistics PV} = 0.449$$

GW1 = Gulf War 1

Olym. = Olympic date

6/03 = FIFA cup finals, Tour De France, 24 Hours of Lemans & G8 summit

The Ljung-Box Q, ACF and PACF indicate that the residual series are white noise. The null hypothesis for the Ljung-Box test is that the residual series is white noise. All variables remaining in the equation meet a 10% significance level. Accuracy is measured by the R^2 and mean absolute percentage error (MAPE). It has been proposed that a MAPE of less than 10% is highly accurate, 11-20% is good, 21 to 50% is reasonable and more than 51% is inaccurate (Chen, Bloomfield and Fu, 2003). The R^2 is calculated for the seasonally adjusted first differenced series. The same analysis was done on each subsequent analysis.

The ARIMA model shown in Equation 2 indicates the Albertville Olympics coincided with a significant spike in US air travel to Paris. Equation 2 shows the increase was in excess of 20K on a seasonally adjusted basis. The graph of forecast versus actual values for US air travel to Paris is shown in Figure 1.

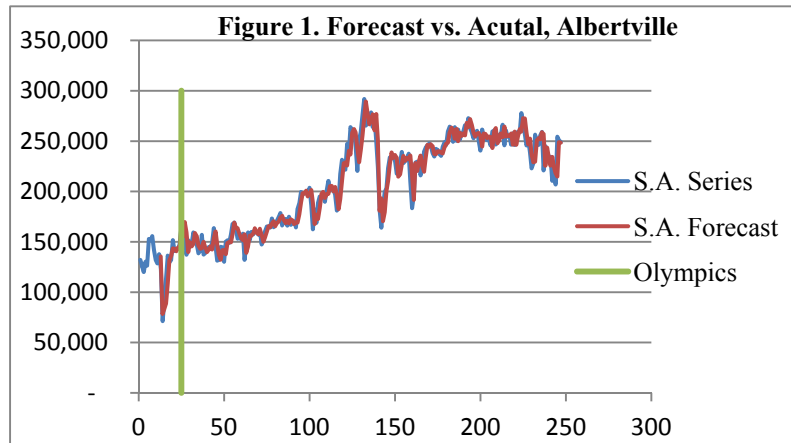


Figure 2 shows the actual passenger volume from the US into Paris compared to the forecast generated without the intervention for the Olympics and using forecast values for lags post Olympics. This is the trend line post Olympics compared to what actually happened. The graph is magnified to show only the time periods around the Olympics.

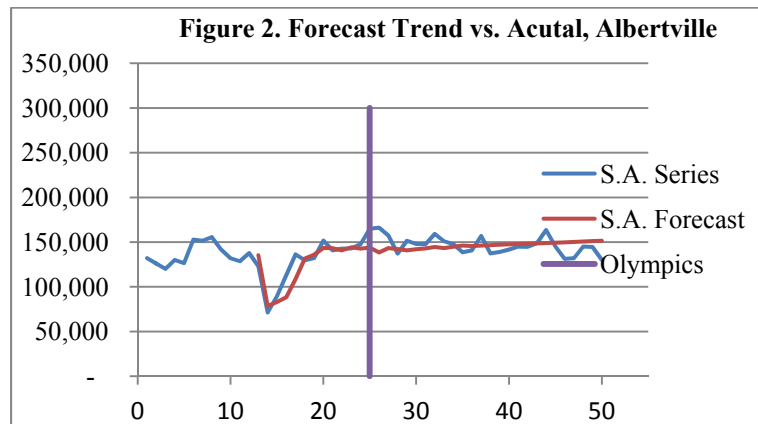
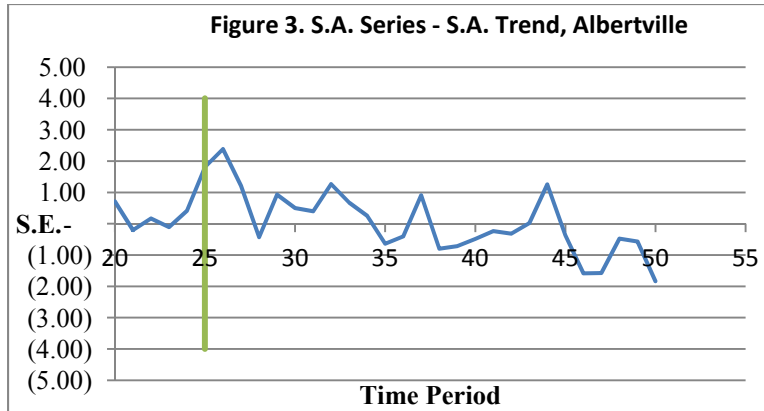


Figure 3 shows the difference between the forecast trend and the actual series in Figure 2 on a seasonally adjusted basis. The graph is magnified for the 5 months prior and 24 months post Olympics. The vertical line indicates the time period for the Olympics. A positive deviation from trend of more than 2 standard errors coincides with the Olympics. This confirms the results

found in Equation 2. Although a significant increase in air travel to Paris at the time of the Olympics there is no evidence that the increase is sustained. The series quickly returns to the pre-Olympic trend after the Olympics.



ATHENS, GREECE, SUMMER 2004

The Athens Summer Olympics in August of 2004 claimed to increase total international tourism to Athens by 4.8 million visits (Kasimati 2003). The US audience for the opening ceremony was 26.6 million (ETOA 2006). US television paid over 50% of the total television fees to cover the Athens games with NBC paying \$793 million (ETOA 2006). Athens has an international airport with service from the US and was used in this analysis. The ARIMA model for the seasonally adjusted series is shown in Equation 3.

$$Z_t = 38.22 - 0.232Z_{t-1} - .208Z_{t-2} - .102Z_{t-3} - 0.149Z_{t-5} - .208Z_{t-6} - .2Z_{t-7} - .139Z_{t-9} + - 5055 * 9/11 \quad (3)$$

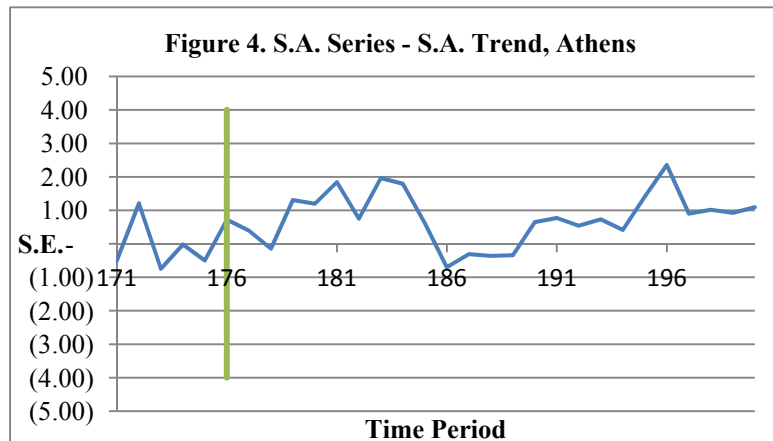
Where,

$$R^2 = 0.746$$

$$MAPE = 11.82\%$$

$$Ljung-Box \text{ Q-Statistics PV} = 0.293$$

Equation 3 and the graph of the deviations from trend, shown in Figure 4, show no significant change in US air passenger volume to Athens around the time of the Olympics and no evidence of a long-term shift in US air passenger volume to Athens. The intervention variable for the Olympics was not statistically significant. As a result, it was and removed from the model. The same approach is taken in all the models when the intervention variable is not statistically significant. An increase in passenger volume 5 to 7 months post Olympics is seen; however, the increase is not statistically significant or sustained.



BARCELONA, SPAIN, SUMMER 1992

The Barcelona Summer Olympics took place in July 1992. It had approximately 2,700 hours of television coverage (de Groote 2005). The city reported an increase in total tourism of .4 million (Kasimati 2003). The Olympics have been credited with making Barcelona one of the world's main tourist destinations (Duran 2002). Prior research concludes that Barcelona experienced the largest tourist growth in Europe due to the Olympics (Duran 2002) while other reports indicate Barcelona had below average tourist growth at that time (ETOA 2006). During 1992, Barcelona had 25,055 hotel beds with an average occupancy rate of 64% (ETOA 2006). At the same time 1.874 million tourists visits to Barcelona were reported. However, Price Waterhouse Coopers reported that the Olympics only generated an additional .4 million tourists (PriceWaterHouseCoopers 2004).

The US was the largest source of tourists in 1993, accounting for 8.7% of total overnight stays (Duran 2002). Barcelona has an international airport with service from the US and was used in this analysis. In 1992 the Barcelona airport reported 3.9 million international tourists (Duran 2002). The ARIMA model for the seasonally adjusted series used in this analysis is shown in equation 4.

$$Z_t = 163.91 - 0.255Z_{t-1} - .132Z_{t-5} - .186Z_{t-6} - .191Z_{t-10} + .286Z_{t-12} + 6,668*5/00 - 12,708 * 6/00 - 6,781*12/00 - 5,907 * 5/09 \quad (4)$$

Where,

$R^2 = 0.924$

MAPE = 42.42%

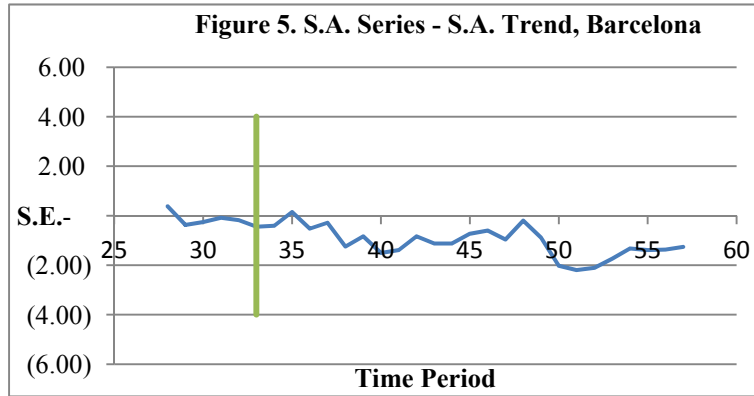
Ljung-Box Q-Statistics PV = 0.309

5/00 – Spanish Grand Prix

6/00 & 12/00 – Airline & air traffic controller strikes in Spain

Equation 4 and the graph of the deviations from trend depicted in Figure 5 show no significant change in US air passenger volume to Barcelona around the time of the Olympics and no evidence of a long-term shift in air passenger volume. This series was also tested for

interventions from the first and second Gulf Wars, 9/11 and the Madrid train bombings, none were found to be statistically significant.



BEIJING, CHINA, SUMMER 2008

Beijing’s Summer Olympics were in August of 2008. Beijing has an international airport with service from the US and was used in this analysis. Regular air travel from the US to Beijing did not begin until May of 1996; therefore, this model has a shorter series length. The series also exhibits non-constant variance. A log transformation was used to stabilize the variance in the seasonally adjusted series. The ARIMA model for the logs of the seasonally adjusted series is shown in Equation 5.

$$Z_t = .011 - 0.344Z_{t-1} - .159Z_{t-4} - 1.787*5/03 + 1.026*6/03 + .952 * 7/03 + .336 * 8/03 \quad (5)$$

Where,

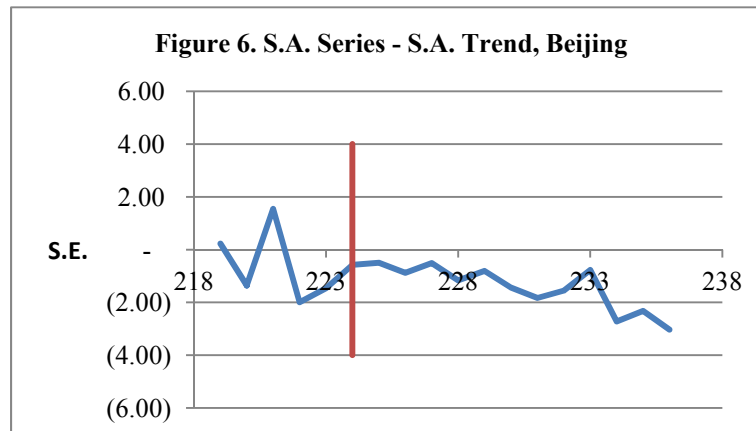
$$R^2 = 0.939$$

$$MAPE = 1.54\%$$

$$\text{Ljung-Box Q-Statistics PV} = 0.710$$

03 – Changes due to SARS

Equation 5 and the graph of the deviations from trend, shown in Figure 6, show no significant change in US air passenger volume to Beijing around the time of the Olympics and no evidence of a long-term shift in air passenger volume. The interventions in 2003 relate to the outbreak of SARS, which was found to be significant in prior research (Liu 2011). An initial negative impact was followed by a recovery after the SARS epidemic subsided.



LILLEHAMMER, NORWAY, WINTER 1994

The Lillehammer Winter Olympics held in February of 1994 were just two years after the Albertville winter Olympics instead of the customary four-year time span. This was done to stagger the summer and winter Olympics. In 1994 US tourists accounted for approximately .4 million guest nights or 8% of total international guest nights for the area. Lillehammer does not have an international airport with service from the US. The closest international airport with service is Oslo, which is used for this model. The ARIMA model for the seasonally adjusted series is shown in Equation 6.

$$Z_t = .42 - 0.113Z_{t-1} + 7,635 * Olym - 9,114 * 3/94 - 2,661 * 10/11 + 2,447*4/03 - 2,535*4/04 + 5,684* 5/99 \quad (6)$$

Where,

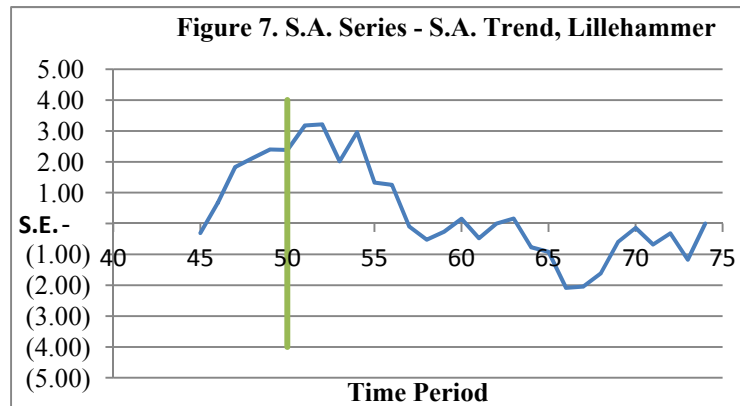
$$R^2 = 0.903$$

$$MAPE = 9.39\%$$

$$\text{Ljung-Box Q-Statistics PV} = 0.700$$

10/11 – General strikes effecting airport and airline fuel delivery

Equation 6 and Figure 7 both show a large positive, statistically significant deviation from trend at the time of the Olympics. The shift was approximately 7,000 additional passengers per month from the US. The positive shift remains for several months and then returns to the pre-Olympic trend.



SYDNEY, AUSTRALIA, SUMMER 2000

Sydney's Summer Olympics in 2000 had a global audience of 25 billion and approximately 3,000 hours of television coverage. The events were primarily held within the Sydney metropolitan area (de Groot 2005). Eight percent of the opening ceremony audience watched from the US. The United States further accounted for 9% of the global prime time audience (ETOA 2006). Groot 2005 reports that the Olympics generated 1.7 million additional tourists from 1997 to 2004.

Sydney has an international airport with service from the US and was used in this analysis. The ARIMA model for the seasonally adjusted series is shown in Equation 7.

$$Z_t = 119.24 - 0.527Z_{t-1} - 0.310Z_{t-2} - 0.152Z_{t-8} + 8,159 * Olym - 14,958 * 9/11 + 7,739 * 12/01 \quad (7)$$

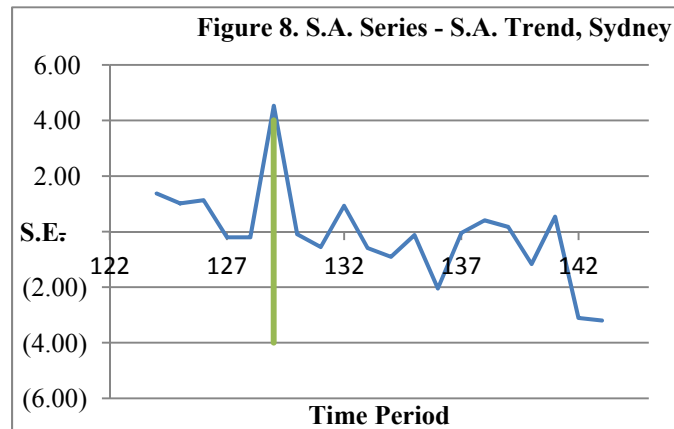
Where,

$$R^2 = 0.827$$

$$MAPE = 5.56\%$$

$$Ljung\text{-}Box\ Q\text{-}Statistics\ PV = 0.970$$

Equation 7 and Figure 8 both show a large positive deviation from trend at the time of the Olympics that is statistically significant. The shift at the time of the Olympics is approximately 8,100 passengers per month from the US. However, the series almost immediately returns to the original trend once the Olympics were over. This finding contradicts the popularly reported 30% increase in international tourism (Smith 2009), at least for tourists from the U.S.



TURIN, ITALY, WINTER 2006

Eight percent of the population watched the Turin Winter Olympics opening ceremony in February of 2006 (ETOA 2006). Milan, Italy is the closest international airport and is used for inbound US passengers in this model. The ARIMA model for the seasonally adjusted series is shown in Equation 8.

$$Z_t = 171.14 - 0.169Z_{t-1} - 0.161Z_{t-3} - 0.189Z_{t-6} - 10,094 * 9/11 - 7,596 * GW1 - 21,553 * 4/08 \quad (8)$$

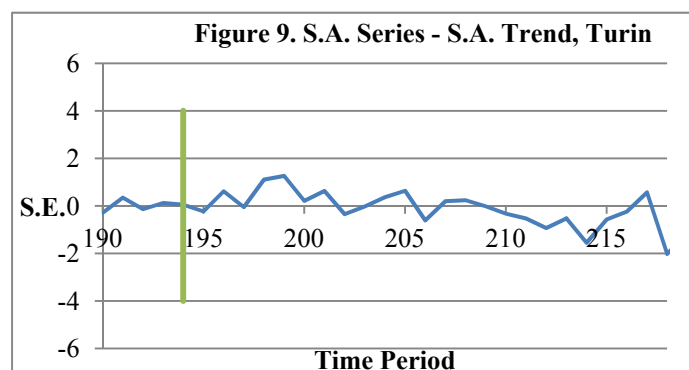
Where,

$$R^2 = 0.931$$

$$MAPE = 6.94\%$$

$$\text{Ljung-Box Q-Statistics PV} = 0.860$$

Neither Equation 8 nor Figure 9 shows a statistically significant, positive deviation from trend at the time of the Olympics.



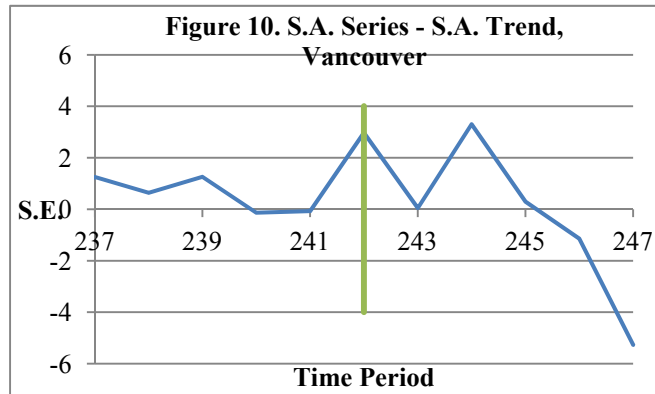
VANCOUVER, CANADA, WINTER 2010

Five percent of the US population watched the Vancouver Winter Olympics opening ceremony in February 2010. The airport used for the analysis is Vancouver, Canada. The ARIMA model for the seasonally adjusted series is shown in Equation 9.

$$Z_t = 468.19 - 0.231Z_{t-1} - 0.169Z_{t-8} - 57,829 * 9/11 - 14,588 * SARS + 38,146 * 2/08 - 37,984 * 3/08 + 17,141 * Olym \tag{9}$$

Where,
 $R^2 = 0.955$
 MAPE 3.76%
 Ljung-Box Q-Statistics PV = 0.574

Equation 9 and Figure 10 both confirm a positive jump in air passengers from the US at the time of the Olympics. The model shows an increase of approximately 17,000 passengers per month from the US at the time of the Olympics. At the time of this research, only five months of post Olympics data were available for Vancouver. This makes observing long-term effects of the Olympics in Vancouver difficult. The limited data does indicate a return to the pre Olympics trend line.



CONCLUSION

The US is the largest media market for the Olympics. Prior research has proposed that a significant linkage between media coverage of the Olympics and increased tourism exists. In this study eight Olympic host cities were analyzed to see if any evidence of increased international tourism from the US to the host cities could be observed. Seasonally adjusted ARIMA models were used to generate a forecast of US air passengers to each host city. After removing variables accounting for any potential shift in US air passenger traffic at the time of the Olympics or thereafter, the forecast values were compared to actual passenger volume. Additionally

intervention variables at the time of the Olympics were tested for statistical significance. The study's results are summarized in Table 3.

Host City	Winter/Summer	Positive Shift	Sustained
Albertville	Winter	Yes	No
Athens	Summer	No	No
Barcelona	Summer	No	No
Beijing	Summer	No	No
Lillehammer	Winter	Yes	No
Sydney	Summer	Yes	No
Turin	Winter	No	No
Vancouver	Winter	Yes	No

In three out of the four summer Olympics there is no increase in US air passengers indicated. In three out of four of the winter Olympics there is an increase. In both cases the increases that are observed are short term and not sustained. These results contradict prior research that claims a short term or long-term increase in international tourism resulting from hosting the Olympics and confirms findings by studies such as the one done by the ETOA.

This study improves on prior research that used same month last year, monthly percentage changes or tried to compare the host city to comparable destinations. Many of these studies lack an ex-post impact measure. This study incorporates both pre and post time periods around each Olympic event studied. The study is however limited to international US air passengers only. Future research should address total changes in tourism for the host city as well as changes in domestic tourism.

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